

Current Status of Roadmap (issues/targets/major countermeasures) as of June 17

Red colored: newly added to the previous version, Blue colored: modified from the previous version

Issues	As of April 17	Step 1 (around 3 months) current status (as of June 17)	Step 2 (around 3 to 6 months after achieving Step 1)	Mid-term issues	
I. Cooling	(1) Reactor Fresh water Injection	Cooling by minimum injection rate (injection cooling) Consideration and preparation of reuse of accumulated water Nitrogen gas injection Consideration and implementation of sealing measure at leaking points of PCV Improvement of work environment	Circulating Injection Cooling (start) Stable cooling Cold shutdown condition PCV flooding Securing heat exchange function	Protection against corrosion cracking of structural materials *to be partially implemented ahead of schedule	
		(2) Spent Fuel Pool Fresh water injection	Reliability improvement in injection operation /remote-control operation *ahead of schedule Circulation cooling system (installation of heat exchanger) *partially ahead of schedule Stable cooling	Remote-controlled injection operation Consideration / installation of heat exchanging function More stable cooling	Removal of fuels
II. Mitigation	(3) Accumulated Water	Transferring water with high radiation level Storing water with low radiation level	Installation of storage / processing facilities Secure storage place Installation of storage facilities / decontamination processing	Expansion of storage / processing facilities Decontamination / Desalt processing (reuse), etc Storage / management of sludge waste etc. Reduction of total amount of contaminated water Mitigation of contamination in the ocean	Installation of full-fledged water processing facilities Completion of processing of accumulated water in buildings Processing of sludge waste etc. Mitigation of contamination in the ocean (continued)
		(4) Ground water	Mitigation of contamination of groundwater	(Sub-drainage management with expansion of storage / processing facilities) Consideration of shielding wall of groundwater Mitigate ocean contamination (continued)	Solidification of contaminated soil, etc Establishment of shielding wall of groundwater
	(5) Atmosphere / Soil	Dispersion of inhibitor Removal of debris	Mitigate ocean contamination Mitigate scattering	Installing reactor building cover (with ventilation system) Consideration of reactor building container Mitigate scattering (continued)	Installation of reactor building container

