



Contribution ID: 24

Type: Oral presentation (preferred)

Contamination density analyses at Fukushima-Daiichi Power Station using pinhole type gamma camera

Thursday, 30 May 2024 11:50 (20 minutes)

In Fukushima Daiichi Nuclear Power Station, various projects are currently working towards decommissioning. Radioactivity distribution measurement is indispensable to plan every project. These remained radioactivity information are also valuable for investigating accident procedure analyses.

We developed contamination density estimation method using pinhole type gamma camera. 1),2) This method was extended to apply to measure ^{137}Cs contamination density of SGTS (stand-by gas treatment system) pipe. The SGTS pipes of unit.1 and 2 are highly contaminated by vent operation of unit 1 to release high pressure of PCV (Primary Containment Vessel) in the accident period. To decrease high dose rate by this piping at adjacent building, it was cut in 2022 and removed from original position and temporarily located on the unit 1 turbine building before cutting to small pieces for storage. We measured ^{137}Cs contamination density of these SGTS pipes from the viewpoint of radioactive waste management and also get data potentially useful for accident procedure analyses.

Figure 1 shows 12 shot areas of unit 1 SGTS pipe took by gamma camera (Hitachi HGD-E1500). Figure 2 shows ^{137}Cs contamination density distribution (GBq/cm²) of the pipe inner surface along the direction of gas flow. Contamination peaks were observed every ~5 meter that may be caused by rust at inner surface caused by surface alteration phenomena by welding at construction.

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Fig.1 12 shot areas of unit 1 SGTS pipe at unit 1 T/B roof

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Fig.2 ^{137}Cs contamination density of SGTS pipe

References

- 1) H. Hirayama, K. Hayashi, K. Iwanaga, K. Kondo and S. Suzuki, "Measurement of ^{137}Cs activity with pinhole gamma camera", J. Nucl. Sci. Technol., Vol. 19, No. 3, 152-162 (2020) (in Japanese)
- 2) K. Hayashi, H. Hirayama, K. Iwanaga, K. Kondo and S. Suzuki "Estimation of ^{137}Cs Contamination Density of Wall, Ceiling, and Floor at Unit 2 Operation Floor in Fukushima Daiichi Nuclear Power Station Using Pinhole Gamma Camera" Nuclear Science and Engineering, 198, 207-227 (2024)

Scientific Topic 1

Scientific Topic 2

Scientific Topic 3

Scientific Topic 4

Shielding and dosimetry

Scientific Topic 5

Induced radioactivity and decommissioning

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Session Classification: Session 5 - Induced Radioactivity

Track Classification: Induced radioactivity and decommissioning