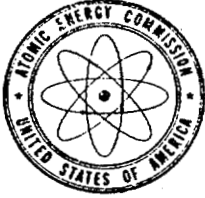


MEMO ROUTE SLIP Form AEC-93 (Rev. May 14, 1947) AECM 02.		See me about this. Note and return.	For concurren For signature.	For action. For information.
TO (Name and unit) Gen W. Roy, Chief M&FFB	INITIALS  DATE	REMARKS U.S. RADIUM CORPORATION BLOOMSBURG, PENNSYLVANIA RO INSPECTION REPORT NOS. 30-5982/73-01 30-5981/73-01		
TO (Name and unit) cc: RO:HQ (4) L:D/D for Fuels & Materials DR Central Files	INITIALS  DATE	REMARKS Attached for your information are the subject inspection reports.		
TO (Name and unit)	INITIALS  DATE	REMARKS		
FROM (Name and unit) <i>Rayman for</i> Raymond H. Smith Acting Senior, Facilities Ection	REMARKS			
PHONE NO. 201 645-2370	DATE 3-28-73			

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 44 - 45



UNITED STATES  
ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS  
REGION I  
970 BROAD STREET  
NEWARK, NEW JERSEY 07102

MAR 27 1973

R. H. Smith, Acting Senior, Facility Radiological & Environmental  
Protection Section  
Directorate of Regulatory Operations, Region I

INSPECTOR'S EVALUATION  
UNITED STATES RADIUM CORPORATION  
BLOOMSBURG, PENNSYLVANIA  
LICENSE NOS. 37-00030-07 and 37-00030-08

Inspection performed from February 13 to 15, 1973 revealed identical violations for both licenses. The major violation occurred because the licensee has taken little action to minimize stack releases. The licensee was noted to have taken good care to minimize air concentrations within the facility but passes these concentrations to outside air without further treatment.

No hazard is believed to exist and both licenses are properly categorized as B with Priority I.

*Eugene Epstein*

Eugene Epstein  
Radiation Specialist

U. S. ATOMIC ENERGY COMMISSION

DIRECTORATE OF REGULATORY OPERATIONS

REGION I

RO Inspection Report No.: 30-5982/73-01

Docket No.: 30/5982

Licensee: United States Radium Corporation

License No.: 37-30-08

Priority: 1

Category: B

Location: Bloomsburg, Pennsylvania

Type of Licensee: Major Processor

Type of Inspection: Unannounced, Routine

Dates of Inspection: February 13-15, 1973

Dates of Previous Inspection: August 31, September 1, 1971

Reporting Inspector: *R. H. Smith*  
*for* Eugene Epstein, Radiation Specialist

*March 22, 1973*  
Date

Accompanying Inspectors: None

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

Other Accompanying Personnel: None

\_\_\_\_\_  
Date

Reviewed By: *R. H. Smith*

R. H. Smith, Acting Senior, Facilities Radio-  
logical Section

*March 22, 1973*  
Date

## SUMMARY OF FINDINGS

### Enforcement Action

#### A. Violations

1. Failure to limit stack effluent releases to Appendix B, Table II, Column 1 concentrations. (Details, Paragraphs 3 thru 8)
2. Failure to provide annual training in Emergency procedures. (Details, Paragraph 9)

#### B. Safety Items

None

### Licensee Action on Previously Identified Enforcement Items

Not applicable.

### Design Changes

None

### Unusual Occurrences

- A. Licensee letter, dated December 2, 1971, to Division of Compliance, reporting an exposure to excessive concentrations of tritium. (Details, Paragraphs 10 and 11)
- B. Licensee letter, dated July 17, 1971, to Division of Compliance, reporting an exposure to excessive concentrations of tritium. (Details, Paragraphs 12 and 13)
- C. Licensee letter, dated June 29, 1972 to Directorate of Regulatory Operations, RO:I, reporting flood damage. (Details, Paragraph 14)

### Other Significant Findings

#### A. Current Findings

Since the last inspection, the licensee has combined all licensed activities into one building.

