



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

JE FILE COPY

January 6, 1981

Docket Nos. 30-5980 ✓
30-5982

United States Radium Corporation
ATTN: Mr. John Miller
Manager, Nuclear Operations
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

Gentlemen:

Subject: Combined Inspection Nos. 30-5980/80-03 and 30-5982/80-03

This refers to the special inspection conducted by Messrs. F. Costello and J. Nicolosi of this office on October 24, 1980, of activities authorized by NRC License Nos. 37-00030-02 and 37-00030-08 and to the discussions of our findings held by Mr. F. Costello with yourself at the conclusion of the inspection.

Areas examined during this inspection are described in the Office of Inspection and Enforcement Inspection Report which is enclosed with this letter. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, measurements made by the inspector, and observations by the inspector.

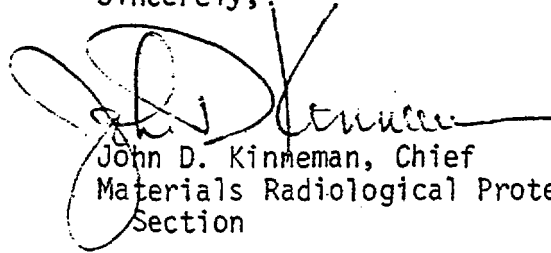
Within the scope of this inspection, no items of noncompliance were observed.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractor) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. Any such application must be accompanied by an affidavit executed by the owner of the information, which identifies the document or part sought to be withheld, and which contains a statement of reasons which addresses with specificity the items which will be considered by the Commission as listed in subparagraph (b) (4) of Section 2.790. The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.

January 6, 1981

No reply to this letter is required; however, should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

A handwritten signature in black ink, appearing to read "John D. Kinneman". The signature is written in a cursive style with a large, looping initial "J".

John D. Kinneman, Chief
Materials Radiological Protection
Section

Enclosure:

Combined Office of Inspection and Enforcement Inspection
Report Nos. 30-5980/80-03 and 30-5982/80-02

bcc w/encl:

IE Mail & Files (For Appropriate Distribution)

Central Files

Public Document Room (PDR)

Nuclear Safety Information Center (NSIC)

REG:I Reading Room

Commonwealth of Pennsylvania

License Fee Management Branch

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 30-5980/80-03
30-5982/80-02
Docket No. 30-5980
30-5982
License No. 37-00030-08 Priority I Category B
37-00030-02

Licensee: United States Radium Corporation
4150 Old Berwick Road
Bloomsburg, Pennsylvania 17815

Facility Name: United States Radium Corporation

Inspection at: Bloomsburg, Pennsylvania

Inspection conducted: October 24, 1980

Inspectors: *Francis Costello*
E. Costello, Radiation Specialist

12/30/80
date signed

J. Nicolosi
J. Nicolosi, Radiation Specialist

12-30-80
date signed

John D. Kinnehan

_____ date signed

Approved by: *John D. Kinnehan*
John D. Kinnehan, Chief, Materials
Radiological Protection Section, FF&MS Branch

12-30-80
date signed

Inspection Summary: Inspection on October 4, 1980 Combined Report Nos. 30-5980/80-03 and 30-5982/80-02

Areas Inspected: Special, announced inspection including radioactive effluents, environmental monitoring and independent measurements. The inspection involved 6 inspector-hours on site by two NRC inspectors.

Results: Of the three areas inspected, no items of noncompliance were identified.

DETAILS

1. Persons Contacted

Mr. J. Miller, Manager, Nuclear Operations
Dr. J. MacHutchin, Radiation Safety Officer
Mr. C. Berlin, Group Leader, Health and Safety, Quality Control
Mr. J. Watts, Technical Manager

2. Radioactive Effluents

The inspectors reviewed the licensee's records of radioactivity in airborne effluents to unrestricted areas. The inspectors noted that, for the previous twelve months, the licensee released 1 curie of tritium in particulate form, 196.5 curies of tritium in soluble form, and 1863.0 curies of tritium as gaseous tritium. The flow rate from the stack is 6000 cubic feet per minute. The average concentrations of tritium released during the previous year are 1.12×10^{-8} microcuries per milliliter in particulate form, 2.2×10^{-5} microcuries per milliliter in soluble form, and 2.09×10^{-5} microcuries per milliliter in gaseous form. Compared with the limits in Appendix B, Table II, Column 2 (MPC), these concentrations are equivalent to 5.6% of MPC for particulates, 1100% of MPC for solubles, and 52.3% of MPC for gaseous tritium. When dilution is taken into account, the average concentration at the site boundary is well within the MPC. The licensee takes continuous samples at the site boundary. Recent samples indicate typical concentrations of 4×10^{-9} microcurie per milliliter of tritium in soluble form, approximately 2% of the applicable MPC.

