

## Timeline of the Fukushima I nuclear accidents

Overview	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
<b>Timeline</b>						
<b>11-Mar</b>						<b>11-Mar</b>
<p>14:46 A M9.0 earthquake strikes off the Sanriku coast Outage of electric power supply from outside of the site</p> <p>14:50 (approx.) Tsunami hits the Fukushima Daiichi nuclear</p> <p>15:14 The government establishes disaster headquarters</p> <p>20:50 An evacuation order is issued to persons within a 2km</p> <p>21:23 An evacuation order is issued to persons within a 3km radius Those within 10km are instructed to remain indoor</p>	<p>14:46 The reactor automatically shuts down The backup diesel generators kick in</p> <p>15:42 The backup diesel generators fail All AC power sources are lost</p> <p>16:36 Emergency core cooling system (ECCS) fails Emergency condenser system starts injecting cooling water into the reactor</p>	<p>14:46 The reactor automatically shuts down The backup diesel generators kick in</p> <p>15:42 The backup diesel generators fail All AC power sources are lost</p> <p>16:36 Emergency core cooling system fails The reactor core isolation cooling system starts injecting cooling water into the reactor</p>	<p>14:46 The reactor automatically shuts down The backup diesel generators kick in</p> <p>15:42 The backup diesel generators fail All AC power sources are lost</p>	<p>14:46 The reactor was down for maintenance No fuel rod was in the pressure vessel</p>	<p>14:46 The reactor was down for maintenance 16:36 The level of cooling water is confirmed safe</p>	<p>14:46 The reactor was down for maintenance 16:36 The level of cooling water is confirmed safe</p>
<b>12-Mar</b>						<b>12-Mar</b>
<p>5:44 An evacuation order is issued to persons within a 10 km radius</p> <p>6:00 A high level of radiation in the Fukushima plant premises is reported</p> <p>15:29 Radiation reading at the Fukushima Daiichi border exceeds 500 μSv/h</p> <p>16:48 An evacuation order is issued to persons within a 20 km radius</p>	<p>0:00 Water level may be low</p> <p>0:49 Pressure is confirmed to be dangerously high</p> <p>5:22 Temperature in suppression chamber is over 100 degree C. Pressure control function is lost</p> <p>6:00 Emergency condenser system fails</p> <p>10:17 Vapor inside containment vessel is released into the air to lower the pressure (Vent operation)</p> <p>11:00 Water level drops. Water injection starts</p> <p>15:36 A hydrogen explosion blows off the roof of the reactor</p> <p>20:20 Seawater and boron is injected in the reactor core</p> <p>22:15 An aftershock stops water injector</p>	<p>0:00 Water level indicator is recovered using a temporary power source. Water level is confirmed safe</p> <p>5:32 Temperature in suppression chamber is over 100 degree C. Pressure control function is lost</p>				<p>Sources: Prime Minister of Japan and His Cabinet (<a href="http://www.kantei.go.jp/saigai/report.html">http://www.kantei.go.jp/saigai/report.html</a>) TEPCO Press Release (<a href="http://www.tepco.co.jp/nu/f1-np/press_f1/2010/2010-j.html">http://www.tepco.co.jp/nu/f1-np/press_f1/2010/2010-j.html</a>) (<a href="http://www.tepco.co.jp/cc/press/index-j.html">http://www.tepco.co.jp/cc/press/index-j.html</a>) METI Press release (<a href="http://www.meti.go.jp/press/index.html">http://www.meti.go.jp/press/index.html</a>) METI The Nuclear and Industrial Safety Agency (<a href="http://kinkyu.nisa.go.jp/kinkyu/index.html">http://kinkyu.nisa.go.jp/kinkyu/index.html</a>)</p> <p>The timeline may fluctuate depending on the sources.</p>
<b>13-Mar</b>						<b>13-Mar</b>
<p>8:33 Radiation reading at the Fukushima Daiichi border exceeds 1204.2 μSv/h</p> <p>13:52 Radiation reading at the Fukushima Daiichi border exceeds 1557.5 μSv/h</p>	<p>11:55 Pumping of seawater and boron is restarted</p> <p>14:00 The issue of heat in the spent fuel pool is discussed</p>	<p>11:00 Vapor inside containment vessel is released into the air to lower the pressure (Vent operation)</p>	<p>5:10 Emergency core cooling system fails</p> <p>8:41 Vapor inside containment vessel is released into the air to lower the pressure inside the reactor (Vent operation)</p> <p>9:08 Water and boron is injected in the reactor core The water supply fails The water level is suspected to be low</p> <p>13:12 Seawater and boron is injected in the reactor core</p>			
