

- Extensive improvements are underway to improve safety and working conditions for the thousands of workers at the Fukushima Daiichi Nuclear Power Station, while at the same time speeding progress toward the safe cleanup of the site.
- These measures address working conditions and morale, management controls, various aspects of water management, and the steps being taken to ensure the safe removal of spent fuel from Unit 4.

1. Improvements in working conditions

Category	Item	Content	Implementation period
Work safety	Decontamination at the site (Enlargement of non Requiring Full Face Mask area)	Central area including Main Anti-Earthquake Building, Multi-nuclide Removal Equipment (ALPS), Entrance Control Building etc.	(Already implemented)
		North-side area including debris storage area (enlarged as vast as two thirds of whole site)	From November 11, 2013
		South-side area including tank groups	From FY2014 to FY2015
	Debris removal at sea side	Starting debris removal such as abandoned vehicle on the east side of the turbine building	(Already started)
	Reinforcement in lighting at the site	Flange-type tank group	Within 2013
		South-side tank group	Within FY2013
	Better communications environment	Better environment outside the buildings within the facility	(Already implemented)
		Better environment for mobile phone calls	(Already started and to be continued)
Facilities	Constructing a Fukushima Daiichi new administrative office building	Temporary office administrative building (holding approx.1000 employees)	(Already started) to June 2014
		Main office administrative building (holding employees and associated companies)	Completion at End FY2015
	New break areas added at the site	Mobile break area converted from large-sized buses and break area (prefabricated concrete type)	Starting from December, 2013
		Large-size break area (8 stories above the ground, holding approx.1,200 persons) <Reference 1-5>	(Under design) From December 2014
	Improvement and enrichment in eating habits	Meal supply center built near Fukushima Daiichi NPS, and supply approx. 3000 meals <Reference1-6>	Completion at End FY2014
Emergency medical care	Enrichment in emergent medical equipment	Echography machine, automatic heart massage device, ambulance added	Within FY2013
Workers' work environment	Installation of an overhaul garage for on-premise vehicles	Installation of an overhaul garage for contaminated vehicles currently used on-premise	(Already started) to March., 2014
	Increase in the number of commuting buses	Increase in the number of commuting buses and decrease the number of people who are waiting for the commuting buses	Already implemented and to be continued
	Increase in unit price of contract work	Doubling the unit price of premium applied to on-premise work (from 10,000 JPY to 20,000 JPY per day)	After work ordered in December, 2013
	Contractors	To speed work on the working conditions referred to in this report (break rooms, etc.), easing of competitive bidding requirements.	From End November
Employees' work environment	Improvement inside Main Anti-Earthquake Building	Equipping items for taking a nap	From End November
		Additional installation of showering facilities for those who temporarily stay overnight	Within FY2013
	Improvement of New Hirono dormitory	Installation of showers and lavatory for all housing buildings	(Already implemented)
		More varieties in menu at staffroom cafeteria	From End November
	Revaluation of employees' treatment	Certain wages are being increased	Starting within FY2013

2. Enforcement of Management and System to Secure Safety and Quality

- Improvement of management of safety and quality, such as development of and improved operation procedure manual, thorough risk prediction and better communication with associated companies
- Clarification of where responsibility lies in chain of command (including associated companies) at the site
- Enforcement of organization and increase in number of personnel at safety and quality management division
 - “Safety and Quality Group”, which supervises safety and quality management division of Head Office and power stations, will be established under the General Manager of the Nuclear Power & Plant Siting Division.
 - Increase in number of personnel of safety and quality management division at power stations
 - Reception of staff specialized in improvement of labor environment
- Enforcement of personnel rotation and appropriate arrangement of workers

Details	Timing of implementation
Establishment of exchange targets for Nuclear Power Division and each business office and implementation of periodic transfer	FY2014
Reorganization and enforcement of organization involved in contaminated water and tank countermeasures and increase in number of personnel who is in management position	Since November

- Increase in number of personnel required for contaminated water and tank countermeasures through internal and external mobilization (+220 personnel)
(The number was rounded to the nearest number.)

