

Introduction of New Decontamination Techniques Using Carbon Dioxide

Kwangheon Park*, Hakwon Kim*, Hongdu Kim*, Moonsung Koh*, Jeongdong Ryu*,
Yangeun Kim**, Bumsik Lee**, and Hyuntaek Park**

1) Kyunghee University

1 Sochen-ni, Kihung-eop, Yongin-shi Kyongki-do, 449-701, Korea

3) Wolsung Power Plant, Korea Electric Power Cooperation

Yangnam-myun, Kyungju-shi, Kyungsangnam-do, Korea

Abstarct

Green technology is being developed up to a point that is feasible not only in an environmental sense, but also in an economical viewpoint. This paper introduces two case studies that applied green technology into nuclear industry. 1) Nuclear laundry: A laundry machine that uses liquid and supercritical CO₂ as a solvent for decontamination of contaminated working dresses in nuclear power plants was developed. The machine consists of a 16 liter reactor, a recovery system with compressors, and storage tanks. All CO₂ used in cleaning is fully recovered and reused in next cleaning, resulting in no production of secondary nuclear waste. Decontamination factor is still lower than that in the methods currently used in the plant. Nuclear laundry using CO₂ looks promising with technical improvements - surfactants and mechanical agitation. 2) CO₂ nozzle decontamination: An adjustable nozzle for controlling the size of dry ice snow was developed. Using the developed nozzle, a surface decontamination device was made. Human oils like fingerprints on glass were easy to remove. Decontamination ability was tested using a contaminated pump-housing surface. About 40 to 80% of radioactivity was removed. This device is effective in surface-decontamination of any electrical devices like detector, controllers which cannot be cleaned in aqueous solution.