<b>14-Mar</b>						<b>14-Mar</b>
	<p>1:10 The level of seawater for pumping is confirmed low. Seawater injection is interrupted</p> <p>3:20 Seawater injection is restarted</p>	<p>3:00 Resources are arranged for seawater injection into the reactor</p> <p>6:50 The pressure inside the containment vessel rises Vapor inside the containment vessel is released into the air to lower the pressure (Vent operation)</p> <p>11:01 The blow-out panel is opened to relieve hydrogen and vapor buildup</p> <p>12:00 Water level is confirmed low</p> <p>13:25 The reactor core isolation cooling system fails</p> <p>20:05 Seawater injection starts</p> <p>22:50 The pressure inside the containment vessel becomes very low</p> <p>23:20 Normal water level and pressure are recovered</p>	<p>1:10 The level of seawater for pumping is confirmed low. Seawater injection is stopped</p> <p>3:20 Seawater injection is restarted</p> <p>7:44 The pressure inside the containment vessel becomes dangerously high</p> <p>11:01 A hydrogen explosion blows off the roof of the reactor building</p> <p>Seawater injection is interrupted</p> <p>20:00 Seawater injection is restarted</p> <p>23:30 Seawater injection is interrupted</p>	<p>4:08 The temperature in the spent fuel pool rises to 84°C</p>		
<b>15-Mar</b>						<b>15-Mar</b>
<p>11:07 People within a 30 km radius are instructed to stay indoors</p>		<p>6:20 An abnormal noise is heard coming out from the suppression chamber. The pressure in the chamber drops low</p> <p>Seawater injection is continued</p> <p>6:45 The suppression chamber is suspected to suffer damage</p> <p>8:25 White smoke is confirmed to come out of the building</p>	<p>2:30 Seawater injection is restarted</p> <p>10:22 Radiation monitor outside the building reads 400 mSv/h</p>	<p>6:20 A Hydrogen explosion damages the building</p> <p>9:38 Small fire breaks out. Fire-fighting starts</p> <p>10:22 Radiation level on the inland side of the building reads 100 mSv/h</p> <p>11:00 Fire is confirmed to be extinguished</p> <p>22:00 METI orders water injection into the spent fuel pool</p>	<p>21:00 The water temperature of the reactor core reads 167.0°C</p> <p>The water temperature of the spent fuel pool reads 58.7°C</p>	<p>21:00 The water temperature of the reactor core reads 155.7°C</p> <p>The water temperature of the spent fuel pool reads 57.0°C</p>
<b>16-Mar</b>						<b>16-Mar</b>
<p>10:30 Radiation reading at the front gate exceeds 1 mSv/h</p> <p>During Radiation level in milk in Fukushima prefecture exceeds the day safety limits (Announced on March 18)</p>		<p>0:30 The issue of heat in the spent fuel pool is discussed</p>	<p>0:30 The issue of heat in the spent fuel pool is discussed</p> <p>8:30 White smoke is confirmed to come out of the building</p> <p>Spraying water over the spent fuel pool is suggested</p>	<p>0:30 The issue of heat in the spent fuel pool is discussed</p> <p>5:45 A small fire breaks out. Fire-fighting starts</p> <p>6:15 Fire is confirmed to be extinguished</p>	<p>0:30 The issue of heat in the spent fuel pool is discussed</p> <p>16:00 The water temperature of the reactor core records the highest at 196.2°C</p>	<p>0:30 The issue of heat in the spent fuel pool is discussed</p>
<b>17-Mar</b>						<b>17-Mar</b>
<p>During Radiation level in water in Ibaraki prefecture exceeds the day safety limits (Announced on March 20)</p>			<p>6:15 The pressure reading in the suppression chamber rises temporarily</p> <p>9:48 Water spraying operation from air starts</p> <p>19:05 Water spraying operation from ground starts</p> <p>20:09 Water spraying operation from ground ends</p>	<p>17:30 A power source provided by the emergency diesel generator at unit 6 becomes available to feed power into the unit 5 reactor</p> <p>Cooling of the spent fuel pool is started</p>	<p>17:30 A power source provided by the emergency diesel generator at unit 6 becomes available</p> <p>Cooling of the spent fuel pool is started</p>	