Over the August 8-10, 1980 weekend, the licensee noted a sharp increase in the concentration of tritium in soluble form. The licensee recorded a release of 34.18 curies of tritium in soluble form over this three day period for an average concentration of approximately 4.66×10^{-5} microcuries per milliliter, 232 times MPC. The licensee believes that this results from the use of a different type crucible in the tritiated foil system. When the licensee changed the crucible back to the previous type, the releases returned to normal. Concentrations measured at the site boundary remained at the level of a few percent of MPC during the release.

The licensee is planning an expanded environmental monitoring program for tritium as described in their letter to the Materials Licensing Branch dated September 19, 1980.

The licensee last calibrated the gaseous tritium effluent monitor on October 11, 1980.

No items of noncompliance were identified.

3. Environmental Monitoring

The inspectors reviewed the results of the licensee's recent bore hole water sample analyses. They noted that the results indicated that concentrations in excess of 10 CFR 20, Appendix B, Table II, Column 2 limits had been detected in water from bore 20, a four (4) foot deep hole on an adjacent property. The analysis indicated a gross alpha concentration of 1.56×10^{-7} microcuries per milliliter and a gross beta concentration of 1.04×10^{-6} microcuries per milliliter. Previous analyses, and previous licensee activities, indicate that gross alpha measurements indicate the presence of radium-226 and its daughters and gross beta measurements indicate strontium-90 and its daughters. The gross alpha analysis indicates a gross alpha concentration 5.2 times MPC (Radium-226) and a gross beta concentration 3.5 times MPC (Strontium-90).

The bore hole is not used as a source of potable water. On the day of the inspection, no water was in the hole for the inspectors to sample.

The licensee plans to expand its environmental monitoring program and will submit a program describing its plans in the near future.

4. Independent Measurements

The inspectors replaced the thermoluminescent dosimeters (TLD) which had been located along the licensee's perimeter at the time of the previous inspection. The exposed TLD's were returned to the Regional Office. The results for this set of TLDs and the results from the previous set of TLD's is included as Attachment 1 to this report. The TLD locations are indicated on Attachment 2.

The inspectors also obtained a drinking water sample from a nearby resident which was analyzed in the NRC Regional Laboratory. The analysis indicated a tritium concentration of 3.26×10^{-6} microcurie per milliliter, approximately 0.1% of the 10 CFR 20, Appendix B, Table II, Column 2 limits.

The inspectors split a urine sample of an employee who had been involved in a recent overhaul of the licensee's gas filling system. The NRC's analysis indicated a concentration of 2.3 microcuries per liter which compared favorably with the licensee's analysis which indicated 2.1 microcuries per liter.

No items of noncompliance were identified.

5. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection. The inspectors summarized the scope and the findings of the inspection.

