

The background features a close-up of several sharpened colored pencils in various colors (teal, orange, blue, red, grey) against a dark, blurred background. A large, semi-transparent green geometric shape, composed of overlapping triangles, is overlaid on the right side of the image. The title text is centered in a bright green color.

Analysis on Waste for the Decommissioning of FDNPS

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Variety of Waste Materials in FDNPS

- ▶ Variety of Nuclides
 - ▶ Wide Range of Mass and Concentration
 - ▶ Various Materials in Various State
 - ▶ Massive Amount of Radioactive Waste
- Location of Radioactive Waste



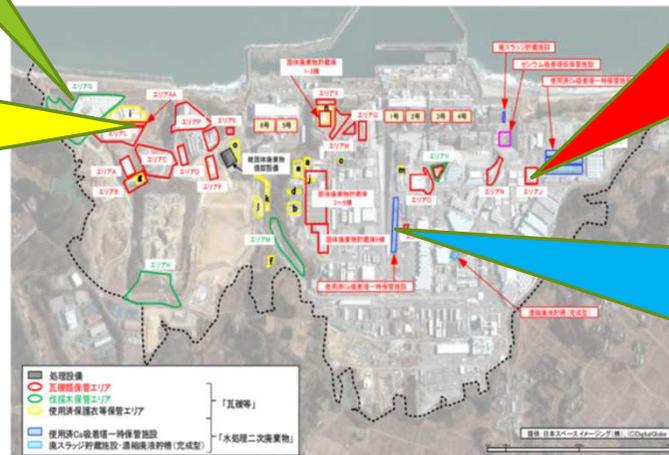
Cut Wood



Rubbles



Combustibles

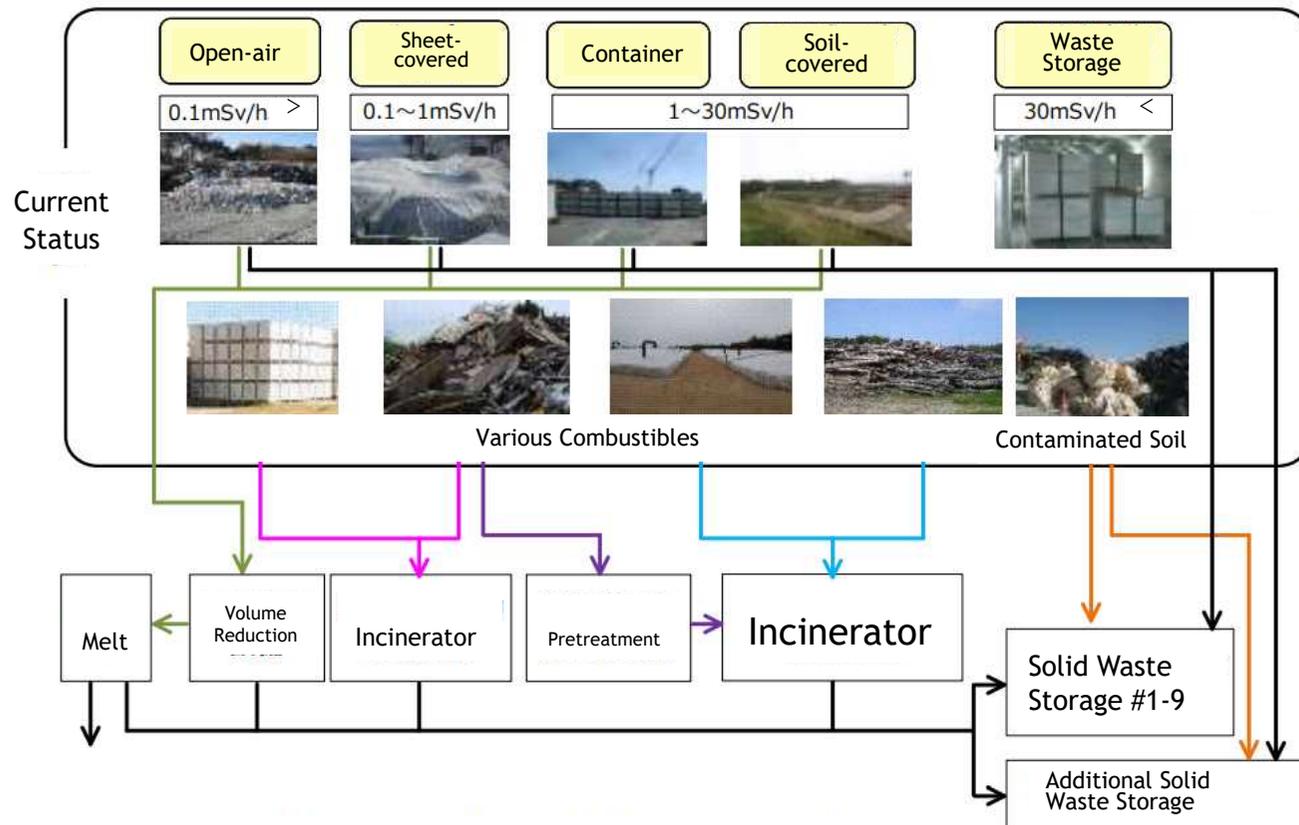


Nuclides Absorption Units

From the website of TEPCO Holdings
<https://www.tepco.co.jp/decommission/progress/waste/>



Various Waste Materials (mainly rubbles)