<b>18-Mar</b>						<b>18-Mar</b>
<p>6:00 The temperature of the water in the common spent fuel pool reads 55°C</p> <p>13:00 MEXT decides to improve radiation monitoring nationwide</p> <p>17:05 INES makes a provisional assessment of the nuclear accident, according to which: Unit 1, 2, and 3: Level 5 &amp; Unit 4: Level 3</p> <p>During Radiation level in spinach in Fukushima prefecture the day exceeds safety limits (Announced on March 19)</p>		<p>6:30 White smoke continues to come out from the blow-out panel</p> <p>22:00 External power is connected to an auxiliary transformer</p>	<p>14:00 Water spraying operation from ground starts</p> <p>14:45 Water spraying operation from ground ends</p>	<p>13:30 Holes are punched in building to prevent hydrogen explosion</p>	<p>17:00 Holes are punched in building to prevent hydrogen explosion</p>	
<b>19-Mar</b>						<b>19-Mar</b>
<p>During MHLW instructs water utilities not to use water that the day contains higher radioactive substances than the legal limit for drinking water</p>	<p>13:30 External power is connected to an auxiliary transformer</p>		<p>0:30 Water spraying operation from ground starts</p> <p>1:10 Water spraying operation from ground ends</p> <p>14:10 Water spraying operation from ground starts</p>	<p>16:00 Resources are arranged for water spraying operation</p>	<p>5:00 Cooling pump starts to pump in water in the spent fuel pool</p> <p>6:00 The water temperature of the spent fuel pool records the highest at 68.8°C</p> <p>23:00 The water temperature of the spent fuel pool is lowered to 43.1°C</p>	<p>4:22 The second backup diesel generator is restored</p> <p>22:14 Cooling pump starts to pump in water in the spent fuel pool</p> <p>23:00 The water temperature of the spent fuel pool records the highest at 67.5°C</p>
<b>20-Mar</b>						<b>20-Mar</b>
<p>During MHLW requests people living in some areas within the day Fukushima prefecture to refrain from drinking tap water</p>		<p>15:05 Seawater injection into the spent fuel pool starts</p> <p>15:46 External power is connected to distribution panels</p> <p>17:20 Seawater injection into the spent fuel pool ends</p>	<p>3:40 Water spraying operation from ground ends</p> <p>21:30 Water spraying operation from ground starts</p>	<p>8:21 Water spraying operation from ground starts</p> <p>9:40 Water spraying operation from ground ends</p> <p>18:30 Water spraying operation from ground starts</p> <p>19:45 Water spraying operation from ground ends</p>	<p>16:00 The water temperature of the reactor is lowered to 76.5°C</p>	<p>7:00 The water temperature of the spent fuel pool is lowered to 36.5°C</p> <p>The water temperature of the reactor reads the highest at 185.0°C</p>
<b>21-Mar</b>						<b>21-Mar</b>
<p>10:37 Seawater injection into the common spent fuel pool starts</p> <p>14:30 Iodine-131 level 126.65 times the legal limit is found in water sample from the outlet of reactors 1-4</p> <p>15:30 Seawater injection into the common spent fuel pool ends</p> <p>During Prime Minister requests governors to regulate the supply the day line for contaminated foods</p>		<p>18:22 White smoke is observed</p>	<p>4:00 Water spraying operation from ground ends</p> <p>15:35 Grey smoke is observed</p> <p>17:55 Smoke is suppressed</p>	<p>6:30 Water spraying operation from ground starts</p> <p>8:40 Water spraying operation from ground ends</p>	<p>11:36 External power is connected to the reactor</p>	<p>5:00 The water temperature of the reactor reads is lowered to 28.2°C</p>

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Overview	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