ATTACHMENT 1

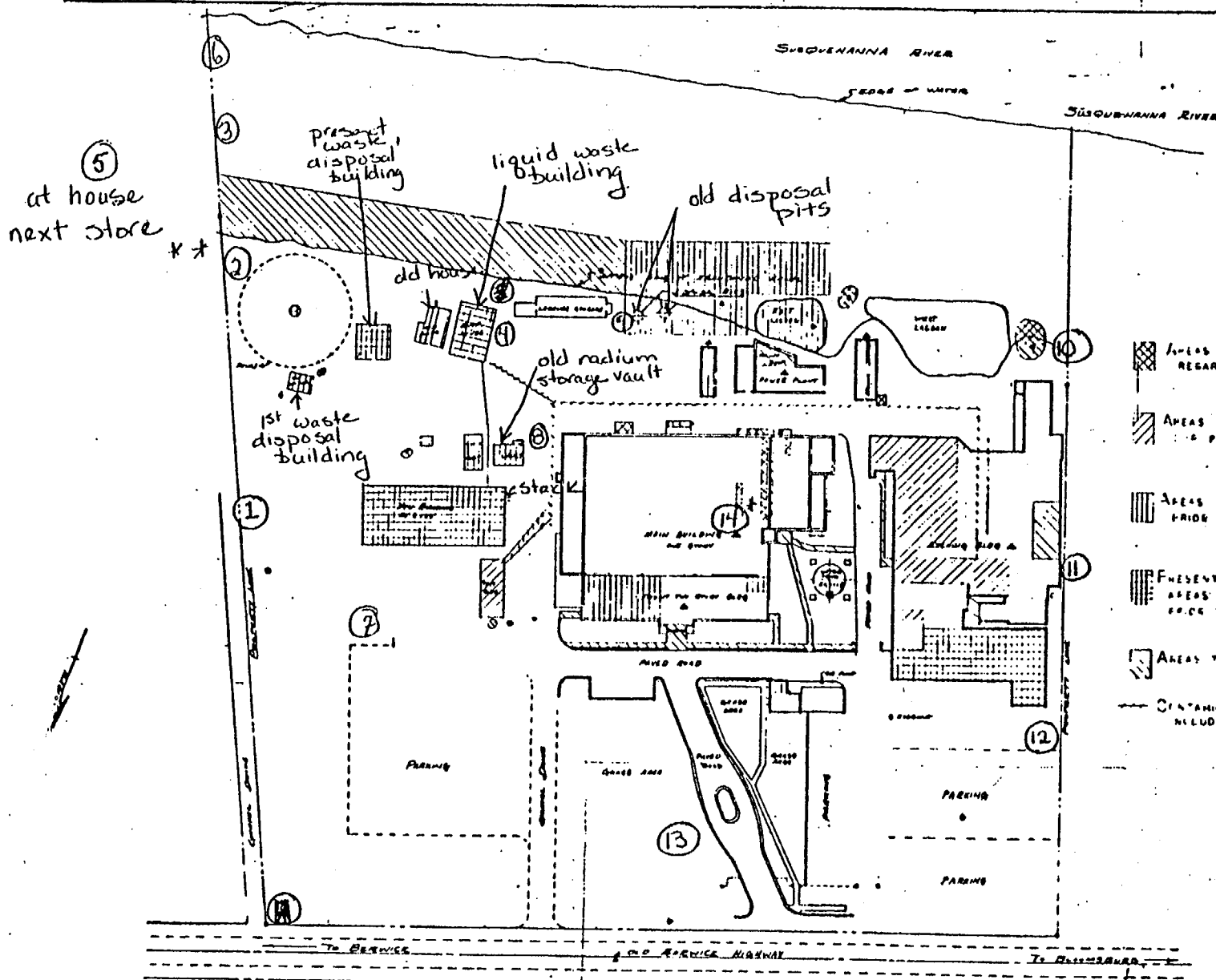
U.S. Radium TLD Environmental Monitoring Data (1980)

<u>Location</u>	<u>DOSE (mrem)</u>	
	<u>April 11-July 18</u>	<u>July 18-October 24</u>
1	14.5 ± 1.6	24.6 ± 1.2
2	20.6 ± 6.9	26.5 ± 2.9
3	50.6 ± 13.5	61.4 ± 5.3
4	27.4 ± 11.8	30.2 ± 2.7
5	No TLD	20.2 ± 1.6
6	35.8 ± 8.4	38.8 ± 2.8
7	17.1 ± 1.9	18.0 ± 2.8
8	69.1 ± 9.9	82.9 ± 8.9
9	32.0 ± 8.3	47.3 ± 2.7
10	44.5 ± 15.9	61.1 ± 1.0
11	26.4 ± 5.1	25.7 ± 0.5
12	37.3 ± 10.7	38.0 ± 13.4
13	20.6 ± 2.0	18.1 ± 2.5
14	38.7 ± 1.7	36.3 ± 0.5
15 - Low Background Control	14.7 ± 5.1	16.9 ± 1.7

The April 11-July 18 badges contained 2 lithium borate TLD's whose higher residual dose resulted in the higher uncertainty for this measurement. These badges also contained 2 calcium sulfate TLD's.

The July 18-October 24 badges contained 3 calcium sulfate TLD's.

NRC TLD LOCATIONS - U.S. Radium - ATTACHMENT 2



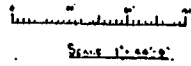
SUMMARY

Areas that must be decontaminated regardless of future.	\$24400
Areas that can be decontaminated for production or storage.	\$22000
Areas that must be decontaminated prior to sale of facility.	\$155850 +
Present radioactive production areas that must be decontaminated prior to sale of facility.	\$18000
Areas to be surveyed.	
Contaminated drains, cesses included above.	
TOTAL	\$220250 +

MOORE MARKS AND SURVEY & ENGINEERING CORPORATION

DR. FREDERICK COOK, RADIUM DEPARTMENT

DATE	NOV 1954	BY	UNITED STATES RADIUM COMPANY
PROJECT	U.S. RADIUM CO. BUILDING SITE DRAWING	SCALE	AS SHOWN
DRAWN BY	W. J. ...	CHECKED BY	...
APPROVED BY	...	DATE	...



* Location 14 - Dial Process Department

ATTACHMENT 2