Decommissioning Process of Nuclear Power Plant



Standard stages of decommissioning (Note:) Boiling water reactor (BWR)





Unloading of spent fuel Spent and unused fuel is carried out to reprocessing plants and storage facilities, where it is subject to careful controls and processing.

System decontamination - clean-up Chemicals are used to remove as much of the radioactive substances remaining in the facility's piping and container vessels as possible in order to facilitate subsequent dismantling work.



Safe storage - standby

The facility is put into safe storage under proper management as long as required and then further dismantling awaits decay of radioactivity to facilitate that work.



Dismantling (1) - internal demolition To avoid release of radioactive substances to the outside, the equipment inside the building, such as piping and vessels, are first disman-



Dismantling (2) - building demolition

After confirming that the targeted radioactive substances from inside the building have in fact been removed, the building is dismantled in the same way as a normal building.



Site Use

tled.

The site can be used for a variety of purposes once it goes through legal procedures and its safety is confirmed. Alternatively, one current proposal is for the site to continue to be used effectively as a nuclear power site through cooperation with the local community.

(Note) The operator determines the specific method according to the conditions, and the Nuclear Regulatory Commission confirms the safety.

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Quantity and Types of Waste Generated During Decommissioning

The total amount of waste generated in decommissioning a 1.1 million kW class boiling water reactor (BWR) is approx. 536,000 tons.



The Peaceful Use of Nuclear Energy and Protection of Nuclear Materials



Safeguard System in Japan



- %1 Except supplemental access, such as when arises during a normal inspection
- *2 The Nuclear Material Control Center is specified according to the Nuclear Reactor Regulation Law as a Designated Organization for Implementing Safeguards and Inspections as well as a Designated Information Processing Organization.

