FCMS: RLB: JMB (37-0003(3-08)

APR 2 9 1977

United States Radium Corporation ATTN: Mr. J. David McGraw Radiation Safety Officer 4150 Old Berwick Road Bloomsburg, Pennsylvania 17815

Gentlemen:

We are enclosing Amendment 6 to your License No. 37-00030-08 in response to your application for renewal of this license. Please note that the license has been renewed for a period of one year. You should file a renewal application thirty days or more prior to the expiration of the renewed license. In addition to other information appropriate to license renewal, you should furnish the following:

1. A description of your efforts to reduce releases of tritium from your operations including effluent treatment (filtering, absorbing, adsorbing, scrubbing, etc.) and a description of the reduction in effigent releases achieved. You should also describe continuing efforts to reduce effluents and the expected results of these efforts in the forseeable future.

2. A description of your program for testing filters in place to insure against the use of filters and filter holders or containers that may be incapable of performing at maximum efficiency due to damage following testing (e.g., in transit, during installation, etc.), and to determine the efficiency of each filter used in the treatment of your airborne radioactive effluents.

We note that filters received by you are accompanied by a certificate attesting as to their efficiency and are contained within a holder requiring only their placement within your ventilation system. We also note that a pressure differential indicator accompanies each filter cartridge. However, there is no assurance that a filter operating at less than its potential efficiency may not be adjusted in accordance with the instructions submitted with your August 13 letter concerning the "filter gauge" and be presumed to be functioning proparly.

As stated in our April 20, 1976 letter, a "restricted area" is defined in Section 20.3(a)(14) of 10 CER Part 20 as an area "access to which is

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United States Radium Corporation - 2 -

controlled by the licensee...." Therefore, if the "total plant site is used as a restricted area...", as you have stated it is, you must control access to this area. If you do not control access to this area, it may not be considered a restricted area for any purpose.

The information requested above should be submitted in duplicate.

Sincerely,

Jack M. Bell Radioisotopes Licensing Branch Division of Fuel Cycle and Material Safety

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UNITED STATES RADIUM CORPORATION

4150 OLD BERWICK ROAD / BLOOMSBURG, PENNSYLVANIA 17815 / (717) 784-3510

August 13, 1976

Radioisotopes Licensing Branch Division of Fuel Cycle and Material Safe_y U. S. NUCLEAF REGULATORY COMMISSION Washington, D. C. 20555

Jack Bell Attn:

Dear Mr. Bell:

USR

In response to your letter of April 20, 1976, we submit the enclosed information. We regret the deficiences in our previous submissions, and trust that the information enclosed herewith will enable you to finalize our license.

Very truly yours,

UNITED STATES RADIUM CORPORATION

David mitter

J. David McGraw Radiation Safety Officer

JDMcG jrn

Certified Mail-ret.rec.req.

Encs.

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- Control of releases in accordance with 10 CFR Part 20, Section 20.1(c) is achieved by utilizing the various control measures outlined below.
 - Tritium particulate The only tritiated particulate material, handled on a sutine basis, is tritiated phosphor used in mark of which dials. This material is purchased as a dry store the phosphor is stored in a stainless steel glove tox equipped with an absolute filter of the type described in Item 3 below. The dry powder is mixed with the necessary adhesives either in the storage box or in a plywood glove box also equipped with the same type of absolute filter. After mixing with the adhesives, the jars containing the liquid paint are decontaminated, removed from the glove box, and the paint is then applied with a variety of equipment. No dry phosphor is handled any place except in the glove boxes.

The only other potential source of significant quantities of particulate material is the cutting of Tritium foils or targets. Normally, this is avoided by cutting to final dimensions before tritiation. On the infrequent occasions when this cannot be done, cutting of active foil is carried out in a fiberglass glove box equipped with absolute filters of the type described in Item 3 below. After cutting, the active parts are placed in jars which are decontaminated prior to removal from the glove box.

Tritium gas - Tritium gas is handled in two separate systems. However, the methods for storage and handling of the gas are the same in both systems. The Tritium is stored adsorbed on uranium in stainless steel pots under vacuum. Since both systems are high vacuum systems, normally operating at 10⁻⁶ - 10⁻⁸ Torr, the systems are self-leak checking. That is, if there is any significant leak, the vacuums required for the processes would be unachievable. The operating procedures require that trese vacuum levels be checked prior to expansion of Tritium into the systems.

On the Foil Tritiation System, the integrity of the system is not interrupted from expansion of Tritium into the lines until the Tritium is pulled back into the pot. Therefore, there is no opportunity for release while Tritium is in the system. On the Gas Fill System, the integrity of the system is interrupted when the glass tube filled with Tritium is sealed. Under normal conditions, sealing of the finished tube also seals the tube stub remaining. The Tritium in this stub is then pulled back into a uranium pot. The thermal shock of sealing the tubes can result in cracking of the glass resulting in release of Tritium gas to the main exhaust stack. This release is avoided by 100% visual inspection of the tube for flaws in the tube or the band at each of the three stages of manufacture prior to filling, and again by the Gas Fill Operator. Rejects are gither immediately discarded or returned for rebanding. In addition, the tube is pumped to 10-6 - 10-7 Torr prior to filling. If this level is not achievable, the tube and the system are all leak checked.