<b>22-Mar</b> During the day External power is connected to all 6 reactors	11:20 The temperature of the reactor pressure vessel exceeds 400°C	7:11 The white smoke is suppressed to a safe level 16:07 Seawater injection into the spent fuel pool start 17:01 Seawater injection into the spent fuel pool end: The water temperature of the spent fuel pool reads 5°C	7:11 The color of the smoke is turning white 15:10 Water spraying operation from ground starts 15:59 Water spraying operation from ground ends 22:45 Electrical power is recovered at the control room	17:17 Water spraying operation from ground starts 20:30 Water spraying operation from ground ends		19:07 External power is connected to the reactor
<b>23-Mar</b> 18:40 The water temperature of the common spent fuel pool records the highest at 7°C	2:30 Seawater injection through the reactor feed-water line starts	4:00 The temperature of the reactor pressure vessel reaches 109°C	9:10 The temperature of the reactor pressure vessel records 304.8°C 11:03 Seawater injection into the spent fuel pool start 13:20 Seawater injection into the spent fuel pool ends 16:20 Black smoke breaks out 23:30 The smoke is confirmed to be suppressed	10:00 Water spraying operation from ground starts 13:00 Water spraying operation from ground ends 21:10 The water temperature of the spent fuel pool reads 100°C	17:24 Cooling pump fails while switching to the external power source The cooling pump is under repair	<b>23-Mar</b>
<b>24-Mar</b> 15:37 External power is connected to the common spent fuel pools 18:05 Cooling pump starts to inject water into the common spent fuel pool	10:50 White smoke is observed 11:30 Electrical power is recovered at the control room		5:35 Seawater injection into the spent fuel pool starts Morning Three workers are exposed to radiation 14:25 The amount of radioactivity is confirmed to be 3.9 MBq/cm <sup>3</sup> in the water and 400 mSv/h above the water surface 16:05 Seawater injection into the spent fuel pool ends	14:35 Water spraying operation from ground starts 17:30 Water spraying operation from ground ends	16:14 Reactor cooling pump is replaced Reactor cooling is restarted	<b>24-Mar</b>
<b>25-Mar</b> 11:46 The government issues a recommendation that those who live within a 30 km radius evacuate voluntarily 15:20 The water temperature of the common spent fuel pool is lowered to 53°C	6:00 The water temperature of the reactor core reads 157.5°C 15:37 Seawater is replaced by freshwater for water injected into the reactor 23:10 The amount of radioactivity in water from the turbine building is confirmed to be 3.8 MBq/cm <sup>3</sup>	10:30 Seawater injection into the spent fuel pool starts 12:19 Seawater injection into the spent fuel pool ends	13:28 Water spraying operation from ground starts 16:00 Water spraying operation from ground ends 18:02 Seawater is replaced by freshwater for water injected into the reactor	6:05 Seawater injection into the spent fuel pool starts 10:20 Seawater injection into the spent fuel pool ends 19:05 Water spraying operation from ground starts 22:07 Water spraying operation from ground ends		15:42 The temporary power source is replaced by the on-site power source
<b>26-Mar</b> 14:30 Iodine-131 level 1850.5 times the legal limit is found in water sample from the outlet of reactors 1-4		9:30 The water temperature of the spent fuel pool reads 57°C 10:10 Seawater is replaced by freshwater for water injected into the reactor 16:46 Power functions are restored at control room During the day Radiation density measurement in water from the turbine building reads 2900 MBq/cm <sup>3</sup> (retracted on the next day)				<b>26-Mar</b>
