Introduction of dose reduction technology

“Our Decontamination technologies for NPSs”

Tadasu, Yotsuyanagi, Toshiba Cooporation, Japan

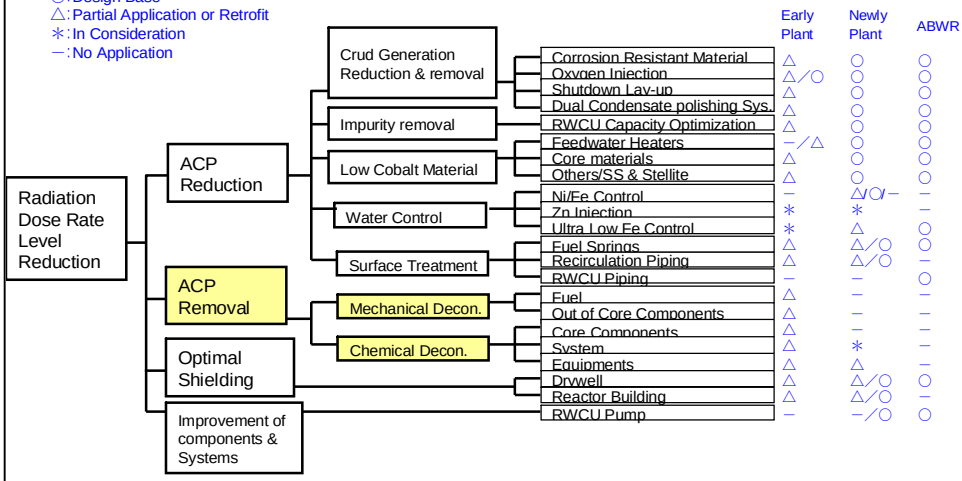
This is the introduction of Toshiba decontamination technology for nuclear power stations. The method of decontamination is divided roughly into chemical decontamination and mechanical decontamination. Chemical decontamination is the method to dissolve and remove metal oxide in the oxide film chemically. Chemical decontamination method is able to achieve high DF and easy to remove dissolved metal such as Fe, Cr by ion exchange resins; therefore, it is the good decontamination method that can minimize the creation of secondary waste.

Before year 2000, CORD method(developed by Siemens in Germany) is mainly used but after 2000, T-OZON method, which was developed by Toshiba originally, is gradually used. T-OZON method uses oxalic acid as a reducing agent to restore external ferrite to solubility Fe and ozone as a oxidation to oxide chromites solubility Cr ($Cr_2O_4^{2-}$). T-OZON method is able to achieve high DF and it is easy to remove secondary generated materials so that it is possible to dramatically reduce secondary waste. (CORD method uses permanganate ion that contains Mn, which is difficult to be removed by oxidation; therefore, there is the limitation to reduce secondary waste).

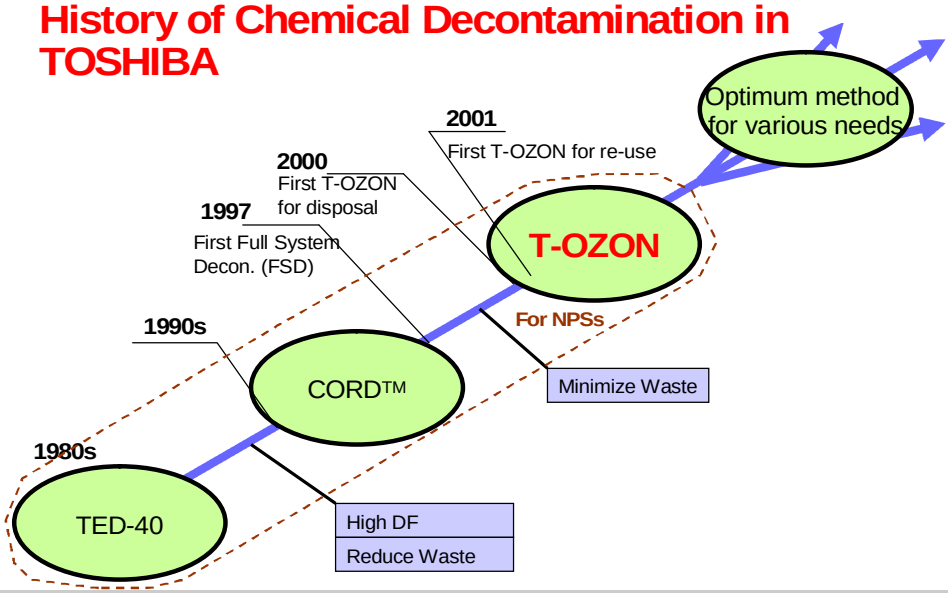
Toshiba developed other various mechanical decontamination methods as well. The cleaning period of Water jet method is relatively short so that it is suitable for simple cleaning of piping. Zirconia blast method has a good point that it repeats polishing.

Measures for Reducing Radiation Dose Rate in BWRs

○: Design Base
△: Partial Application or Retrofit
∗: In Consideration
－: No Application



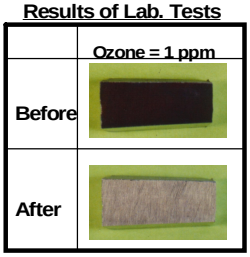
History of Chemical Decontamination in TOSHIBA



Main Features of T-OZON

- High DF
- Minimum Secondary waste volume
- No adverse impacts on material integrity

Results of Lab. Tests



DF > 100

Volume of Secondary Waste