

## UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

## AUG 7 1979

MEMORANDUM FOR: R. E. Cunningham, Director, Division of Fuel Sycle and Materials Safety, NMSS

FROM:

J. H. Sniezek, Director, Division of Fuel Facility and Materials Safety Inspection, IE

SUBJECT: U. S. RADIUM CORPORATION

Your memorandum dated July 18 requested us to initiate a comprehensive survey in the environs of the U.S. Radium facility. The following discussion is to clarify some apparent misunderstandings as indicated by statements in your memorandum and raises some questions about some apparent concerns of NMSS.

Your memorandum stated:

"The results of the samples taken by U. S. Radium and Region I are inconclusive. We are uncerned that we are unable to determine whether the results obtained by U. S. Radium and Region I are valid. Both U. S. Radium and Region I expressed their misgivings concerning the validity of measurements of such low concentrations of tritium."

Let us assure you that our results are valid and, in our minds, are conclusive. We are confident of the analytical results of the samples within the limits of statistical error given in the inspection report. They are conclusive from the standpoint they were collected from areas which represented the most likely locations where sampling would have revealed a problem if one existed, and the results show no problem in that environmental levels of tritium are small fractions (<2%) of NRC regulatory limits (Part 20 MPC) for concentrations in effluents to unrestricted areas. We believe Part 20 effluent values are reasonable "standards" for comparison of the environmental levels.

The so-called "misgivings" expressed about the validity of measurements of low concentrations of tritium are statements of fact--the last paragraph (on page 6) of our report number 30-5982/79-02 states:

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"At these levels, small amounts of cross contamination or chemical luminescense in samples could radically affect the reported results. For instance, the highest reported levels of tritium in well water represent less than 50 counts per minute (cpm) above a background standard count of about 20 cpm. Therefore, the results for environmental samples should be interpreted as upper limits of the value of the true concentrations."

The minimum detectable activity (MDA) for our analysis of tritium in water is about 4000 picocuries per liter; that is, our MDA is about 0.1 percent of the NRC regulatory limit for concentrations of tritium in effluents to unrestricted areas. This level of measurements sensitivity is more than adequate for this type of survey.

Your memorandum pointed out that: (1) U. S. Radium has collected samples of grass, extracted the water from these samples, and analyzed the water for tritium; (2) the results indicated that from about 2 miles from the facility and closer there were 10,000-20,000 picocuries of tritium per liter of water extracted from the grass; and (3) one such sample collected 350 yards east of the stack from which U. S. Radium releases tritium showed 75,000-80,000 picocuries of tritium per liter of water.

We have some reservations about the sampling and analytical methous used by the licensee and his contractor, and we are checking this out. Assuming, however, the results are valid, 80,000 picocuries of tritium per liter of water is only about 2 percent of the NRC limit for concentrations in effluents to unrestricted areas. The results are even less significant considering the amount of grass one would have to collect to extract a liter of water.

Also, we are unsure of the basis of your concern for this tritium in water extracted from grass. Does the concern stem from the relatively high value, 80,000 picocuries per liter?

- It's only about 2% of the NRC limits for tritium effluents to unrestricted areas.
- It should be viewed from a more correct expression of the results--80,000 picocuries of tritium (per liter of water) per X amount (kilograms, square meter, etc.) of grass.
- It should also be viewed from the standpoint of a potential exposure pathway and resultant dose to man, something normally considered in the licensing process to establish allowable release rates.

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If the concern arises because 80,000 picocuries per liter, at first glance, might indicate significant deposition in the local environ, we should bear in mind:

- Tritium is released in relatively significant quantities from the facility because the effluents are regulated under Part 20, Appendix B, Table II.
- The inspection report states that about 304 curies of soluble tritium and 1167 curies of gaseous tritium were released through the stack for the annual period ending June 26, 1979. This is well within NRC established effluent release limits.
- . If the NRC limits allow tritium to be released from the facility in significant quantities, there will be measurable amounts found in the environs. The environmental levels, however, should be viewed from the perspective of exposure pathways.

Your memorandum stated that U. S. Radium's analysis of grass samples collected approximately 20 miles west of their facility indicated the presence of about 10,000 picocuries of tritium per liter of water extracted from the grass, showing the presence of tritium in an areas where it was not expected. While we have some reservations about the validity of these results, the following remarks are pertinent (as are some of the preceding ones regarding tritium in water extracted from grass):

- We have learned that the licensee's consultant has collected and analyzed some grass samples from the vicinity of Philadelphia, Pennslyvania and the results indicated the presence of 1,400-4,000 picocuries of tritium per liter of water (per some amount of grass).
- We have collected some grass samples from near the Region I office and sent them to our DOE contract laboratory for analysis. We will provide the results when they are available.

Your memorandum also states that our inspection report contained results of only air and water samples. We assume your concern is that we did not collect and analyze any grass samples. Again, we are unsure (as discussed before) of the basis for your concern regarding tritium in water extracted from grass.

You also noted that our results for water samples 6 and 7 collected from two residential wells show 11,000 and 21,000 picocuries per liter.

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We are confident the values are correct within the limits of statistical error given in the report.

- . They are, respectively, about 0.4 and 0.7 percent of the NRC limit for tritium in effluents to unrestricted areas.
  - They are (also), respectively, about 50 and 100 percent of the EPA standards for drinking water. (EPA standards are established for public water supplies.)

For the reasons stated above, we see no compelling reasons for initiating a comprehensive survey of the environs of the U.S. Radium facility. As we pointed out in the beginning, we have confidence in our analytical results, and feel they are conclusive from the standpoint of establishing that environmental levels of tritium are small fractions of Part 20 limits for releases to unrestricted areas. Furthermore, the inspection findings show the license is in compliance with regulatory requirements for the release of tritium effluents. However:

- If the levels of tritium identified in the environment are considered to be too high, we strongly recommend that appropriate requirements be imposed to limit effluent releases n.w regulated under Part 20 (i.e., establish ALARA limits); or
- if the levels of tritium in the environment are of significant concern from the standpoint of public protection, we strongly recommend that licensing action be taken to suspend the operation (we see no basis for this, as we pointed out, when levels are compared to Part 20 limits); or
- 3. if there is a need for comprehensive further evaluation to deturmine the fate and public impact of tritium in the environs as a result of facility operation, we strongly recommend that the licensee be required to establish a more extensive effluent and environmental monitoring program and routinely report the results to the NRC.

We would be glad to discuss this further if you desire.

O. H. Sniezek, DiPector Division of Fuel Facility and Materials Safety Inspection Office of Inspection and Enforcement

cc: <sup>B</sup>. H. Grier, IE R. McClintock, IE V. L. Miller, NMSS D. A. Nussbaumer, NMSS -4-





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