#### B. Status of Previously Reported Unresolved Items

Not applicable

Management Interview

The following persons attended a management interview on February 15, 1973:

D. Bean, Vice President for Bloomsburg, Pennsylvania and Parsippany, New Jersey Operations

J. D. McGraw, Radiation Safety Officer

The following subjects were discussed:

- A. The current policy of placing inspection reports in the Public Document Room following a review by the licensee to determine proprietary information.
- B. The stack releases of tritium and the impact of these releases on the environment. (Details, Paragraphs 3 thru 8)
- C. The lack of annual emergency procedure training. (Details, Paragraph 9)
- D. The lack of physical restriction to the Nuclear Facility Building was discussed and licensee representatives stated that as a minimum this area would be provided with physical restriction. (Details, Paragraph 2)

DETAILS

Persons Contacted

1. D. Bean, Vice President, Bloomsburg, Pennsylvania and Parsippany, New Jersey Operations  
J. D. McGraw, Radiation Safety Officer  
R. E. Bickert, Production Foreman  
D. B. Cowan, Production Supervisor

Restriction of Access

2. It was noted that the entrance to the Nuclear Facility Building was not physically restricted in any manner. The inspector was able to approach the entrance to this building without being accosted by anyone. It was noted that the site boundary had no physical restriction. Signs were noted posted at the entrance to the property with black lettering on a white background informing visitors that there were radioactive materials present and that they should report to the main building entrance. There was no receptionist in the main building lobby and instructions were present, informing a visitor to use the telephone to call the person to be visited.

Stack Effluent Releases

3. Licensee representatives stated that all licensed activities were performed in the Nuclear Facility Building. They stated that all air effluent from this facility was exhausted through one stack, the base of which, was located immediately outside the west end of the building. Blueprints indicated that the stack is 60 feet tall and 24 inches in diameter at the point of release. Records of flow rate studies indicated that activity is released from the stack at the rate of 5000 to 5800 ft<sup>3</sup>/min., 24 hours daily.
4. Plot plans indicated and it was noted that the nearest inhabited buildings are located at the East Property Boundary line, approximately 70.7 meters from the stack and that the prevailing wind blows from West to East.
5. Licensee representatives stated that the stack effluent was monitored at the stack, near the point of release, using isokinetic techniques. Records indicated that continuous monitoring for particulate, water vapor and gas was performed by passing air through a particulate filter, three successive water impingers and a Carey Vibrating Reed Electrometer. Samples had been counted daily.

6. A review of the stack monitoring data showed that the MPCa listed in Appendix "B", Table II, Column 1,  $2 \times 10^{-7}$  uCi/ml, was exceeded by a factor of 17.46, when averaged over the year 1971 and by 15.8, when averaged over the year 1972. Licensee representatives stated that tritiated water vapor is the major portion of the activity and that the stack is not provided with scrubbing devices, designed to remove water vapor. It was also noted that the entrance to the Nuclear Facility Building was not restricted by any physical barrier and also the entire site has no physical barrier to prevent access.
7. Licensee representatives stated that in accordance with their letter of April 24, 1969, to Isotopes Branch, they did calculate atmospheric diffusion of stack effluent using a modified "Suttons" formula, and arrived at the following dilution factors:

East Property Line, 70.7 meters from the stack -  $6.9 \times 10^{-3}$   
West Property Line, 146.3 meters from the stack -  $2.3 \times 10^{-4}$   
North Property Line 114.3 meters from the stack -  $6 \times 10^{-3}$   
South Property Line, 53.3 meters from the stack -  $6 \times 10^{-3}$

8. Records of special surveys indicated that in August 1969, confirming air surveys were made at the East Property line only. Records do not show any surveys conducted at the North, South, and West boundaries. Licensee representatives stated that air was collected at the East property line at a height of five feet from the ground and that particulate and water vapor was collected for 24 hours and compared with stack emission concentrations for a similar period. The reduction factors noted at the East boundary line varied between 20 and 93.5 for water vapor and between 1.05 and 6.5 for particulate as against a calculated value of 1450 for water vapor.

Emergency Procedure Training

9. Records were not available to indicate whether employees have received annual training in entry and emergency exit procedures. Licensee representatives stated that they had not conducted an emergency evacuation drill. They also stated that the alarm bell had not been sounded during work hours and was only tested for operability during non-work hours each month.

Unusual Occurrences

10. A review of the incident file revealed that during the first week in November 1971, one person was using tritium gas to manufacture tritium tritide foils and targets. This system, according to licensee representatives, holds 3000 Ci of tritium gas. A local air monitoring system was used to indicate air concentration levels to persons entering this laboratory. This system was noted to be a Johnson Associates Tritium Monitor equipped with a moving recorder chart. The file indicated

that the intake hose had deteriorated and air was not reaching the tritium monitor. The person cleaning the room was not aware of the monitor malfunction. A rise in tritium concentrations in urine for this person between samples taken on November 2 and 3, 1971 of 16.9 uCi/liter was noted. This rise of tritium concentration in urine was reported to be equivalent to 1.5 times 40 MPCa hours for tritium as water, of  $5 \times 10^{-6}$  uCi/ml. air, listed in Appendix "B", Table I, Column 1.