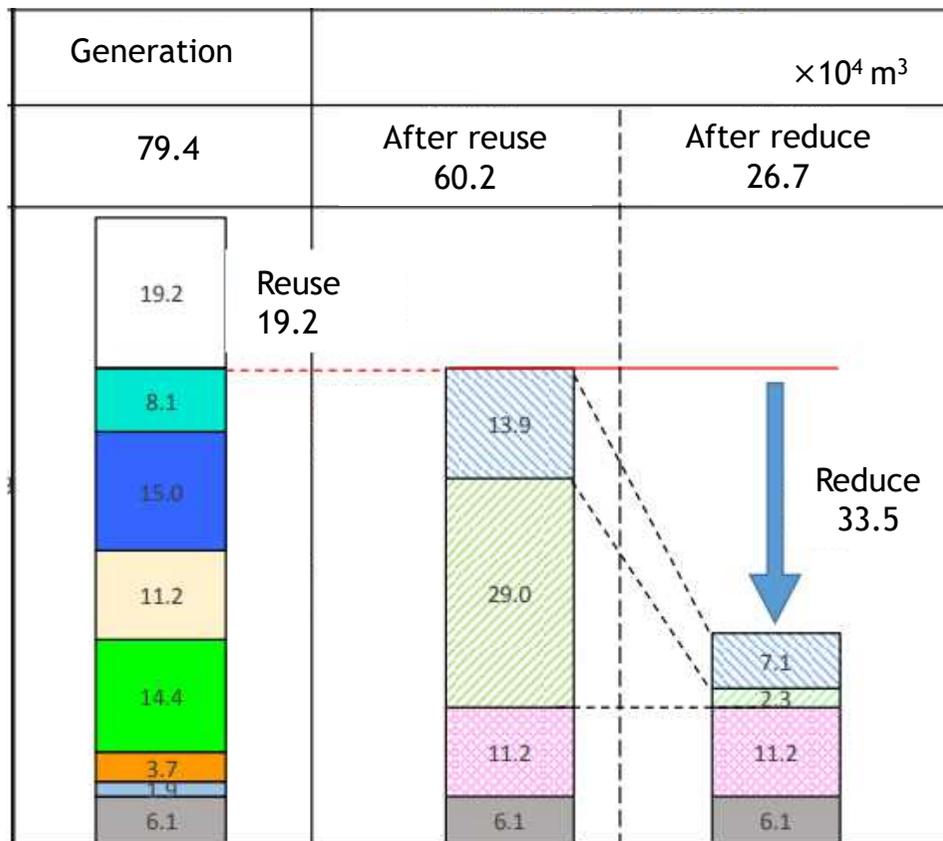


From the website of TEPCO Holdings