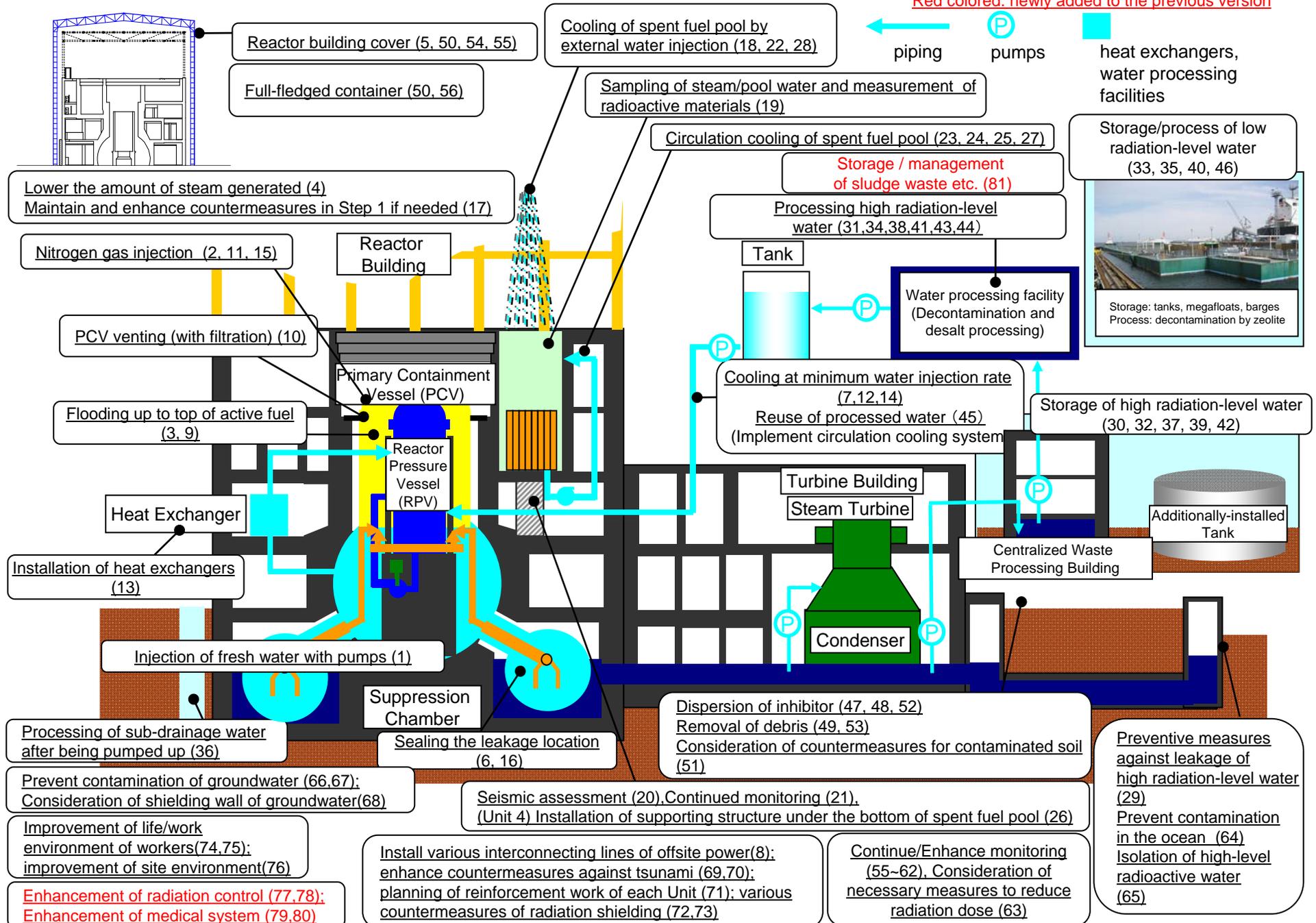
Current Status of Roadmap (issues/targets/major countermeasures) as of June 17

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Issues		As of April 17	Step 1 (around 3 months) current status (as of June 17)	Step 2 (around 3 to 6 months after achieving Step 1)	Mid-term issues
III. Monitoring/ Decontamination	(㊦) Measurement, Reduction and Announcement				
		Expand/ enhance monitoring of radiation dose in and out of the power station and inform of results fast and accurately		Sufficiently reduce radiation dose in Evacuation Order / Deliberate Evacuation Preparation Area/ Evacuation Preparation Area	Continue monitoring and informing environmental safety
IV. Countermeasures against aftershocks, etc	(㊧) Tsunami, Reinforcement, etc	Enhancement of countermeasures against aftershocks and tsunami, preparation for various countermeasures for radiation shielding		Mitigate disasters (Continued)	Reinforcement work of each Unit
		(Unit 4 spent fuel pool) Installation of supporting structure	Consideration / implementation of reinforcement work of each Unit		
V. Environment improvement	(㊨) Life/work environment	Improvement of workers' life / work environment		Enhancement of environment improvement (continued)	Improvement of workers' life / work environment (continued)
	(㊩) Radiation control / Medical care			Enhancement of Healthcare	Improvement of radiation control / medical system (continued)
			Improvement of radiation control / medical system	Enhancement of Healthcare (continued)	Improvement of radiation control / medical system (continued)

Overview of Major Countermeasures in the Power Station as of June 17

Red colored: newly added to the previous version



Current Status of Countermeasures (1)