Parties to the NPT and IAEA Safeguard Agreements

	[Parties to the NP	(191 Countries)	(As of February, 2015)			
	Parties to the Comprehensive Safeguards Agreements (174 Countries)						★: IAEA Signatories
East Asia (4)	Middle East & Southeast Asia (18)	★ Serbia	★ Vatican	★ Chad	★ Costa Rica	Oceania (1)	(164 countries)
★ Korea	★ Afghanistan	★ Tajikistan	★ Finland	★ Central Africa	★ Columbia	Micronesia	Additional Protocol Parties
North Korea	★ United Arab Emirates	★ Czech Republic	★ Belgium	★ Tunisia 🔵	★ Jamaica		(126 countries)
★ Japan	★ Yemen	Turkmenistan	★ Portugal	★ Togo	Suriname	Southeast Asia (1)	
★ Mongolia	★ Iraq	★ Hungary	★ Malta	★ Nigeria	St. Kitts and Nevis	East Timor 🔵	•: Parties that Signed but Failed to Ratify
	★ Iran 😑	★ Bulgaria	★ Monaco	★ Namibia	Saint Vincent and the Grenadines		the Additional Protocol
Southeast Asia (10)	★ Oman	★ Belarus 🔵	★ Liechtenstein 🔵	★ Niger	Saint Lucia	Africa (9)	(15 of the 21 Parties to the Comprehensive Safeguards Agreements)
★ Indonesia	★ Qatar	★ Poland	★ Luxembourg	★ Burkina Faso	★ Chile	★ Eritrea	
★ Cambodia	★ Kuwait	★ Bosnia-Herzegovina		★ Burundi	★ Dominica	Cape Verde 🔵	
★ Singapore	★ Saudi Arabia	★ Macedonia	Africa (44)	★ Botswana	★ Dominican Republic	Guinea 🔵	(IAEA Board)
★ Thailand 🔵	★ Syria	★ Moldova	★ Algeria	★ Madagascar	★ Trinidad and Tobago	Guinea-Bissau 🔵	35 Countries (2014-15)
★ Philippines	★ Sri Lanka	★ Montenegro	★ Angola	★ Malawi	★ Nicaragua	Sao Tome and Principe	
★ Brunei	★ Nepal	★ Latvia	★ Uganda	★ Mali	★ Haiti	Equatorial Guinea	(Other Notes)
★ Vietnam	★ Bahrain	★ Lithuania	★ Egypt	★ South Africa	★ Panama	Somalia	·The IAEA concluded a safeguard agreement
★ Malaysia 🔵	★ Bangladesh	★ Romania	★ Ethiopia	★ Mauritius	★ Bahamas	★ Benin 🔵	with Taiwan as well.
★ Myanmar 🔵	Bhutan		★ Ghana	★ Mauritania	★ Paraguay	★ Liberia	·The IAEA concluded an additional protocol
★ Laos 🔵	Maldives	Western Europe (24)	★ Cameroon 🔵	★ Mozambique	Barbados		with EURATOM.
	★ Jordan	★ Iceland	★ Gabon	★ Morocco	★ Brazil	Middle East & South Asia (1)	
Oceania (13)	★ Lebanon	★ Ireland	Gambia	★ Libya	★ Venezuela	Palestine	
★ Australia		Andorra	★ Kenya	★ Rwanda	★ Belize		
Kiribati 🔵	Eastern Europe (27)	★ Italy	★ Cote d'Ivoire 🔵	★ Lesotho	★ Peru	Voluntary Safeguards	
Samoa	★ Azerbaijan	★ Austria	Comoros		★ Bolivia	Agreement Countries	
Solomon	★ Albania	★ Netherlands	★ Republic of Congo	North & South America (34)	★ Honduras ●	(Nuclear-weapon States)	
Tuvalu	★ Armenia	★ Greece	★ Democratic Republic of Congo	★ Argentina	★ Mexico	★ U.S.A.	
Tonga	★ Ukraine	★ Cyprus	★ Zambia 🔵	Antigua & Barbados		★ U.K.	
Nauru	★ Uzbekistan	★ San Marino	★ Sierra Leone	★ Uruguay		★ France	
★ New Zealand	★ Estonia	★ Switzerland	★ Djibouti	★ Ecuador		★ Russia	
★ Papua New Guinea	★ Kazakhstan	★ Sweden	★ Zimbabwe	★ El Salvador		★ China	
Vanuatu	★ Kyrgyzstan	★ Spain	★ Sudan	★ Guyana	1		Countries with other
★ Palau	★ Georgia	★ Denmark	* Swaziland	★ Canada			-sateguard agreements
★ Marshall Islands	★ Croatia	★ Germany	* Seychelles	★ Guatemala			★ Israel
★ Fiji	★ Slovakia	★ Turkey	★ Senegal ●	Grenada			★ India ●
	★ Slovenia	★ Norway	★ Tanzania	★ Cuba			★ Pakistan

Electric Power Development based on the Three Laws



- * "Special Accounts for Promotion of Electric Power Development Acceleration Measures" and "Special Accounts for Petroleum and Sophisticated Structure of Energy Supply and Demand" were merged into "Special Accounts for Energy Measures" in FY2007. Among this, "Accounts for Promotion of Electric Power Development" took over operation of the "Special Account for Promotion of Electric Power Development Acceleration Measures".
- * Since FY2007, the revenue from "Promotion of Power-resources Development Tax" has transferred to the annual revenue of the general account. The necessary amount has been transferred from the general account to "Special Accounts for Energy Measures" each year.
- * In addition, approximately 8.8071 billion yen is set aside as a nuclear damages compensation support account.
- * Revenue of Power-Resources Development Tax is the estimated amount for the 2015 fiscal year.

