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UNITED STATES RADIUM CORPORATION

P. O. Box 246

MORRISTOWN, NEW JERSEY

May 27, 1960

PLANTS AND LABORATORIES
BLOOMSBURG, PA.
BERNARDSVILLE, N. J.
WHIPPANY, N. J.
NO. HOLLYWOOD, CALIF.

EUROPEAN SUBSIDIARY:
UNITED STATES RADIUM
CORPORATION (EUROPE)
GENEVA, SWITZERLAND

CANADIAN SUBSIDIARY:
RADELIN LTD. TORONTO

CABLE ADDRESS:
RADELIN-MORRISTOWN, N. J.

Mr. J. R. Mason, Chief, Isotopes Branch
U. S. Atomic Energy Commission
Division of Licensing and Regulation
Washington 25, D. C.

Reference: DLR.RP

Dear Mr. Mason:

Please refer to your letters of January 6th and March 22nd, 1960 and ours of February 17th and April 1st, 1960 relative to our reported lack of compliance with the requirements of 10 CFR, Part 20.

1. We have completed the surveys to determine the concentrations of radioactivity in the water, bed and banks of the canal containing the waste effluent from our radioactive laboratories. The results are given in Table I and are reported in terms of alpha particle and beta-gamma activity. Since the radioactivity is the result of an unassayed mixture of radioisotopes a determination of the amounts of each isotope present is not feasible. We are fairly certain, however, that Sr^{90} - Y^{90} , Cs^{137} and Ra^{226} with daughter products are present. A large number of samples were counted and the values are given as maximum, minimum and average for each lot of samples.

Table I

Radioactive Content of Canal Water and Earth

Canal Water	Alpha uc / ml	Beta-gamma uc / ml
Maximum	2.5×10^{-7}	5.18×10^{-6}
Minimum	2.1×10^{-8}	1.56×10^{-6}
Average	7.0×10^{-8}	2.42×10^{-6}
Canal Bed	uc/mg	uc/mg
Maximum	1.0×10^{-7}	5.71×10^{-6}
Minimum	2.24×10^{-9}	3.27×10^{-6}
Average	8.56×10^{-8}	1.29×10^{-6}
Canal Banks		
Maximum	1.47×10^{-6}	2.28×10^{-6}
Minimum	6.51×10^{-10}	zero
Average	2.95×10^{-7}	4.58×10^{-7}

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Mr. J. R. Mason

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2. We have found that by chemical treatment the alpha activity may be reduced to less than 1×10^{-8} uc/ml and the beta-gamma activity to 1×10^{-7} uc/ml. To enable us to handle the large volumes of water involved, the canal has been divided into three sections and we have constructed a large storage pool having a capacity of about 100,000 gallons. By the proposed method, each section will be treated with appropriate carriers and flocculating agents, and the radioactive material will be precipitated in situ. After a settling period the supernatant liquid will be pumped to the storage pool for monitoring. If the activity is found to be less than the maximum permissible level for mixed isotopes of 1×10^{-7} uc/ml, the water will be discharged to the river. Dilution to the permissible level during discharge will be carried out if necessary.

The procedure will then be repeated for the other sections of the canal, and finally the active sludge will be transferred to the large tank for permanent storage where it will be allowed to dry by evaporation. The ultimate disposition of the solids will be determined after a re-estimate of the total radioactivity has been made.

3. We have engaged the services of a consulting engineering firm to study the liquid effluent problem, and the installation of an evaporation system for the concentration of radioactive wastes has been recommended. The recommendation is under study at this time, and as soon as several unknown variables have been evaluated, we shall decide upon the procedure for implementing the program. Basically the plan involves the separation of the laboratory wastes into three categories:
 - a. non-radioactive
 - b. Ra^{226} - Sr^{90} wastes
 - c. other radioactive wastes

The radioactive wastes will be delivered to two hold-up tanks for monitoring, and the feed to the evaporator will be proportional according to the amount of contained activity. The system will be equipped with an entrained mist separator, and the distillate will pass through an ion exchange column to a hold-up tank for monitoring before discharge.

We expect to have completed the activities suggested under Item 2. by August 15, 1960. The decisions as to action on the evaporation system will be made by June 20 and the program should be complete by September 1, 1960.

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Mr. J. R. Mason

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May 27, 1960

With reference to your letter of May 13th, 1960, we have made provision for immediate bio-assays whenever it is suspected that persons may have accumulated a body burden of a radioactive material.

Very truly yours,

C. C. Carroll
Manager, New Products

OCC:vn