Red frame: progressed countermeasures from the previous version

Issues	Unit	<Step 1 (targeting mid July)>: Radiation dose is in steady decline ▽ Previous status (as of May 17) ▼ Current status (as of June 17)		
I. Cooling	(→) Reactor	1	<p>Nitrogen gas injection [Countermeasure 11] (Continue To Step 2)</p> <p>Continue cooling by minimum injection rate (injection cooling) [Countermeasure 14]</p> <p>Consideration and preparation of reuse of accumulated water [Countermeasures 12,45*]</p> <p>Start / Implementation of circulating water cooling [Countermeasures 12,14,45*] -Water injection with processed accumulated water (June 17) (Continue To Step 2)</p> <p>*(Countermeasure 45 implemented ahead of schedule from Step 2)</p> <p>Improvement of work environment [Countermeasure 76] -Debris removal, radiation dose survey, entering buildings</p> <p>Consideration / implementation of sealing leakages [Countermeasure 16] (Continue To Step 2)</p> <p>Secure heat exchange function [Countermeasure 13] (Continue To Step 2)</p>	
			2	<p>Continue cooling by minimum injection rate (injection cooling) [Countermeasure 14]</p> <p>Consideration and preparation of reuse of accumulated water [Countermeasures 12,45*]</p> <p>*(Countermeasure 45 implemented ahead of schedule from Step 2)</p> <p>Consideration of leakage sealing measure of PCV [Countermeasure 6]</p> <p>Consideration / implementation of sealing leakages [Countermeasure 16] (Continue To Step 2)</p> <p>Nitrogen gas injection [Countermeasure 11] -Start injection (late June) (Continue To Step 2)</p> <p>Improvement of work environment [Countermeasure 76] -Radiation dose survey, operation of local exhausters (June 11), entering buildings</p> <p>Secure heat exchange function [Countermeasure 13] (Continue To Step 2)</p>
				3

Target [→] [↔] Maintain stable cooling

Legend: : Implemented : Under construction : Field work started : Field work not started yet

Current Status of Countermeasure (2)

Red frame: progressed countermeasures from the previous version

Issues	Unit	<Step 1(targeting mid July)>:Radiation dose is in steady decline ▽ Previous status (as of May 17) ▼ Current status (as of June 17)	
1. Cooling	(2) Spent Fuel Pool	1	<p>Continuation of water injection by "Giraffe", etc [Countermeasure 22]</p> <p>Restoration of normal cooling system [Countermeasure 24] - Water injection through normal cooling system (from May 29)</p> <p>Installation of heat exchanger [Countermeasures 25,27*] Consideration/Design → Fabrication/Transportation → Installation (by end of Step 2) *(Countermeasure 27 implemented ahead of schedule from Step 2)</p>
		2	<p>Restoration of water injection through normal cooling system [Counter measure 23]</p> <p>Installation of heat exchanger [Countermeasures 25,27*] - Circulating water cooling operation (from May 31) *(Countermeasure 27 implemented ahead of schedule from Step 2)</p> <p>Installation of heat exchanger (image)</p>
		3	<p>Continuation of water injection by "Giraffe", etc [Countermeasure 22]</p> <p>Restoration of normal cooling system [Countermeasure 24] - Water injection through normal cooling system (May 16)</p> <p>Cooling by installation of heat exchanger [Countermeasures 25,27*] Consideration/Design → Fabrication/Transportation → Installation *(Countermeasure 27 implemented ahead of schedule from Step 2)</p>
		4	<p>Continuation of water injection by "Giraffe", etc [Countermeasure 22]</p> <p>Restoration of normal cooling system [Countermeasure 24] - Debris removal, scaffolding etc. in process</p> <p>Cooling by installation of heat exchanger [Countermeasures 25,27*] Consideration/Design → Fabrication/Transportation → Installation (by end of Step 2) *(Countermeasure 27 implemented ahead of schedule from Step 2)</p>