<b>27-Mar</b>	7:30 Water in the turbine building is being transferred to the surface condenser 15:30 Water accumulation in the trench outside the turbine building is confirmed The dose rate at the surface is 400 µSv/h	7:30 Water in the turbine building is being transferred to the surface condenser 15:30 Water accumulation in the trench outside the turbine building is confirmed The dose rate at the surface exceeds 1000 mSv/h 18:31 Fire extinguisher pump is replaced by a temporary electric pump for water injection into the reactor During the day The radiation density from the previous day is reexamined The radiation density is corrected to be 19 MBq/cm <sup>3</sup>	7:30 Water transfer from the turbine building to the surface condenser is under consideration 12:34 Water spraying operation from ground starts 14:36 Water spraying operation from ground ends 15:30 Water accumulation in the trench outside the turbine building is confirmed Radiation measurement is not possible because of the presence of debris	7:30 Water transfer operation from the turbine building to the surface condenser is under consideration 16:55 Water spraying operation from ground starts 19:25 Water spraying operation from ground ends		<b>27-Mar</b>
<b>28-Mar</b> Evening Plutonium is found in the Fukushima plant soil sampled on March 21 and March 22 During the day Water accumulation in the Central Waste Treatment Facility is confirmed			17:40 Pumping of water from the condenser storage tank to the suppression pool surge tank is started 20:30 Fire extinguisher pump is replaced by a temporary electric pump for water injection into the reactor			<b>28-Mar</b>
<b>29-Mar</b> During the day The presence of radioactive substances is confirmed in the water found in the Central Waste Treatment Facility The radiation density is 22Bq/cm <sup>3</sup>	7:30 The transfer of the water in the turbine building to the surface condenser is terminated due to insufficient capacity Water transfer from the condenser storage tank to the suppression pool surge tank is prepared to make room for water from the turbine building 8:32 Fire engine pump is replaced by a temporary electric pump for water injection into the reactor	16:30 Fire engine pump is replaced by a temporary electric pump for water injection into the reactor Freshwater is used instead of seawater 16:45 Pumping of water from the condenser storage tank to the suppression pool surge tank is started 18:25 Water injection into the spent fuel pool ends	14:17 Water spraying operation from ground starts Freshwater is used instead of seawater 18:18 Water spraying operation from ground ends	11:50 Electrical power is recovered at the control room		<b>29-Mar</b>
<b>30-Mar</b>		9:25 Water injection into the spent fuel pool starts 9:45 The temporary electric pumping fails while water is injected. Switched back to the fire engine pump 23:50 Water injection into the spent fuel pool ends		14:04 Water spraying operation from ground starts 18:33 Water spraying operation from ground ends		<b>30-Mar</b>
<b>31-Mar</b> During the day A water-laden US Navy barge arrives at the Fukushima plant Iodine-131 density 4385 times the legal limit is found in water sample from the South of the water outlet	9:20 Transfer of the water in the trench to the Central Waste Treatment Facility starts 11:25 Transfer of the water in the trench to the Central Waste Treatment Facility ends The water level in the trench is lowered from 0.14 to 1.14 meters from overflowing 12:00 Pumping of water from the condenser storage tank to the suppression pool surge tank starts 13:03 Water spraying operation from ground starts 16:04 Water spraying operation from ground ends During the day Iodine-131 density in the water from the turbine building is 430 Bq/cm <sup>3</sup>		8:40 Pumping of water from the condenser storage tank to the suppression pool surge tank ends 16:30 Water spraying operation from ground starts 19:33 Water spraying operation from ground ends	During the day Lighting in the turbine building is partially restored		<b>31-Mar</b>
