

## Overview of the Unified Program of the Scaling Factor Determination Program and the Dose to Curie Conversion Program

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Final disposal of radioactive waste generated from Nuclear Power Plant (NPP) requires the information of the radionuclides inventories in waste package by national regulations and guidelines. However, the direct assessment through the destruction of the drummed radioactive waste for all stored drums is difficult economically and time-consuming. Thus it is well-known to rely on the indirect method by which the activities of the Difficult-To-Measure (DTM) nuclide are estimated using the correlations of the activities between the Easy-To-Measure (Key) nuclide and the DTM nuclide with the measured activities of the Key nuclide, so called the scaling factor (SF) method. Generally in order to apply the SF method to the real LILW drums, the following three parts are required, such as the gamma scanning system for the measurement of Key nuclide, the database for the each activity of the nuclides in waste stream sample for the SF and the SF determination method for the assessment of the radionuclides inventory in the real waste drums.

KAIST developed the program for the SF determination method based on the database for the activity of the each selected nuclide analyzed by KAERI using the statistical method such as log mean average (LMA) generally and the theoretical method for some fission nuclides. The general outline of the SF determination method is presented at Table I. To improve the reliability of the SF calculated by the program, two methods have been applied. The first method is the calculation of scaling factor by grouping the waste type or plant type of the database set. The other method is the calculation of SF after the outlier of the database is eliminated. KAIST also developed the other program for the dose to curie conversion (DTC) method for the drums which can not be assessed by the gamma scanning system because of related technical difficulties, measuring time and cost. To improve the reliability of the assessment for the activities of gamma nuclides, the density of the waste for DAW drums are considered and the source position in the drums are installed conservatively. In this program, the activities of beta and alpha nuclides are calculated using the SF determination program. The SF determination program and the DTC Program are unified as one program for convenience and efficiency. The unified program includes the above two program as well as the function for the manager of the database. Figure I and Figure II show the main windows of the SF determination program and the DTC program in the unified program.

Table 1. Outline of the SF Determination Method

DTM Radionuclides	Key Nuclides	Method
H-3, C-14, Fe-55, Ni-59, Ni-63, Nb-94	Co-60	Statistical Method(LMA Method)
Sr-90, Tc-99, I-129	Cs-137	Statistical Method(LMA Method)
Gross Alpha	Co-60	Statistical Method(LMA Method)
Tc-99, I-129	Cs-137	Theoretical Method

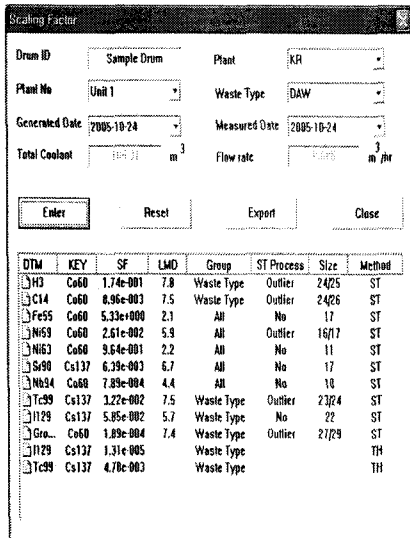


Figure 1. Main Window of the SF Determination Program

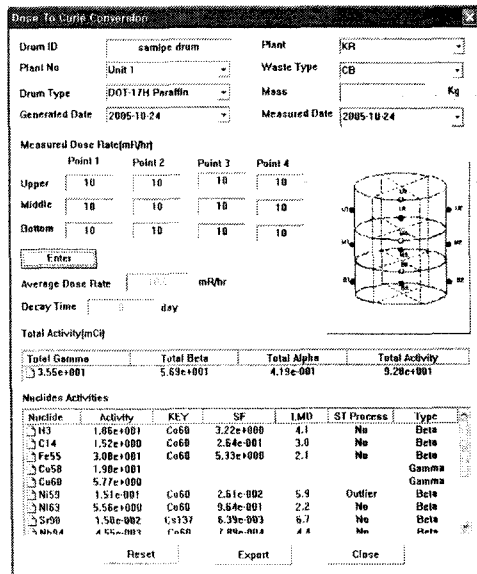


Figure 2. Main Window of the DTC Program