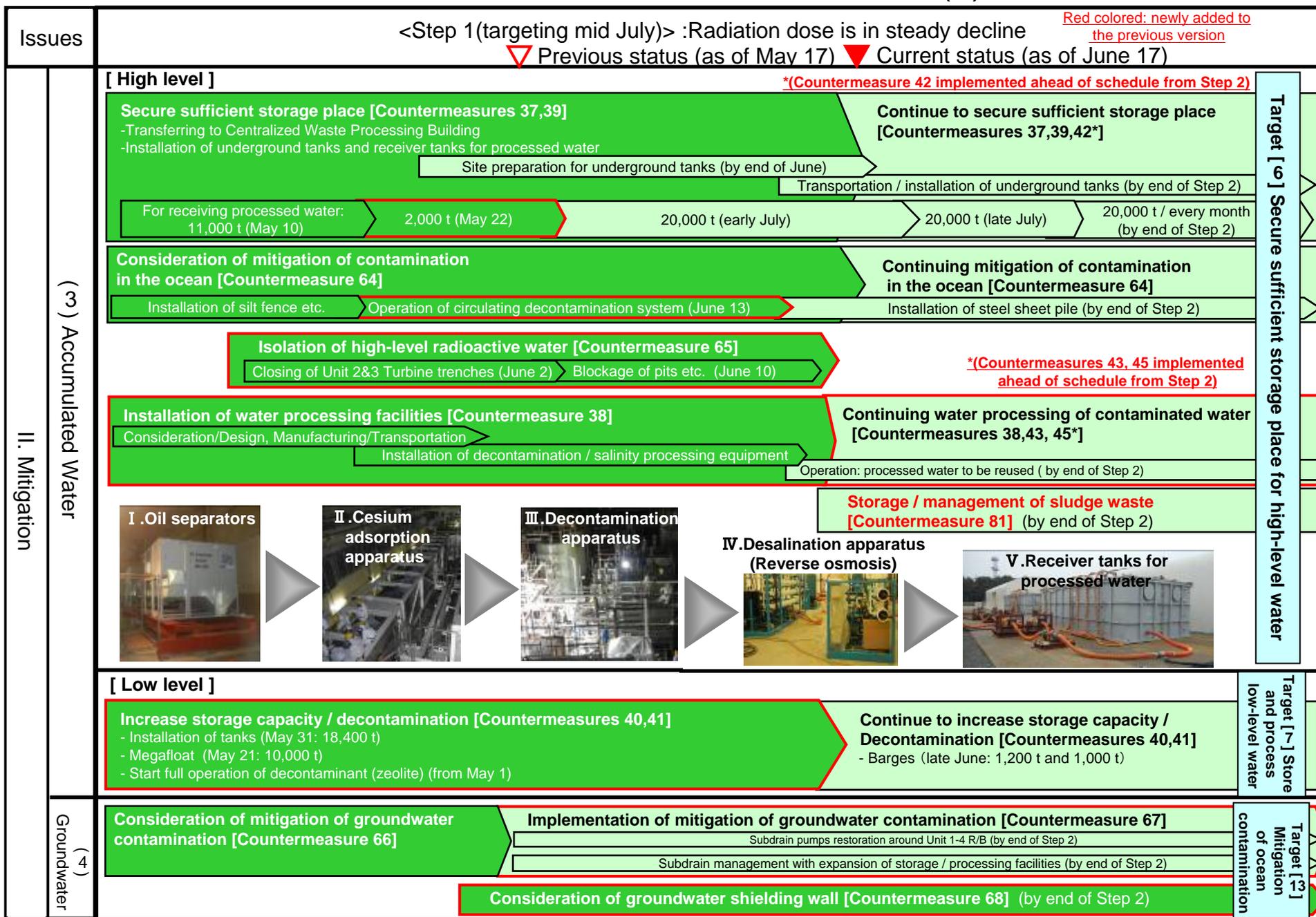
Target [4] Maintain stable cooling

Legend: : Implemented : Under construction : Field work started : Field work not started yet

Current Status of Countermeasures (3)

Red frame: progressed countermeasures from the previous version

Red colored: newly added to the previous version



Legend: : Implemented : Under construction : Field work started : Field work not started yet

Current Status of Countermeasures (4)