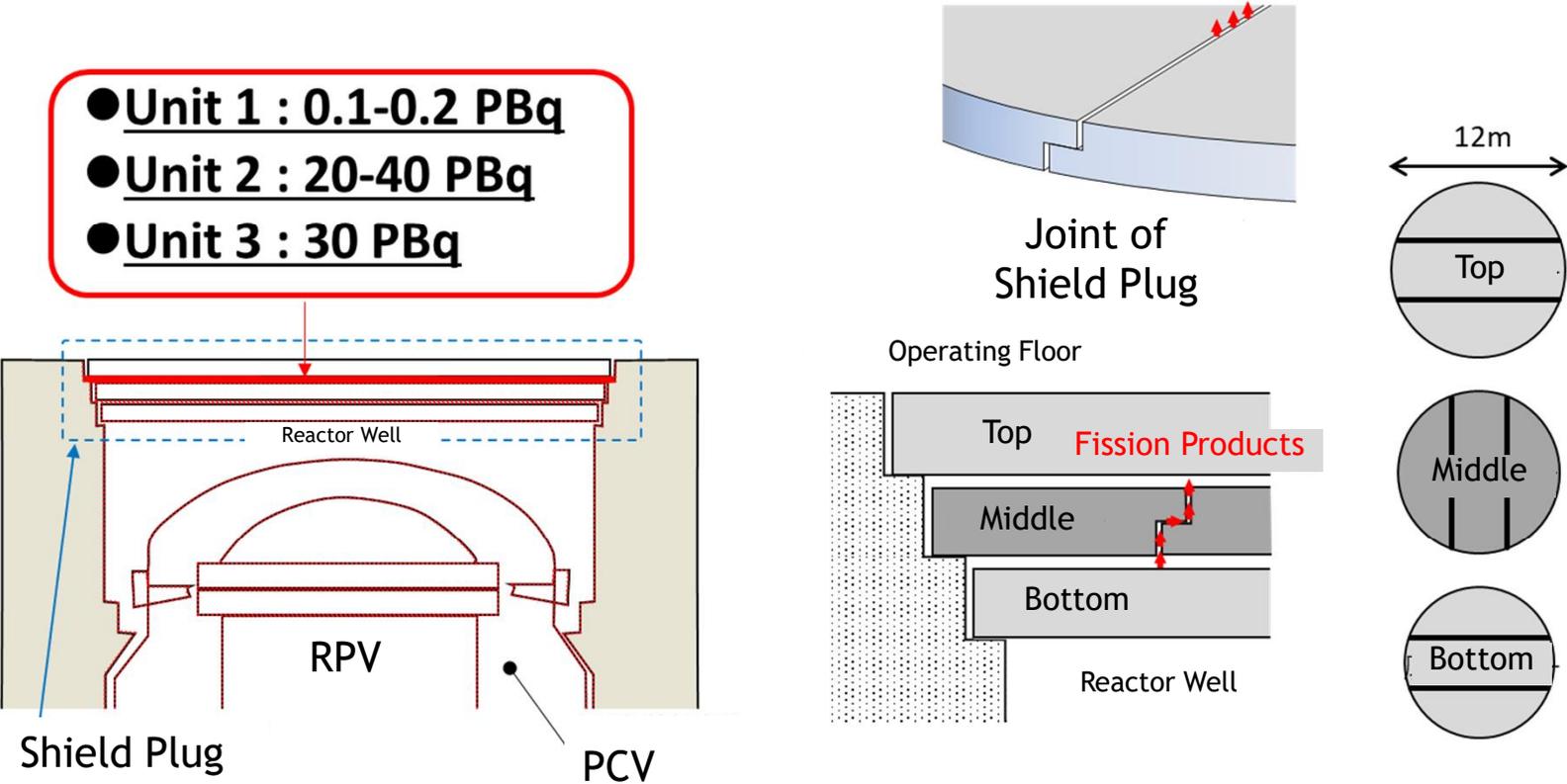
<https://www.tepco.co.jp/decommission/progress/waste/>

