



**The Outline of Cs Removal Technology by Dry Process and the Report of Entrusted Business of Verification Survey of the Technology that Removes Cs from Contaminated Wastes to Civil Work Materials at Temporary Plant in the Warabidaira Region in Iitate Village**

Kenichi HONMA<sup>1\*</sup>, Hiroyuki TAKANO<sup>1</sup>, Wataru KOBAYASHI<sup>2</sup>, Tadashi SASAKI<sup>2</sup>, Yuji TAKAHASHI<sup>3</sup>, Takuro SHINANO<sup>4</sup>, Tamao HATTA<sup>5</sup>, Yuuzou MANPUKU<sup>6</sup>, and Jiro USUI<sup>7</sup>

<sup>1</sup>Taiheiyo Cement corporation (2-4-2 Osaku, Sakura, Chiba 285-8655, Japan)

<sup>2</sup>JGC corporation (MM Park Bldg., 3-6-3 Minato Mirai, Nishi-ku, Yokohama, Kanagawa 220-0012, Japan)

<sup>3</sup>Taiheiyo Engineering Corporation (SA Bldg., 2-17-12 Kiba, Koto-ku, Tokyo 135-0042, Japan)

<sup>4</sup>National Agriculture and Food Reserch Organization, Tohoku Agricultural Research Center

(50 Harajukuminami, Arai, Fukushima 960-2156, Japan)

<sup>5</sup>Chiba Institute of Science, Faculty of Risk and Crisis Management (3 Shiomi-cho, Choshi, Chiba 288-0025, Japan)

<sup>6</sup>National Agriculture and Food Reserch Organization (311 Kannondai, Tsukuba, Ibaraki 305-0856, Japan)

<sup>7</sup>Japan Sewage Works Agency Fukushima Reconstruction Project Office

(Yushimadai Bldg. 3F, 2-31-27 Yushima, Bunkyo-ku, Tokyo 113-0034, Japan)

### Summary

The authors have developed a heat treatment method for removed soil from land clean-up operations and incinerator ash which contain radioactive contaminants. The proposed method removes Cs by volatilization to produce reusable materials satisfying the clearance level, while reducing the volume of radioactive Cs contaminated waste by concentration. A simulative experiment using artificial soil onto which non-radioactive Cs was adsorbed showed that Cs removal rate, which was very low when the soil was heat treated with no additives or with a simple addition of CaCl<sub>2</sub> as a promoter chloride, could increase significantly by adding inorganic high-performance accelerators developed by the authors to the soil. Based on the findings from the experiment, verification projects were carried out jointly with the public sector, using contaminated soil sample from the field and sewage sludge ash from an incinerator. It was demonstrated in the joint projects that radioactive Cs content in the contaminated soil or sewage sludge ash was successfully reduced from the order of tens of thousands Bq/kg to below 100 Bq/kg which was the clearance level, and that the obtained product satisfied requirements in the specifications for fill soil, subbase material and many other civil work materials. As a result of verification, a temporary demonstration plant was built in the Warabidaira region in Iitate Village, Fukushima. Its operation starts in April 2016 for further verification in which the removed soil from the village and the incinerator ash from an adjacent facility are heat treated by the proposed method and recycled into civil work materials for reuse.

**Key Words:** Removed soil from land clean-up operations, Incinerator ash, High-performance accelerator, Clearance level, Purification products