

UNITED STATES  
ATOMIC ENERGY COMMISSION  
DIVISION OF COMPLIANCE  
REGION I  
970 BROAD STREET  
NEWARK, NEW JERSEY 07102

201 645-3962

April 14, 1971

Paul R. Nelson, Senior Radiation Specialist *for PRH*  
Region I, Division of Compliance

INSPECTOR'S EVALUATION  
KAWECKI BERYLCO INDUSTRIES  
BOYERTOWN, PENNSYLVANIA  
LICENSE NO. SMB-920

A reinspection of the licensed program conducted on March 31, 1971 showed that the program is well documented and well managed. Use is now limited to the Boyertown plant. No use has occurred at the Reading plant since the last inspection on October 1, 1968. Use at the Revere plant has been limited to a pilot run to determine the economics of a thermic reduction process. These two sites are used for storage only. The program at the Boyertown plant involves the extraction of tantalum and columbium from raw ores and tin slag. Evaluations of the associated hazards have been made and are continuing at periodic intervals. Evaluations to date have shown small potential for exposure to radiation, or exposure to excessive air concentrations. There were no items of noncompliance noted during the inspection. A clear 591 was issued.

The license is properly categorized as I-II. Recommend reinspection at the normal interval plus six months. Schedule for September, 1972.

*Ralph J. Meyer*  
Ralph J. Meyer  
Radiation Specialist

591 BACKUP NOTES

Region I, Division of Compliance  
Newark, New Jersey

1. Licensee:  
Kawecki Berylco Industries, Inc.  
P.O. Box 60  
Boyertown, Pennsylvania
  2. Date of Inspection: March 31, 1971
  3. Type of Inspection: Announced reinspection
  4. License No. SMB-920, Docket No. 40-6940  
Last amendment No. 2, dated August 19, 1970  
Category I, Priority II
  5. Date of Previous Inspection:  
October 1, 1968
  6. There is no "Company Confidential", proprietary or classified information contained in this report.
  7. Scope of Inspection:  
Parts 20, 30 and 40
  8. Inspected by: Ralph J. Meyer April 14, 1971  
Ralph J. Meyer, Radiation Specialist Date of Report  
  
Reviewed by: Paul R. Nelson 9/3/71  
Paul R. Nelson, Sr. Radiation Specialist Date
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### Summary

Inspection findings showed that the licensed program is well documented, records were in order, procedures well defined, and supervised by competent individuals. Evaluation of the radiological hazards has been consistent with the use program. Personnel were cooperative in providing records and information. No deficiencies were noted in operation of the program.

### Noncompliance Items

As evidenced from records, statements and the inspector's observations, there were no items of noncompliance noted.

### Unusual Occurrences

According to F. Coyle, the individual charged with responsibility for the program, no unusual events have occurred to date. This was further evidenced by records and evaluations generated to date.

### Previous Items of Noncompliance

There were no items of noncompliance identified during the previous inspection.

### Management Summary

Inspection findings were discussed with corporate officer, Robert Anderson. The inspector informed him that inspection findings showed no items of non-compliance, and that control of the operation was consistent with the license, regulations, and health and safety. Anderson stated that they would continue in that vein.

## DETAILS

### Participants

1. R. Anderson, Corporate Officer  
R. Coule, Manager, Analytical Section and RSO  
D. Wood, Production Supervisor  
R. Gallagher, Consultant, Applied Health Physics

State of Pennsylvania notified; did not participate.

### Scope of Licensed Program

2. As evidenced by statements and records, the licensed program involves the extraction of tantalum and columbium from ore concentrates and tin slag. Thorium and uranium contained in the raw materials are removed as waste product during the extraction process. Production runs range from two to six thousand pounds, on intermittent basis. Uranium and thorium content ranges from 0.0% to 0.4%.

### Organization

3. Coyle stated that the licensed program is oriented under the Operations Division, John Cenarazo, Manager and V.P. The responsibility for radiological safety is vested with Frank Coyle, Manager of Analytical Section, and RSO designate. Coyle provides the onsite supervision, under the direction of Applied Health Physics, Incorporated, acting as consultants.

### Administrative Control

4. Coyle stated that he is assisted in the administration of the program by William Gannon, Procurement, and Don Wood, Production Supervisor. Coyle stated that they have taken the radiological safety instruction course, presented by Applied Health Physics, and at least one is on plant at all times to supervise. Coyle stated that he maintains the records and Applied Health Physics makes on plant visits for audits and consultation.

### Use of Material

5. The license authorizes use at the Reading, Revere and Boyertown (Pennsylvania) plants. Authorized possession limit is 210,000 pounds of uranium and thorium. Coyle stated that all processing is accomplished at the Boyertown plant. He stated there has been no processing done at the Reading plant since last inspection (10/1/68) and is used only for raw material storage. Coyle stated that operations at the Revere plant had involved one production run employing an alumina thermic reduction, which will no longer be used because of economic considerations. He stated the only process in current use is a liquid extraction process, conducted at the Boyertown plant. Only pilot runs have been made at the Revere and Reading plants.
6. Coyle stated that all raw material is received in bags or drums. The bags are stored in a warehouse and the drums are stored in a fenced yard. Each lot of material is assayed for uranium-thorium content and was shown on the receipt and inventory records. Coyle stated that assay values vary, but for

inventory purposes they use the maximum values that have been experienced to date. Coyle stated that all source material remains in the waste sludge. The waste sludge from each run is assayed for purposes of ascertaining the uranium-thorium return.