Red frame: progressed countermeasures from the previous version

Red colored: newly added to the previous version

Issues		<p><Step 1(targeting mid July)> :Radiation dose is in steady decline ▼ Previous status (as of May 17) ▼ Current status (as of June 17)</p>	
II. Mitigation	(㉟) Atmosphere / Soil	<p>Dispersion of inhibitor [Countermeasure 52] - Plane and slope: approx. 340,000 m² (as of June 14) - Around Units 1 to 4: approx. 120,000 m² (as of June 14)</p>	<p>Continuing dispersion of inhibitor [Countermeasure 52] (by end of Step 2) - Plane and slope: approx. 420,000 m² (by end of June) - Around Units 1 to 4: dispersion scheduled to Unit 4 reactor building (around June 18)</p>
		<p>Removal of debris [Countermeasure 53] (from April 6 to Step 2) - Removal of debris (equivalent of 279 containers with approx. 4 m³ volume and 30 containers with approx. 8 m³ volume) (as of June 14)</p>	
		<p>Installing reactor building cover [Countermeasure 54] -Unit 1: Preparation construction work (May 13), Main structure construction work (June 27)</p> <p>Design Procurement, Manufacturing On-site construction (by end of Step 2)</p> <p>-Units 3 & 4 : Now designing (by end of Step 2)</p>	
			<p>Consideration of reactor building container [Countermeasure 50] (by end of Step 2)</p>
III. Monitoring / Decontamination	(㉟) Measurement, Reduction and Announcement	<p>Expand / enhance monitoring and announcement [Countermeasures 60,61] (by end of Step 2) < Continue monitoring in and out of the power station, estimating released amount > - Land area: radiation dose rate in air (50 points / week), soil contamination survey etc. - Sea area: expanding to offshore of Fukushima, Ibaraki and Miyagi prefectures. Considering to introduce marine life monitoring and unmanned survey ship. Radioactivity concentration in the seaport is above regulatory limit (start decontamination with Countermeasure 64)</p>	

Legend : Implemented : Under construction : Field work started : Field work not started yet

Current Status of Countermeasures (5)

Red frame: progressed countermeasures from the previous version

Red colored: newly added to the previous version

Issues		<Step 1(targeting mid July)> :Radiation dose is in steady decline ▽ Previous status (as of May 17) ▼ Current status (as of June 17)	
IV. Countermeasures against aftershocks, etc	(ㄣ) Tsunami, reinforcement, etc	Countermeasures against tsunami [Countermeasure 69] -Transferring emergency power sources to the upland (April 15) - Addition of redundant water injection line (by April 15) - Setting fire trucks etc. to the upland (by April 18)	Enhancement of countermeasures against tsunami [Countermeasure 70] - Installation of temporary tide barriers (from May 18 to end of June)
		(Unit 4) Installation of supporting structure under the bottom of the pool [Countermeasure 26] - Structure already evaluated. Installation work started (from May 23). Supporting structure effective (late June).	Planning and implementation of reinforcement work of each Unit [Countermeasure 71] (by end of Step 2)
		Preparation for various countermeasures for radiation shielding [Countermeasure 72] (application of slurry) - Pipe work completed, pumping vehicles deployed (May 17)	Continuing various countermeasures for radiation shielding [Countermeasure 73] (by end of Step 2)
V. Environment improvement	(∞) Life / work environment	Improvement of workers' life / work environment [Countermeasure 74] Improvement of meals Upgrade of lodging facility Installation of temporary dormitory Securing daily life water Installation of rest station at the site (7 stations installed by Tepco: as of June 17)	Continuing and enhancement of improvement of workers' life/work environment [Countermeasure 75] (by end of Step 2) From end of June: move to temporary dormitory Expansion of temporary dormitory Increasing available amount of daily life water Expansion of rest station at the site
		Improvement of radiation control [Countermeasure 77] - Installation of decontamination facility for people and vehicles - Issuance of individual examination certificate (May 7) - Introduction of bar-code reader for individual APD rental	Continuing improvement of radiation control [Countermeasure 78] -Expansion of whole-body counters with support from the government (by end of July), additional expansion (by end of Step 2) - Expansion of decontamination facility: installation of survey place in case of rain and cleansing place (by early July) - Automated recording of individual APD. Long-term follow-up of workers etc.
	(㉵) Radiation control / Medical care	Improvement of medical system [Countermeasure 79] - Setting resident doctor for 24 hours, considering heat stroke countermeasures in summer with support from the government (May 29)	Continuing improvement of medical system [Countermeasure 80] (by end of Step 2) - Increasing medical clinics, increasing resident doctors and improvement of transportation of patients etc. with support from the government

Legend: : Implemented : Under construction : Field work started : Field work not started yet