11. The person who performed the target and foil incorporation had no more than 7.96 uCi/liter in his urine of November 3, 1971; an increase of 1.26 uCi/liter over his urine of November 2, 1971. Corrective action, according to licensee representatives, consisted of repairing the monitoring instrument and instructing personnel not to remain in rooms where the air monitor was not functioning and to report any malfunction.
12. A review of the Incident file revealed that one person between June 5 and 7, 1972 showed an increase in urinary tritium from 0.25 to 25.55 uCi/liter, equivalent to an exposure to 2.6 times 40 MPCa hours. The file indicated that the person involved opened a locked metal cabinet in which luminescent exit markers filled with tritium up to 10 Ci per marker, had been stored. The cabinet was reported not to have been opened for several days and contained styrofoam padding.
13. The file indicated that one exit marker containing 3.1 Ci tritium was leaking and the employee inhaled vapor which was released upon opening the cabinet door. Licensee representatives stated that corrective action consisted of removing the styrofoam insulation and adding blowers to each of two adjoining storage cabinets. It was noted on February 14, 1973 that the two cabinets were each equipped with an exhaust fan and that air from these cabinets was exhausted to the Nuclear Facility stack.
14. Examination of the Incident file revealed that the Susquehanna River overflowed its banks on June 2, 1972 and completely flooded the licensee's Liquid Waste Treatment Building. Licensee representatives stated that this building was ten feet below grade and was the only building involved in the flood. They stated that the building had contained an evaporator and four 250 gallon liquid waste holdup tanks. Licensee representatives stated that only one tank was full and the other three were empty. They also stated that all the activity in the filled tank was drained off into the river by the flood. No exact evaluation of the activity released could be made and records of releases indicated that the tanks usually held liquid with concentrations of tritium from 5 to 6 times MPC. Based on this, a total of up to 17 mCi of tritium may have been released. Licensee representatives stated that the flood caused damage of \$20,000 and that the facility was out of use for a minimum of two weeks. It was noted that a new waste treatment building is under construction and that this is located above grade.



### Concentrations in Restricted Areas

15. A review was made of the methods used to determine concentrations in air in restricted areas and the results of these surveys from September 1, 1971 to February 1, 1973. According to licensee representatives, a daily urine bioassay analysis is performed on-site to evaluate exposure. The licensee stated that liquid scintillation is used for counting urine samples and when a daily sample exceeds 5 uCi/liter tritium over the previous days sample, the continuous recorder chart of the Johnson Associates Tritium monitor, located in each room or area of use, is reviewed. These charts were noted to indicate tritium concentrations in uCi/m<sup>3</sup> or 1 x 10<sup>-6</sup> uCi/ml.
16. It was noted by an examination of records, that all incidents involving persons exposed to excessive concentrations had been reported.

### Liquid Effluent Releases

17. The liquid effluent releases were reviewed for the period of September 1, 1971 to February 1, 1973. Licensee representatives stated that liquid waste is discharged, after dilution, to the Susquehanna River and that prior to the flood of June 2, 1972, all liquid waste was passed through an evaporator prior to analysis and discharge. The licensee stated that since the flood, they analyzed, diluted, and discharged directly to the river. The record of releases showed approximately 34 discharges each year, with a yearly average concentration at the point of discharge no greater than 0.685 of MPCw, 3 x 10<sup>-3</sup> uCi/ml., listed in Appendix "B", Table II, Column 2.

### Solid Waste Disposal

18. Solid waste was noted by examination of records to have been packaged and transferred to an authorized disposal contractor. Records were noted maintained, showing each transfer as well as date, kind and quantity.

### Posting and Labeling

19. Current posting and labeling was reviewed and it was noted that the Nuclear Facility Building and each laboratory within were posted with signs reading, "Caution - Radioactive Materials" with symbol. Form AEC-3, "Notice to Employees", was also noted posted in the lobby of the Nuclear Facility Building.

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS  
REGION I

RO Inspection Report No.: 30-5981/73-01

Docket No.: 30/5981

Licensee: United States Radium Corporation

License No.: 37-30-07

Priority: 1

Category: B

Location: Bloomsburg, Pennsylvania

Type of Licensee: Major processor

Type of Inspection: Unannounced - Routine

Dates of Inspection: February 13-15, 1973

Dates of Previous Inspection: August 31 and September 1, 1971

Reporting Inspector: *R. H. Smith*

*for* E. Epstein, Radiation Specialist

*March 22/1973*  
Date

Accompanying Inspectors: None

Date

Date

Other Accompanying Personnel: None

Reviewed by: *R. H. Smith*

R. H. Smith, Acting Senior  
Facilities Radiological Section

*March 22/1973*  
Date

## SUMMARY OF FINDINGS

### Enforcement Action

#### A. Violations

1. Failure to limit stack effluent releases to Appendix B, Table II, Column 1 concentrations. (Details, Paragraphs 3 thru 8)
2. Failure to provide annual training in Emergency procedures. (Details, Paragraph 9)

#### B. Safety Items

None

### Licensee Action on Previously Identified Enforcement Items

Not applicable.