7. A review of the inventory records showed the following quantities on hand.

<u>Reading Plant</u>			
<u>Material</u>	<u>Gross Pounds</u>	<u>% of U-Th</u>	<u>U-Th Pounds</u>
Eastern Tin Slag	304,830	0.13	397
Nitrate Fusions	7,638	0.12	10
Eastern Tin Slag	1,810,425	0.06	1,086
Columbite	168,000	0.3	504
<u>Revere Plant</u>			
Columbite	400	0.3	1.2
Waste Slag	56,280	0.3	169
<u>Boyertown Plant</u>			
Tantalite	930,000	0.4	372
Columbite	381,600	0.3	1,145
GSA	44,400	0.1	45
Thaisarco Tin Slag	76,668	0.27	119
Waste Sludge	183,000	--	998
			<u>4,926.2</u>

Source material inventory was within license limits.

8. Briefly, as described by Coyle, the liquid extraction of tantalum and columbium is as follows. The raw materials in various blends are dumped into a hopper that feeds a ball mill. The material is then fed to a bucket elevator system that elevates the material and dumps to a digester tank containing hydrofluoric acid. The system is a sealed system from the dumping hopper to the digester tank. From the digester tank the slurry is fed to a filter press. The end products from the filter press is a Ta-Cb liquor that is further processed, and a waste sludge. The U-Th is retained in the sludge which is put into steel drums for storage. (See Flow Sheet, Attachment I)

9. The inspector observed that the only potential hazard in the process would exist during the dumping of the ores into the feed hopper. It was noted that the system from the hopper to the digester was a closed system, and that from the digester all material is in wet form. Coyle stated that personnel wear respirators during the dumping of material, and retire from the building immediately after the hopper is filled. He further stated that air concentrations inside the hopper building have not exceeded applicable limits.

*(see also para 15)*

#### Facilities

10. The use area and storage areas are within the perimeter of a security fence and all entries controlled by security guards. Additionally the storage warehouse and storage yard are maintained locked except for times of in or out loading. The facilities and control of access are adequate.

#### Equipment

11. The inspector noted that monitoring equipment as described on Page 5 of the supplement to the license application, dated October 3, 1967, was in evidence. The instruments were operable and recently calibrated.

#### Radiological Safety Procedures

12. Coyle displayed written operating, emergency and radiological safety procedures. A review of the procedures showed that they were well detailed and adequate for the use program. Gallagher stated that Coyle, Gannon, and Wood had attended the 40 hour training course presented by his firm (Applied Health Physics). Coyle stated that personnel involved in the use program have received on plant training and instruction prior to working in the program. He stated that work habits are routinely audited.
13. Coyle displayed a copy of the license and the applicable regulations. Coyle was familiar with the contents and requirements of same. The inspector observed that Form AEC-3 was conspicuously posted.

#### Personnel Monitoring

14. Coyle stated that personnel monitoring is not provided to individuals. He stated that evaluations made of personnel exposures showed that routine exposure did not exceed 25% of 20.101 limits. The inspector reviewed the exposure study and noted that recorded exposures were well within the limits as noted above. Coyle stated that routine surveys of the storage area and use areas are made for backup.

#### Exposure to Air Concentrations

15. As evidenced by records numerous air samples were taken in the use area during the initial runs and at periodic intervals thereafter. In general air concentrations have been  $1 \times 10^{-12}$  uCi/ml. This is less than Appendix B, Table I limit of  $3 \times 10^{-11}$  uCi/ml for natural thorium which would be the most restrictive limit. The maximum concentration was  $1.2 \times 10^{-11}$  uCi/ml. This sample was taken immediately over the dump hopper. Coyle stated that the maximum exposure time would not exceed one hour in any one week in that occupancy in the dump area is limited to the time it takes to dump the material into the hopper. In addition to the low concentrations noted, Coyle stated that personnel wear respirators during the dumping operation.

#### Effluents to Unrestricted Areas

16. The inspector observed that the only potential for release of air effluents to unrestricted areas would occur from the hopper room, and would occur only during dumping operations. Evaluations of air concentrations within the room (restricted area) has shown that they are less than Appendix B, Table II limits ( $1 \times 10^{-12}$  uCi/ml-Th) established for release to unrestricted areas.

#### Disposals

17. Coyle stated that all waste (sludge) generated in the process is held in storage on plant. Liquid effluents are released to the sewerage system. Routine samples of the liquid effluent are taken on a routine basis and the results recorded. A review of the records showed that concentrations range from  $10^{-7}$  to  $10^{-6}$  uCi/ml, well below the Appendix B, Table I, Column 2 limit for insoluble Th, of  $3 \times 10^{-4}$  uCi/ml, which would be the most restrictive limit.

