

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

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| 1. LICENSEE BERYLLIUM CORPORATION Hazleton, Pennsylvania | 2. REGIONAL OFFICE U. S. Atomic Energy Commission Region I, Division of Compliance 376 Hudson Street New York, New York 10014 |
| 3. LICENSE NUMBER(S) 37-7676-1 | 4. DATE OF INSPECTION April 20, 1966 (Initial) |
| 5. INSPECTION FINDINGS <input type="checkbox"/> A. No item of noncompliance was found. <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 34.42 <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 34.42 <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) <input checked="" type="checkbox"/> E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e) <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) <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) <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) <input type="checkbox"/> I. Form AEC-3 was not properly posted. 10 CFR 20.206(c) <input type="checkbox"/> J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 34.33(b) <input type="checkbox"/> K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 34.43(d) <input type="checkbox"/> L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.51, 40.61 or 70.51 <input checked="" type="checkbox"/> M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 34.25(c) <input type="checkbox"/> N. Records of inventories were not maintained. 10 CFR 34.26 <input type="checkbox"/> O. Utilization logs were not maintained. 10 CFR 34.27 <div style="text-align: right;">Alfred W. Grella (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;"><div>_____ (Date)</div><div>_____ (Licensee Representative — Title or Position)</div></div> | |

DRAFT
GRELLA:cj
5/17/66

Reviewed by: [Signature]

Date: 5/17/66

BACK-UP FOR AEC-591

PART 30 INSPECTION

BERYLLIUM CORPORATION
Hazleton, Pennsylvania

Inspector: Alfred W. Grella

License No.: 37-7676-1

Date of Inspection: April 20, 1966 (Announced Initial)

Persons Accompanying Inspector:

None - State of Pennsylvania Health Department Notified

Persons Contacted:

Mr. Paul C. Kempchinski, Principal Analytical Chemist and RSO
Mr. Wilfred G. Atwood, Electrical Engineer
Mr. Arthur E. Epstein, Plant Manager

DETAILS

Organization and Administration

1. The Beryllium Corporation is a publicly owned corporation engaged in the manufacture of beryllium metal and compounds. Approximately 350 persons are employed at the Hazleton plant where the unalloyed metal is produced and 600 persons at its other primary plant in Reading, Pennsylvania where beryllium copper alloys are manufactured.

2. The uses of the Sb-124 ^{radiation} ~~fuel~~ source contained in a beryllium analyzer are within the Analytical Chemistry Section of the Quality Control Department.
3. Uses of the Cs-137 sealed source contained in a liquid level gauge are within the processing area of the plant under the supervision of the Engineering Department.
4. Mr. Kempchinski serves as RSO and license administrator, having operational jurisdiction over use of the Sb-124 source. Mr. Atwood has primary operational responsibility for the use of the Cs-137 source. Kempchinski reports to the Chief Chemist, who in return reports to the manager of the Quality Control Department, who in turn reports to the Plant Manager. Mr. Atwood reports to the head of the Department of Engineering, who in turn reports to the Plant Manager. No formal Radiation Safety Committee has been formed, however Kempchinski and Atwood jointly coordinate the uses and handling of licensed material.

Facilities and Uses

5. The licensee possesses a single 25 mc Cs-137 sealed source as an Industrial Nucleonics Model BS-S-10053 source, which is contained in an Industrial Nucleonics Model LS-101A liquid level gauge. Records of receipt indicated that this source had been received from Industrial Nucleonics on 10/16/59. The liquid level gauge is on line continuously for the measurement of the liquid level in an 18 gallon closed tank, which is part of a beryllium compound leaching line in the refinery area of the plant. The uses of this liquid level gauge are under the supervision of the Engineering Department, with Mr. Atwood