Overview of Water Intake Systems



Surface water intake system (Tomari Nuclear Power Station, Units 1, 2)



Intake pipe-type deep water intake system (Yanai Power Plant, Units 1, 2)



Curtain wall-type deep water intake system (Tomari Nuclear Power Station, Units 1 to 4)



Intake tower-type deep water intake system (Hamaoka Nuclear Power Station, Unit 4)



Porous dike-type deep water intake system (Shika Nuclear Power Plant, Unit 1)

Overview of Water Discharge Systems



Surface water discharge system (Tomari Nuclear Power Station, Units 1-4)



Multi-stage discharge water system (Higashi Niigata Thermal Power Plant, Units 1-3)



Drainpipe-type submerged water discharge system (Genkai Nuclear Power Plant, Units 3, 4)



Porous dike-type submerged water discharge system (Tomari Nuclear Power Station, Units 1, 2)

Table of Fish Breeders Using Hot Water from Power Plants (Nuclear-Power Related)

Ducinees	Water Intake S	Source	Main Fish Species	
Business	Power Plant	Capacity (10,000kW)		
Shizuoka Thermal Effluent Utilization Research Center	Chubu Electric Power Co. Hamaoka Nuclear Power Plant	Unit 3110.0 Unit 4113.7 Unit 5126.7	(Hatchlings) Red sea bream, flounder, swimming crab, mud crab, abalone, Japan tiger prawn, grouper, tiger globefish	
Ishikawa Prefectural Fisheries Research Center, Production Department Shiga Plant	Hokuriku Electric Power Co. Shika Nuclear Power Plant	Unit 154.0 Unit 2120.6	Abalone, flounder, turban shell	
Kansai Electric Power Co., Ltd. Takahama Nuclear Power Plant	Kansai Electric Power Co., Ltd. Takahama Nuclear Power Plant	Units 1,282.6 each Units 3,487.0 each	Abalone, turban shell	

Changes in Nuclear Fuel Tax Rates

(As of September 2024)

	Established		Currently			
Prefecture	Year Established	Tax Rate	Tax Rate Valid		Notes	
Fukui	1976	5%	18% ^{*1,6}	Nov. 2021 to Nov. 2026	9th update	
Ibaraki*4	1978	5%	18% ^{*1}	Apr. 2024 to Mar. 2029	9th update	
Ehime	1979	5%	18% ^{*1, 6}	Jan. 2024 to Jan. 2029	9th update	
Saga	1979	5%	18% ^{*1,6}	Apr. 2024 to Mar. 2029	9th update	
Shimane	1980	5%	17% ^{*2, 6}	Apr. 2020 to Mar. 2025	8th update	
Shizuoka	1980	5%	17% ^{*2}	Apr. 2020 to Mar. 2025	8th update	
Kagoshima	1983	7%	18% ^{*1}	Jul. 2024 to Jul. 2029	9th update	
Miyagi	1983	7%	17% ^{*2, 6}	Jun. 2023 to Jun. 2028	8th update	
Niigata	1984	7%	17% ^{*3}	Nov. 2019 to Nov. 2024	7th update	
Hokkaido	1988	7%	17% ^{*2}	Sep. 2023 to Aug. 2028	7th update	
Ishikawa	1992	7%	17% ^{*2}	Oct. 2022 to Oct. 2027	6th update	
Aomori*5	2004	10% (Currently 12%)	17% *2	Apr. 2024 to Mar. 2029	5th update	

*1: The tax rate of 18% breaks down to 8.5% of the cost and 9.5% of the output (the output percentage is a conversion of the tax amount/heat output into a percentage - the notes below also apply this rule).

*2 : The tax rate at 17% breaks down to 8.5% of the cost and 8.5% of the output.

*3 : The tax rate at 17% breaks down to 4.5% of the cost and 12.5% of the output.

*4 : The nuclear fuel taxes for Ibaraki Prefecture have been taxed since April 1999 as a "Nuclear Fuel Handling Tax".

*5 : The nuclear fuel taxes for Aomori Prefecture are taxed from April 2004 as a "Nuclear Fuel Materials Handling Tax".

*6 : For Fukui Prefecture (from November 2016), Shimane Prefecture (from April 2017), Saga Prefecture (from April 2017), Ehime Prefecture (from August 2017) and Miyagi Prefecture (from March 2020), output tax is levied even during decommissioning.

Nuclear Fusion and Fission



Principle of Fusion

Principle of Fission