#### Surveys

18. As evidenced by statements and records, surveys are made on a routine frequency. It was further noted that independent surveys are made by Applied Health Physics and the results reported. It was noted that contamination levels have been minimal and radiation levels have not exceeded 1 mR/hr in the restricted areas and .1 mR/hr in unrestricted areas.

#### License Conditions

19. A review of the license conditions showed that the licensed program has been conducted within those conditions to date.

Posting and Labeling

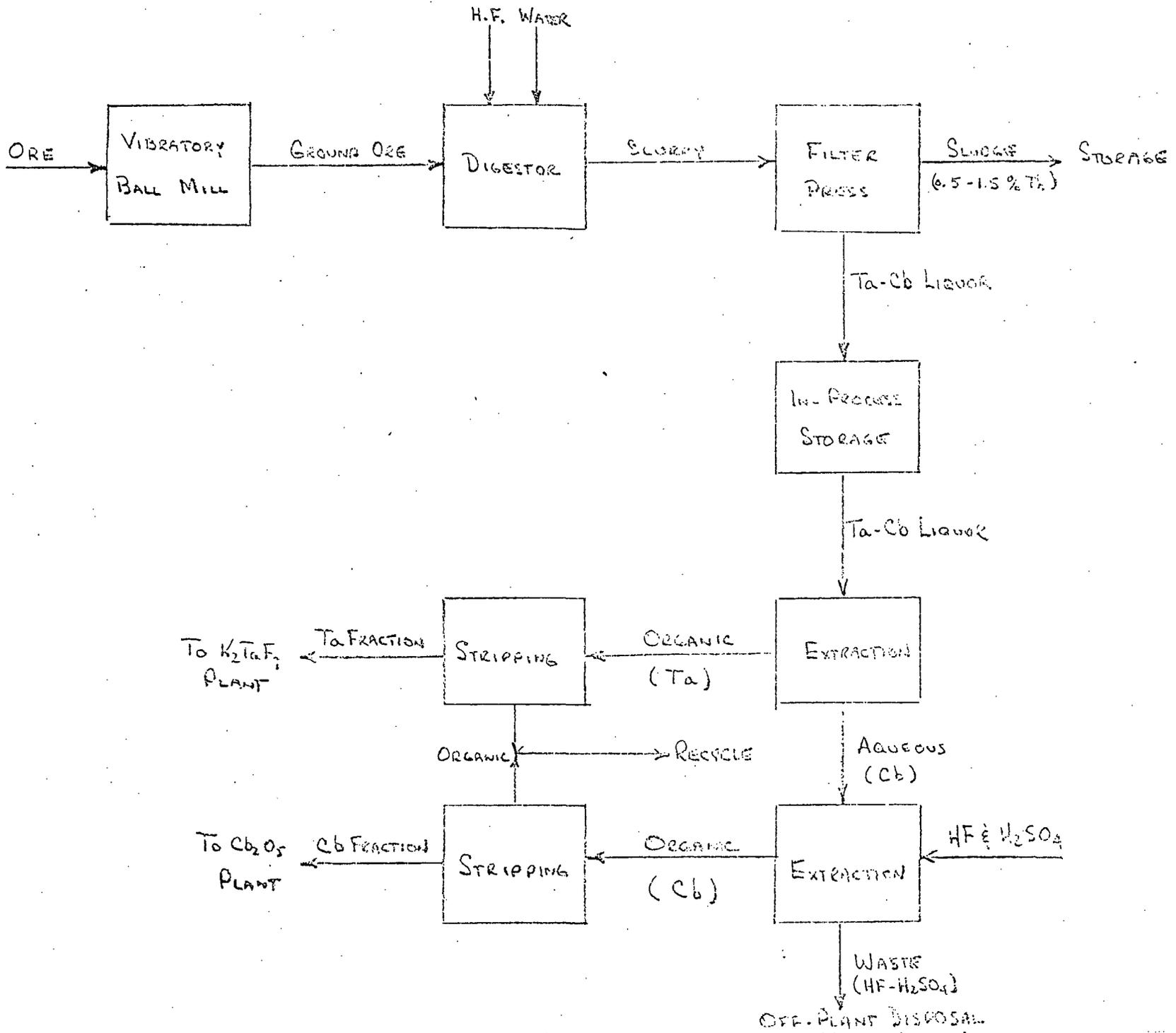
20. The inspector observed that the storage areas and use area were posted with conventional radiation signs bearing the words, "Caution - Radiation Area", and "Caution - Radioactive Materials". It was also noted that all containers carried a conventional label with the words, "Caution - Radioactive Materials".

Inspector's Survey

21. Results of the survey conducted by the inspector using an Eberline Model E-120 GM are as follows:

Unrestricted Areas	.02 to .05 mR/hr
Warehouse Storage	.3 to .8 mR/hr
Outside Storage Yard	.2 to 1.0 mR/hr
Use Area	.1 to .2 mR/hr
At side of containers	.1 to 1.5 mR/hr

Smears of floor areas did not exceed background (.06 mR/hr).



ATTACHMENT I