6. The license also authorizes the possession and use of two sources of Sb-124 at 250 mc each for use in a Boulder Scientific Model 200 beryllium analyzer which is used for the analysis of beryllium and beryllium compounds which are intermediates in the plant process. At the time of inspection, it was noted that the licensee possessed one U. S. Nuclear type 3130 sealed source which was contained in the Boulder Scientific beryllium analyzer.
7. Kempchinski stated that the beryllium analyzer unit is used eight hours per day, one shift, five days per week, and approximately 40 samples per day are analyzed for beryllium content.
8. In use of the analyzer the liquid or solid beryllium compounds to be analyzed are put into three inch diameter by 1/2 inch trays which are then inserted directly into a slide chamber which positions each ~~range~~ ^{tray} beneath the Sb-124 source. The neutrons produced by the (n, gamma) reaction of the Sb-124 with beryllium are then a direct measure of the beryllium content of the sample. An associated Baird-Atomic Model 135 scaler-timer is used in conjunction with a BF-3 neutron detector and pre-amplifier for neutron detection and measurement. The BF-3 detector is positioned directly above the source chamber.
9. The source housing for the unit is a combination storage-use and shipping container. During shipment a blank slide is kept in place below the counting chamber with a 6" diameter lead plug inserted in the top of the chamber in place of the detector. During usage the slide is replaced by an operating slide which contains the inserted sample trays. During periods when the unit

detector is also removed and replaced by the 6" diameter lead plug. The analyzer unit is shielded on its sides by 2" lead bricks and sits on a table with a 1" lead base.

10. The beryllium analyzer is located in a separate 8' by 8' "Beryrometer" room which is located within the Analytical Laboratory area. This room is constructed of 8" cinder block and has one 6' by 3' middle door with a lock. The only items in the room are two tables, one containing the analyzer-detector and the other the scaler-read out system. One technician, under the supervision of Kempchinski, normally works in this room performing the beryllium analyses.
11. This "Beryrometer" room has been established as a restricted area.
12. The maximum potential external radiation from the unit occurs during removal of the lead plug and insertion of the BF-3 detector unit. This operation reportedly takes approximately 10 seconds. Complete details on the operating procedures are contained in the back-up attached to the licensee's application dated 2/6/63.
13. The Cs-137 liquid level gauge is located in the "100 Area" wherein leaching of beryllium salts and water solution takes place in a closed pipe-tank process system. The gauge is installed on the "Red Mud" tank to control the liquid level. The "on-off" control of the gauge is reportedly always kept on except for periods when maintenance is performed, in which case the control is turned to the off position. The sign was noted to be posted above the unit stating

14. The records of receipt in the position of Atwood indicated that the gauge was an Industrial Nucleonics gauge, Serial No. 4401, Source No. CS-2502, which had been received on 10/15/59. A subsequent shield service visit had been made by Industrial Nucleonics on 11/28/62 and also during 12/65.

Instrumentation and Calibration

15. The licensee was noted to possess one Victoreen 592B ion chamber survey instrument (0 - 1 r), which is calibrated by the Instrument Services Group of a nearby plant (Foster-Wheeler Corp.), which performs industrial radiography. The calibrations are reportedly done about every three months. A tag attached to the instrument was noted to indicate that the most recent calibration had been made on ^{19/}4/66.

Instructions

16. Operating instructions containing the essential elements of information as listed in the attachment to the licensee's application, pertaining to use of the beryllometer unit were noted to be posted in the "Beryllometer" room. Two lab technicians plus one fill-in lab technician, who reportedly operate the unit, have been trained by Kempchinski in the proper operation of the unit. Kempchinski had previously taken one week training at Boulder Scientific in Radiation Safety and use of the unit.

Surveys

17. Surveys are taken by Kempchinski during uses of the beryllometer unit as follows:

- a. On incoming crates containing a new source. records indicated

- b. On outgoing crates containing old sources (for purposes of preparing ICC shipping label).
- c. Inside and outside the "Beryllometer" room.