In the event that the tube should still fail, the Tritium released is kept to the smallest amount possible by keeping the volume of gas involved in the sealing operation to a minimum. This is achieved by a tube valve which isolates the tube from the rest of the system.

Filled tubes are 100% leak checked and then decontaminated and removed to the Exit Sign area tube storage cabinet. Any tubes found leaking are cold welded into a length of copper tubing and sent to waste disposal.

Tritiated water -No tritiated water is used in any production process. The only significant sources of water-soluble Tritium are the vacuum pumps on the Tritium gas handling systems. Small amounts of Tritium gas occasionally pass through the pumping system. Here, they react with the pump oil, producing a water-soluble form of Tritium. Over the past years, a number of various scrubbing systems have been evaluated for removal of this soluble Tritium from the pump effluent, ranging from a simple impinger to elaborate copper-oxide-molecularsieve scrubber. They each posed the same problem: excessive back pressure on the forepump. This back pressure led to seal failure resulting in excessive contamination and operator exposure. At the present time, a new foil tritiation system is being constructed. On this system, a different approach is being taken. Should this new scrubbing method show promise, it will be extended to other areas of operation. Design and evaluation of scrubbing systems is a continuing program in our effort to comply with 10 CFR Part 20, Section 20.1(c).

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- 2. Tritium is the only isotope to be handled in production. Therefore, the facilities and procedures are designed with this in mind. Carbon-14, Krypton-85 and "any byproduct material" would be in the form of sealed sources for use as calibration standards for either radiation or light measurement. Item 7 in the license should be amended to reflect this.
- 3. The absolute filters used throughout the facility are a pre-packaged filter. The filter is enclosed in either a plywood or stainless steel housing. This unit is then tested by the manufacturer and the test results marked along with a serial number on each individual unit. The installation done at this site consists only of removing the used filter package from the exhaust line and replacing with a new unit. Illustration I shows the type of filter used.

Changing of the used filter is done when indicated by the method recommended by the manufacturer. Illustration II shows the type of filter gage provided by the manufacturer. Included in that same illustration are the instructions for use of the gage.

4. Restricted areas in our facility are defined by means of the Zone System outlined in the Nuclear Facility Health Physics Program Revision II. (See J. D. McGraw's letter of November 19, 1970.) The limits specified in this Zone System include those of 10 CFR 20.202(b)(2) "Radiation Area", and 10 CFR 20.202(d) "Airborne Radioactivity Area". Also included in these definitions are limits on fixed and removable contamination.

With regard to total plant site as a restricted area, O. L. Olson's letter and application of April 24, 1969, notes "The 'stal plant site will be used as a restricted area for purposes of calculating atmospheric dispersion". Further information concerning dispersion calculations can be found in the Safety Analysis Report in the same application.

It has been accepted in the past that the sixty foot elevation of the discharge point effectively restricts the area of the plume because of altitude. Since atmospheric dispersion is the only reason for restricting the total plant site, no further access control is needed in areas external to the plant buildings.

- 5. Management responsibilities are defined in the Nuclear Facility Health Physics Program Revision II, Part 7.0.0 "Administration Procedures". A revised Table of Organization is attached which clarifies individuals responsible for various jobs. At the present time, the jobs of Production Manager, Radiation Safety Officer, and Health Physicist are all filled by one individual. This is possible because of the reduced volume of work in certain areas of the facility. A comparison of the attached Table of Organization with that submitted on April 24, 1969, by O.L. Olson, dramatically illustrates the reduction in personnel.
- 6. Environmental sample points are located along the east property line for two reasons. First, the prevailing winds are from the west. (See O. L. Olson's letter and application of April 24, 1969, Safety Aralysis Report, Meteorological Data.) The east property line is therefore the prevailing downwind direction. Second, the east property line is the site boundary closest to the discharge point.

The three environmental samples located on the east property are located 1) on the centerline of the prevailing downwind direction from the stack, and 2) 150 feet north and 150 feet south of this centerline (see attachment 5 of my letter of February 5, 1976).

These positions were chosen so as to 1) measure the Tritium concentrations at the closest off-property approach point to the stack, and 2) determine if there was any significant Tritium concentrations to either side of the centerline.

The three sample points are located at an elevation of approximately six feet, the height of the average man. The samples, therefore, represent the air concentrations that would be inhaled by an individual at that point.

7. See Item 2 above.



No. 2C1600 EXHAUST FILTER has a plywood exterior with a black painted finish, and uses glass-asbestos as a filter media. The filter has a minimum retention efficiency rating of 99.97% for 0.3 micron size or larger particles (DOP test), and includes a gauge for indicating the accumulation of dust within the filter. The filter is the disposable type, whereby the entire filter including the plywood shell is disposed of, and a new filter is substituted for it on the support bracket. 2" O.D. x $1\frac{1}{2}$ " L. aluminum connections are provided on each end of the filter, plus one 2" I.D. x 3" L. flexible hose connector with two 2" dia. adjustable stainless steel clamps for connecting to a blower or another filter. Overall dimensions are $14\frac{7}{8}$ " L. x 8" H. x 8" W.

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FILTER GAGE F 935

Rotate adjustment cap until ball is floating at point of bottom arrow "A". When ball is floating at point of top arrow "B", filters should be changed.

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VICE-PRESIDENT GENERAL MANAGER

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TABLE OF ORGANIZATION

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