§ 5. Discontinuation of Radioisotope Use at a Tritium-handling Laboratory

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The tritium-handling laboratory of the National Institute for Fusion Science was constructed about twenty years ago. Although its total area was only 250 m^2, eighty-five percent of which was a controlled area, it handled a large amount of tritium for the nation's small-scale radiation facilities—up to 100mCi (3.7 GBq) a day and 100 times this amount in a year. Tritium was the only radionuclide handled there, and a "zero-release" method for tritium confinement was used.

For about twenty years was a convenient place to work for various studies concerning safe tritium handling, tritium cleanup, tritium monitoring, and so forth, but its role recently came to an end and we completed the work legally required for the discontinuation of radioisotope use. This included taking appropriate measures related to the discontinuation and then notifying the minister of Education, Culture, Sport, Science, and Technology of the discontinuation and the measures taken. The whole process could be divided into three terms comprising nine tasks carried out in the order shown in Table 1.

The first term was devoted to making preparations for the discontinuation of radioisotope use and comprised four tasks. The first, of course, was to conclude the ongoing study using tritium, and the second was to check fixtures and articles for radioactive contamination. Uncontaminated items were then disposed of as industrial waste. The third task was to deal with the tritium we had at that time. This could have been done by disposing of it or by delivering it to other qualified users. In our case, all the tritium was disposed of as waste. The forth task was to educate and train radiation workers who would perform the tasks necessary on discontinuation of radioisotope use. This education and training of radiation workers was an important obligation regulated by law in Japan.

The second term involved work related to the actual discontinuation of use and comprised three tasks. The first was to measure the contamination of the fixtures, equipment, and instruments, a part of which was found to be contaminated when they were checked during the first term. After these items were decontaminated, the contamination of the laboratory itself was measured and it was decontaminated. The contamination measurement and decontamination were the main tasks of the beginning half of the second term and were huge tasks. Massive amounts of radioactive waste that could not be sufficiently decontaminated were generated, so the final task of the second term was to classify and delivery this radioactive waste.

The third term comprised the preparation of the declarations of discontinuation of use and the submission of these declarations, along with the report of measures taken, to the minister of Education, Culture, Sport, Science, and Technology. After all these strictly legally regulated tasks required for discontinuation of radioisotope use were completed, we had to complete such final tasks as removing the radiation monitoring instruments and evacuating the laboratory.

Table 1. Whole working process of reporting the declaration concerning discontinuation of use and measure taken in the discontinuation

Term	Working process
First term	(1) Conclusion of studies using radioisotopes
	(2) Contamination measurement and disposal of fixtures and articles
	(3) Disposal and delivery of radioisotopes and radioactive waste
	(4) Education, training, and registration of radiation workers
Second term	(5) Contamination measurement and decontamination of fixtures, articles, equipment, and instruments
	(6) Contamination measurement and decontamination of the laboratory
	(7) Classification and delivery work radioactive waste and uncontaminated waste
Third term	(8) Preparation and report of declaration concerning discontinuation of use and measures taken in the discontinuation
	(9) Settlement of remaining work

In the future study of measures taken, we will provide further detail about the three terms and will present the results of the radiation monitoring performed during these tasks, a classification of all the wastes, and a summary of all the other information obtained during this work.