### Design Changes

None

### Unusual Occurrences

Licensee letter, dated June 29, 1972 to Directorate of Regulatory Operations, RO:I, reporting flood damage. (Details, Paragraph 10)

### Other Significant Findings

#### A. Current Findings

Since the last inspection, the licensee has combined all licensed activities into one building.

#### B. Status of Previously Reported Unresolved Items

Not applicable

### Management Interview

The following persons attended a management interview on February 15, 1973:

D. Bean, Vice President for Bloomsburg, Pennsylvania and Parsippany, New Jersey Operations

J. D. McGraw, Radiation Safety Officer

The following subjects were discussed:

- A. The current policy of placing inspection reports in the Public Document Room following a review by the licensee to determine proprietary information.
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J. D. McGraw, Radiation Safety Officer  
R. E. Bickert, Production Foreman  
D. B. Cowan, Production Supervisor

Restriction of Access

2. It was noted that the entrance to the Nuclear Facility Building was not physically restricted in any manner. The inspector was able to approach the entrance to this building without being accosted by anyone. It was noted that the site boundary had no physical restriction. Signs were noted posted at the entrance to the property with black lettering on a white background informing visitors that there were radioactive materials present and that they should report to the main building entrance. There was no receptionist in the main building lobby and instructions were present, informing a visitor to use the telephone to call the person to be visited.

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9. Records were not available to indicate whether employees have received annual training in entry and emergency exit procedures. Licensee representatives stated that they had not conducted an emergency evacuation drill. They also stated that the alarm bell had not been sounded during work hours and was only tested for operability during non-work hours each month.

#### Flood Damage

10. Examination of the Incident file revealed that the Susquehanna River overflowed its banks on June 2, 1972 and completely flooded the licensee's Liquid Waste Treatment Building. Licensee representatives stated that this building was ten feet below grade and was the only building involved in the flood. They stated that the building had contained an evaporator and four 250 gallon liquid waste holdup tanks. Licensee representatives stated that only one tank was full and the other three were empty. They also stated that all the activity in the filled tank was drained off into the river by the flood. No exact evaluation of the activity released could be made and records of releases indicated that the tanks usually held liquid with concentrations of tritium from 5 to 6 times MPC. Based on this, a total of up to 17 mCi of tritium may have been released. Licensee representatives stated that the flood caused damage of \$20,000 and that the facility was out of use for a minimum of two weeks. It was noted that a new waste treatment building is under construction and that this is located above grade.

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12. It was noted that the application of tritium paint to watch dials and hands was performed in one room by hand and in another room by silk screen operations. An inspection of these areas on February 14, 1973 revealed that the hand application area was divided into individual booths for each worker and each booth was separately ventilated. It was noted that each silk screen apparatus was also separately vented.
13. Records of surveys indicated that the licensee performed a series of breathing zone surveys using a pump and drawing air via a hose through a particulate filter and liquid impinger. These air sample results were then compared with bioassay results. The maximum breathing zone concentration for hand painting was 1.68 x 10<sup>-6</sup> uCi/ml. The maximum breathing zone concentration for silk screen operations was 4.41 x 10<sup>-6</sup> uCi/ml. The maximum urinary concentration noted during breathing zone surveys was 4.4 uCi/liter. A review of the bioassay results showed that the urines of dial painters and silk screen operators were usually about 2.5 uCi/liter.

### Liquid Effluent Releases

14. The liquid effluent releases were reviewed for the period of September 1, 1971 to February 1, 1973. Licensee representatives stated that liquid waste is discharged, after dilution, to the Susquehanna River and that prior to the flood of June 2, 1972, all liquid waste was passed through an evaporator prior to analysis and discharge. The licensee stated that since the flood, they analyzed, diluted, and discharged directly to the river. The record of releases showed approximately 34 discharges each year, with a yearly average concentration at the point of discharge no greater than 0.685 of MPCw, 3 x 10<sup>-3</sup> uCi/ml., listed in Appendix "B", Table II, Column 2.

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