Item	Details	Number of personnel
Relocation of personnel inside nuclear division	Relocation of personnel inside Fukushima Daiichi NPS, Distribution of personnel from Fukushima Daini NPS, Kashiwazaki-Kariwa NPS, etc.	70 personnel *
Distribution of personnel from TEPCO group company	Distribution of personnel from thermal power, transmission, civil, distribution division in TEPCO group company	110 personnel
Reception of personnel from outside of the company	Reception of personnel from other electric companies Project manager (expert of plant manufacturer) will be invited from outside of the company to the Head Office.	20 personnel
Increase in number of personnel involved in safety and quality management division, etc.	(Being adjusted)	20 personnel

* Fukushima Daiichi NPS: 20 personnel, Fukushima Daini NPS: 20 personnel, Kashiwazaki-Kariwa NPS: 20 personnel
Breakdown of the personnel already located (200 personnel) as of November 1 <Reference 2>
(1) Installation and replacement of tanks: 100 personnel
(2) Tank patrol: 60 personnel
(3) Safety and quality management: 20 personnel
(4) Analysis and evaluation of radiation and environment: 20 personnel

3. Making equipment permanent

Details		Scheduled timing
Construction of new central monitoring room (improve central control capabilities)		From FY2014 to FY2016
Replacement of switching stations and power panels	North side of Unit 5/6: New construction of power delivery stations	Start from FY2015
	South side of Unit 1-4: Enhancement of facilities	(Being augmented in sequence)
Upgrades of infrastructure at the site	Repairing of roads	(Being augmented in sequence)
	Renewal of water supply pipes at the Main Anti-earthquake Building and increase of purifying tank	FY2013
	Renewal of emergency generator at the Main Anti-earthquake Building	FY2014
	Replacement of the drainage channel C	FY2013
Radioactive waste disposal, storage facilities	Installation of radioactive waste disposal and storage facilities under negotiation with locals	(To be implemented in sequence)
	Review of handling rules for combustible and dangerous materials and securement of storage place	2013
Fire prevention and suppression, including alarms and extinguishing equipment	Increase of fire detectors and extinguishing equipments at inside and outside of the building	Plan will be developed in 2013
	Improvement in credibility of electric wire pipes and pipes	(To be implemented in sequence)

4. Precautionary measures of rainwater

- Appropriate management of accumulated water inside dikes by implementing countermeasures for preventing overflow from dikes and controlling inflow into dike (=> not allowing contaminated rainwater to overflow)

Countermeasures			Timing of implementation
Prevention of overflowing <Reference 4-1>	Elevation of existing dikes by using steel plate	H4 north area (high level contamination)	(Already implemented)
		All other areas	2013 (Already arranged)
	Further elevation of dikes by using concrete, etc. (improvement in credibility)		(Being designed in detail) To be implemented in sequence
Control of rainwater inflow <Reference 4-2>	Installation of gutters on tank roofs at points where high level contamination was found		From December 2013 to the end of 2013
	Installation of gutters on all other tanks		FY2013
Prevention of contamination from spreading into the soil	Facing on surface of ground around tanks <Reference 4-3>		FY2013
Prevention of water inflow into drainage channel	Convert the drainage channel B into closed conduits <Reference 4-4>		From November 2013 to the end of 2013
Increase in capacity of temporary receiving tank of accumulated water <Reference 4-5>			2013 (Already arranged)

5. Causes and Measures of the Leak from the Tank

- Based on the cause of the 300 ton leak, measures towards the same type of tanks will be prioritized