Estimation on Amount of Rubbles

On March 2033



Example of Heavily Contaminated Components: Shield Plug over the PCV



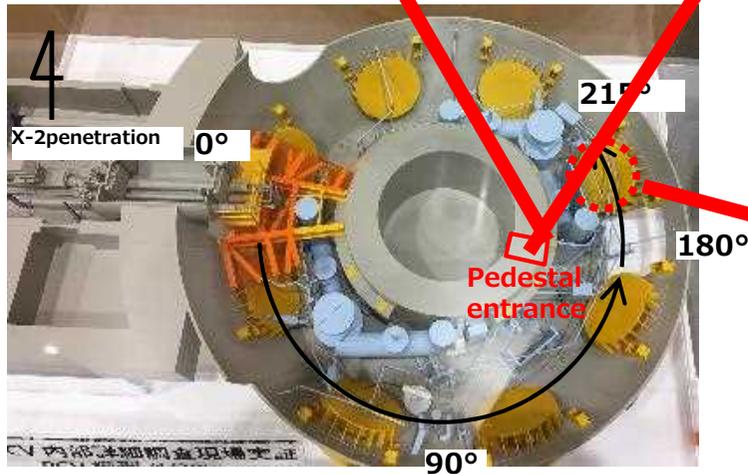
Debris from Damaged Core



A. Table-shaped deposition at pedestal entrance



B. Lump-shaped deposition inside pedestal entrance



C. Table-shaped deposition

From the TEPCO's Materials at the NRA meeting on FDNPS Accident Study

Generated with the Decommissioning Activities



Scaffold

R zone (アノラックエリア)	Y zone (カバーオールエリア)	G zone (一般服エリア)
全面マスク 	全面マスク 又は 半面マスク (※1 ※2) 	使い捨て式防じんマスク 
カバーオールの上にアノラック 	カバーオール 	一般作業服 

Protection Gears



Containers storing used cloths

Characteristics of Wastes and Needs of Analysis

- ▶ Wide variety, high radiation dose, massive volume... and unknowns
- ▶ Widening needs for application of analysis and its results
(methodology, resource, efficiency, accuracy, applicability, timeliness, etc.)
- ▶ Identifying characteristics before handling and utilize the results afterwards
- ▶ Flexible approach required for consideration on the categorization of waste materials and the ways of storage

Capacity Building for Various and Massive Analysis

- ▶ Currently insufficient analyzing capacity in Japan!
- ▶ Can TEPCO and other organizations doing analysis be enough to accomplish decommissioning?





- 1 Put priority on enhancing capacity of analysis
- 2 Require initiatives to increase analytical resources

① Continuous in long term,

② High quality,

③ Enough amount of,

a. Human resources,

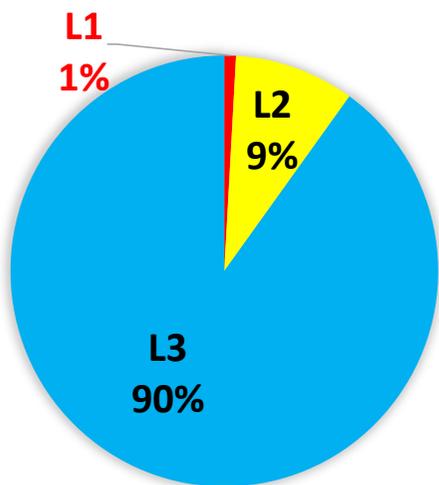
b. Facility and equipment,

c. Operational resources,

are systematically required.

Reference: Categorization and Amount of Waste from ordinal NPP decommissioning

- Example of Unit 5 of FDNPS Estimation



Amount of Radioactive Waste
(Total: 9,140ton)

Category of Radioactive Waste		Amount /ton	Criteria
Category 1		—	Beyond Category 2
Cat. 2	Relatively high radiation (L1) [mid-depth]	80	^{14}C :10PBq/t, ^{36}Cl :10TBq/t, ^{99}Tc :100TBq/t, ^{129}I :1TBq/t, α -emitter:100GBq/t
	Relatively low radiation (L2) [pit]	830	^{14}C :100GBq/t, ^{60}Co :1PBq/t, ^{63}Ni :10TBq/t, ^{90}Sr :10TBq/t, ^{99}Tc :1GBq/t, ^{137}Cs :100TBq/t α -emitter:10GBq/t
	Very low radiation (L3) [trench]	8,230	^{60}Co :10GBq/t, ^{90}Sr :10MBq/t, ^{137}Cs :100MBq/t
Non-Radioactive Waste		Amount /ton	Criteria
Below Clearance Level		13,700	Clearance level of radiation
Uncontaminated Waste		311,000	—

Analysis for the Long-term Storage

- ▶ Identify Analytical needs for long-term stable and safe storage and categorization of waste storage
- ▶ Monitor long-term situation of stored waste and utilize the results of measurement



- 1 Material to consider categorization of waste for the future disposal
- 2 Envisioning determination of measures to be taken