

# 千葉県が実施した放射能除染とその効果について

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## Efficacies of Radioactive Decontamination Methods Conducted by the Government of a Municipality of Chiba Prefecture

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### Summary

A large amount of radioactive materials were discharged from Fukushima Dai-ichi Nuclear Power Plant in March 2011, and this caused a serious radioactive contamination over large area of eastern Japan. This paper is designed to review the efficacies of decontamination methods that were conducted by the government of a municipality of Chiba Prefecture to eliminate radioactive materials. The efficacies of each decontamination methods were evaluated by reduction of air dose rate (1 cm dose equivalent dose) observed before and after decontamination (the natural air dose rate of 0.04  $\mu\text{Sv/h}$  derived from the ground was subtracted for the calculation of reduction rate). Following seven decontamination methods are cited from our past reports. 1) Coverage of ground with uncontaminated soil to thickness of 5 cm. 2) The topsoil was stripped and removed to the depth of 5 cm (exceptionally 1 cm at Japanese Garden). 3) Stripped and removed the topsoil containing radioactive materials in the range of 3 ~ 5 cm depth, subsequently coverage with uncontaminated soil to the thickness of 3 cm to the subsoil layer. 4) Replacement with uncontaminated sand 15 ~ 20 cm depth in sandbox. 5) Washing the paved road with high-pressure water jet washer (water pressure of 15 MPa, the rate of water usage was approximately 20 L/m<sup>2</sup>). 6) Replacement of contaminated sand at the artificial turf tennis court. 7) Lawns were mowed at 2 cm length. The observed air dose reduction rates were 57%, 64% (31% at Japanese Garden), 75%, 65 ~ 74%, 33%, 67% and 70% respectively. A point to notice is that, radioactive materials are known to transfer among environmental media by weathering effects (e.g. wind, precipitation) that may act as either increase or decrease of air dose rate. Therefore, great attention should be paid to the monitoring of air dose rate even after the decontamination was achieved.

**Key Words:** Decontamination, Chiba Prefecture, Fukushima Dai-ichi Nuclear Power Plant, Air dose reduction rate, Monitoring

### 和 文 要 約

本報では、これまで著者らが報告してきた既報に基づいて、千葉県が実施した除染の事例を一部紹介するとともに除染手法別に得られた効果について概説した。除染手法別の効果については、除染前後で得られた空間線量率から低減率を算出して評価した(低減率はバックグラウンド値を差し引いて算出)。除染効果の検証を行った除染手法は以下の7つである。1) 汚染土壌表面の覆土による遮へい、2) 汚染土壌の切削除去、3) 汚染土壌の切削除去と覆土による遮へいの組み合わせ、4) 砂場における汚染砂の入れ替え、5) 舗装道路の高圧洗浄、6) 人工芝庭球場の汚染珪砂の入れ替え、7) 芝の深刈り。それぞれの除染手法で得られた空間線量率の低減率は、57%、64%(日本庭園では31%)、75%、65~74%、33%、67%、70%であった。放射性物質はウェザリング効果により環境媒体中を移動することから、空間放射線量率は増減する。そのため、除染が完了したとしても、空間線量率のモニタリングを継続的に行い、新たに措置が必要となった場合には、適切に対応していくことが重要である。