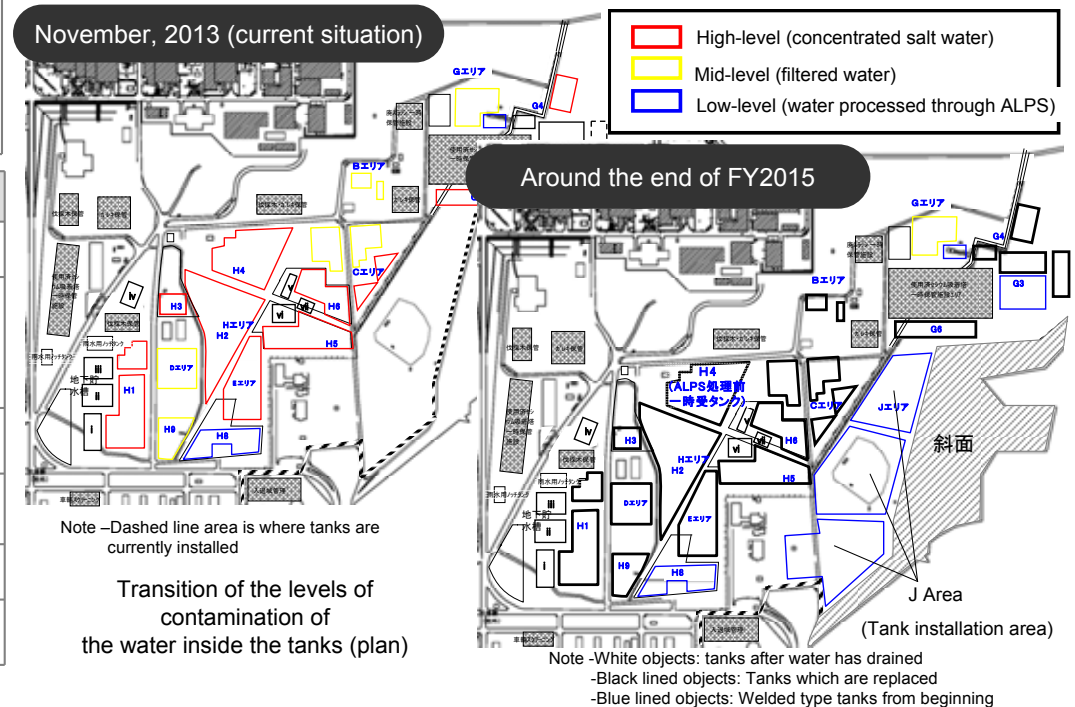
Cause <reference5-1>	<ul style="list-style-type: none"> The direct cause of the leak was clarified to be the gradual slippage of the gland on the flange connecting the bottom panels. Management towards the evaluation and measurements of the risks that increase by time were inadequate, while process to install the tanks (from signing order to fixing costs, part maintenance, integrity confirmation such as water filling tests) were appropriate during the time when there was urgent need to install tanks.
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Measures	Period						
[Immediate measures] Water leakage prevention measures for the same type of tanks <reference5-2>	<table border="1"> <tr> <td>Caulking of the bottom of the tanks</td> <td>(Currently installed)</td> </tr> <tr> <td>Filling sealants at the bottom of the bottom panels etc.</td> <td>(To be implemented based on test results)</td> </tr> <tr> <td>Filling sealants on the bottom panels (inside the tank)</td> <td>(To be implemented based on test results)</td> </tr> </table>	Caulking of the bottom of the tanks	(Currently installed)	Filling sealants at the bottom of the bottom panels etc.	(To be implemented based on test results)	Filling sealants on the bottom panels (inside the tank)	(To be implemented based on test results)
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Management measures	<table border="1"> <tr> <td>Strengthening patrols (4 times/day, 120 people (gross)/day)</td> <td>(Already implemented)</td> </tr> <tr> <td>Installation of water level gauges in all flange type tanks</td> <td>(Currently Installed) ~till end of November</td> </tr> </table>	Strengthening patrols (4 times/day, 120 people (gross)/day)	(Already implemented)	Installation of water level gauges in all flange type tanks	(Currently Installed) ~till end of November		
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Installation of water level gauges in all flange type tanks	(Currently Installed) ~till end of November						
Replacing the tanks to welded type tanks	(installed in series)						
Processing all the contaminated water by operating the second/third multi-nuclide removal facilities	~till end of next year						

6. Storage Plans/Measures to manage contaminated water

- Storage situations and installation plans**
 - Currently, a total of totally approx. 370,000 tons of water is stored, while current storage capacity is approx. 410,000 thousand tons
 - J area tank installation will be accelerated and the size of the tanks will be larger. Approx. 800,000 tons of storage capacity will be ensured by the end of FY2015.
- Replacing tanks**
 - Flange type/horizontally long tanks will be replaced by more reliable welded type tanks targeted within FY2015.
 - Tank installation quality will be thoroughly managed including design/construction.
- Measures to prevent groundwater inflow**
 - Groundwater bypass, sub-drain water pumping and water shielding walls on land side will be conducted to reduce amount of groundwater flowing into the buildings

- Strengthening multi-nuclide removal facilities (ALPS) and improving reliability** <reference6>
 - ALPS will be strengthened and operated around after mid next year, decontaminating water inside the tanks by next fiscal year
 - Operation reliability will be improved, steadily taking corrective action by measures such as anti-corrosion improvements



7. Fuel Removal from Unit 4 spent fuel pool

- Installation of facilities required for reliable fuel removal**
 - The facilities are design to have multi-layered safety measures designed especially for the risks involved and designed to withstand another 9.0 magnitude earthquake.
- Sufficient preparation in advance**
 - Development of detailed procedures, preparation for emergency scenarios, and thorough prior safety evaluation
 - Work safety review from the third parties such as the International Expert Group
 - Sufficient personnel: (6 groups × 3 sets, 4 workers + supervisor + radiation manager /group)
 - Elaborative training in advance, including use of a mock-up of the site
- Upgraded reporting system**