These are taken at two week intervals by Kempchinski. Readings noted on the survey records were typically as follows:

Inside the room - operator's position - background

1 foot from unit - 0.5 mr/hr

1 foot directly above unit - 20 mr/hr

Sides and rear of unit - 0.5 - 2 mr/hr

Outside the room - atop ceiling above unit - less than 1 mr/hr

Outside the walls of the room - background

- 18. Records of such surveys were noted to be maintained by Kempchinski on a pre-printed survey form. Several independent surveys made by the inspector, using an NMC thin window GM survey instrument, confirmed the readings as noted above.
- 19. Measurements of external radiation levels about the Cs-137 liquid level gauge were taken by the inspector. A maximum of 7 mr/hr at any single point on the exterior of the gauge unit was noted. At 12" from the unit a maximum of 1.5 mr/hr was noted.

Leak Tests

- 20. Leak testing of the Sb-124 sealed source contained in the beryllometer unit is not performed by the licensee, however the leak test requirement

six months. Kempchinski's records indicating that leak tests had been provided upon receipt of new sources on the dates as indicated below:

| <u>Date Source Received</u> | <u>Date Leak Tested By Boulder Scientific Co.</u> |
|-----------------------------|---|
| 8/16/63 | 7/25/63 |
| 12/27/63 | 11/27/63 |
| 4/10/64 | 3/17/64 |
| 8/5/64 | 6/22/64 |
| 1/6/65 | 11/30/64 |
| 4/7/65 | 3/15/65 |
| 8/19/65 | 7/16/65 |
| 2/8/66 | 1/20/66 |

21. All tests were noted to have been recorded as less than .005 uc of removable activity.
22. The leak test records in the possession of Atwood for the Cs-137 liquid level gauge indicated that the source had been leak tested by Industrial Nucleonics during field service visits in 11/62 and 12/65. Records indicated less than .005 uc of removable activity. No record of the initial leak test certificate provided with the unit upon receipt in 10/59 was available, although Atwood stated that to the best of his knowledge a leak test certificate had been received, but had probably been misplaced since he was not the primary user at that time.

Procurement Procedures

23. Kempchinski stated that he is responsible for orders for procurement

crate containing the source is delivered directly to the Analytical Laboratory by the Receiving Department.

Storage and Security of Materials

24. The "Beryllometer" room is kept locked at all times except when a technician is working in the room. Keys to the room are possessed only by the technician and Kempchinski.

Posting and Labeling

25. The door to the "Beryllometer" room was noted to be posted with a "Caution - Radiation Area" sign containing conventional symbol. The source housing was also noted to contain a "Caution - Radioactive Material" sign with the conventional symbol and a tag indicating kind and quantity of activity, and date of assay. An AEC-3 form was also noted to be posted inside of the room. It was, however, noted that no "Caution - Radioactive Material" sign with conventional symbol was posted in the room. ^A~~The~~ sign was turned over to the licensee by the inspector.
26. The liquid level gauge containing the Cs-137 source was noted to contain a metal tag bearing the words "Caution - Radioactive Material" with conventional symbol, the words "Do Not Disassemble, Serial No. 2502, 25 mc, Cs-137, 11/59".

Personnel Monitoring

27. Personnel monitoring is performed by the licensee on personnel involved with work with the beryllometer unit. A Picker X-ray film badge service is obtained on a one month exchange frequency. Six badges are purchased,

three are used routinely, these being by two technicians and one fill-in technician. One spare badge is also kept in the "Beryllometer" room above the unit. Exposures for the primary technician were noted to be 14 mr/1 year. The control badge kept in the room was noted to have been 376 mr for the year 1965.

Items of Noncompliance

28. 10 CFR 20.203(e)
- in that the "Beryllometer" room area was not properly posted to indicate the presence of radioactive material. (Refer to paragraph 25.)
29. License Condition 15B
- in that complete records of leak test results, ^{on the Cs-137 file} were not maintained for inspection. (Refer to paragraph 22.)
30. The above items of noncompliance were discussed with Kempchinski, ^{Arwood} and Mr. A. Epstein, Plant Manager, who indicated complete willingness to effect corrective action. A Form AEC-591, with Items E and M checked, was issued at the conclusion of the inspection.