Preliminary Study on the Development of Integrated Dose Assessment Program for Accident Analysis on LILW managed in Temporary Storage Facility

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Ⅰ. Introduction

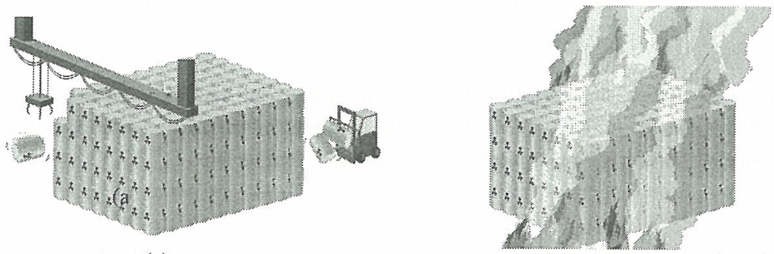
In order to develop the integrated dose assessment program for accident analysis on LILW managed in temporary storage facility (TSF), a variety of parameters were considered such as risk factor, radionuclide inventory, atmospheric dispersion factor, dose conversion factor, and so on. In case of risk factor, the master logic diagram (MLD) method, which is based on the fault tree analysis but without the formal mathematical properties, was used. And then, the release rates with respect to the type of wastes and radionuclides were considered to evaluate the amount of radionuclides released by derived risk factors. Furthermore, the atmospheric dispersion factor was calculated by the U.S. NRC computer program named PAVAN [1-2].

Synthesizing above parameters, the integrated dose assessment program for accident analysis on LILW managed in TSF has being developed by Visual C# in Microsoft Visual 爀愀渀 io.NET 2003. The final goal of this st渀 昀爀is to develop the integrated dose assessment program for accident analysis.

Ⅱ. Information Analysis for Dose Assessment originated by Arbitrary Accidents

Ⅱ-1. Risk factor

The main risk factor led to arbitrary accidents, the dropping of a drum and fire were derived from the MLD method (Fig. 1). Based on two risk factors, four heading events for establishment of risk-based accident scenarios were also derived.



(a) (b)

Figure 1. The main risk factors (a) Drop, (b) Fire

Ⅱ-2. Radionuclide inventory

In order to evaluate the exposure dose from main risk factors with regard to the TSF, we first calculated the radionuclide inventory by the dose to curies conversion method considering the release rates with respect to the type of wastes and radionuclides.

Ⅱ-3. Atmospheric dispersion factor

In this study the atmospheric dispersion factor was calculated by PAVAN, which is based on various models and assumptions suggested in U.S. NRC Regulatory Guide 1.145 [3]. For final exposure dose assessment, we adapted the χ/Q value corresponding to the 50 percentile for workers and public, i.e., 2.35E-3 sec/m^3 for workers and 2.82E-5 sec/m^3 for public.

Ⅲ. Development of Integrated Dose Assessment Program for Accident Analysis

Based on the information analysis for dose assessment originated by arbitrary accidents, this computer program has being developed by a tool named Visual C# in Microsoft Visual Studio.NET 2003. Furthermore, this program will be integrated with the existing dose assessment code for evaluating the exposure dose resulted from gaseous and liquid radioactive materials released in normal operation of NPP. Figure 2 shows the flow chart of computer program being developed.

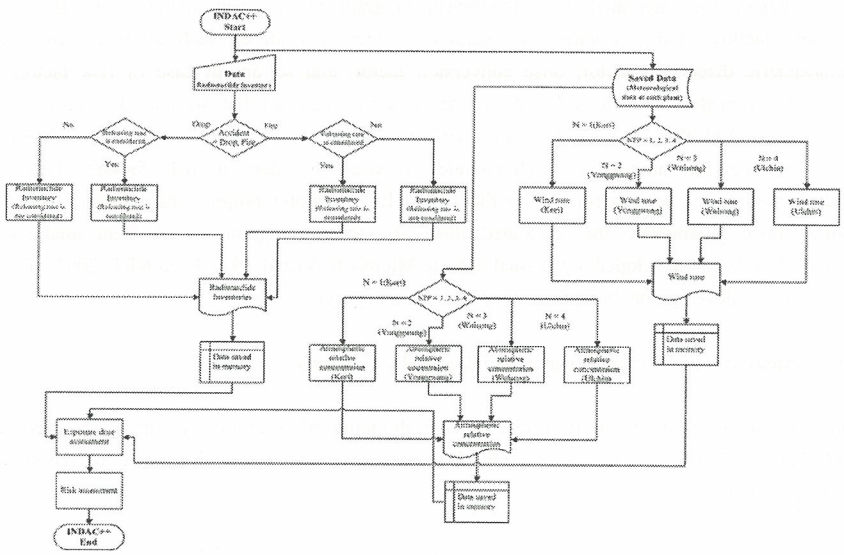


Figure 2. The flow chart of integrated dose assessment program

Ⅳ. Conclusion

Based on the previous studies, the integrated dose assessment program has being developed to evaluate the risk level of accidents originated in TSF. To do this work, a variety of parameters were also considered such as risk factor, radionuclide inventory, atmospheric dispersion factor, and so on.

References

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