<b>1-Apr</b> 15:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering 15:58 Transfer of freshwater from a US Navy barge to the filtered water tank starts 16:25 The water transfer is suspended due to a connection failure During the day The on-site radiation monitoring posts from No. 1 through No. 8 are recovered A sample of sand lance caught off the coast of Ibaraki is found to contain high level of Iodine-131 at 4080 Bq/kg (Announced on April 4) (Radiation safety standards for fish has yet to be set)		11:50 Pumping of water from the condenser storage tank to the suppression pool surge tank ends 14:56 Freshwater injection into the spent fuel pool starts 17:05 Freshwater injection into the spent fuel pool ends		8:28 Water spraying operation from ground starts 14:14 Water spraying operation from ground ends		<b>1-Apr</b>

## Timeline of the Fukushima I nuclear accidents

Overview	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
<p><b>2-Apr</b></p> <p>9:10 A second US Navy barge arrives carrying freshwater</p> <p>10:20 Transfer of freshwater from a US Navy barge to the filtered water tank starts</p> <p>16:40 The water transfer is suspended due to a connection failure</p> <p>During Water in the Central Waste Treatment Center is being the day transferred to the turbine building of unit -</p>	<p>15:26 Pumping of water from the condenser storage tank to the suppression pool surge tank ends</p> <p>17:16 Water spraying operation from ground starts</p> <p>17:19 Water spraying operation from ground ends</p> <p>During Lighting in the turbine building is partially restored the day</p>	<p>9:30 Water with a dose rate of greater than 1000 mSv/h is confirmed in a pit which houses cables and is located near to the sea water inlet point</p> <p>A crack on the sidewall of the pit and the leakage of water to the sea through the crack are confirmed</p> <p>17:10 Water transfer from the water condenser to the condenser storage tank is started</p> <p>16:25 Injection of concrete is started to patch the crack on the pit</p> <p>19:25 Injection of concrete is finished</p> <p>During Cameras for monitoring the water levels are installed in the vertical part of the trench outside of the turbine building and on the basement floor of the turbine building</p> <p>During Lighting in the turbine building is partially restored the day</p>	<p>9:52 Water spraying operation from ground starts</p> <p>12:54 Water spraying operation from ground ends</p> <p>During Lighting in the turbine building is partially restored the day</p>			<p><b>2-Apr</b></p>
<p><b>3-Apr</b></p> <p>9:52 Transfer of freshwater from the second US Navy barge to the first barge starts. The first barge pumps in the freshwater into the filtered water tank</p> <p>11:15 Transfer of freshwater from the second US Navy barge to the first barge ends</p>	<p>11:52 The temporary electrical pump is replaced by a pump powered by external power supply</p> <p>13:55 Water transfer from the water condenser to the condenser storage tank starts</p>	<p>12:06 The temporary electrical pump is replaced by a pump powered by external power supply</p> <p>13:47 A mix of polymer, sawdust and newsprint is injected in the power-cable storage pit to stop the water leakage</p>	<p>12:16 The temporary electrical pump is replaced by a pump powered by external power supply</p>	<p>17:14 Water spraying operation from ground starts</p> <p>22:16 Water spraying operation from ground ends</p>		<p><b>3-Apr</b></p>
<p><b>4-Apr</b></p> <p>9:22 Water transfer from the Central Waste Treatment Facility to the turbine building attached to unit 4</p> <p>19:03 Water discharge from the Central Waste Treatment Facility to the sea starts</p>		<p>7:08 A tracer (bath salt) is injected in the pit to determine the source of water leak</p> <p>11:05 Freshwater injection into the spent fuel pool starts</p> <p>13:37 Freshwater injection into the spent fuel pool ends</p>	<p>9:22 The water level in the trench has risen 15 cm since the previous day</p> <p>17:03 Water spraying operation from ground starts</p> <p>19:19 Water spraying operation from ground ends</p>		<p>Around noon Water is found in the sub-drain pit. Low level of contamination is confirmed</p> <p>21:00 Water discharge from the sub-drain pit to the sea starts</p>	<p><b>4-Apr</b></p> <p>Around noon Water is found in the sub-drain pit. Low level of contamination is confirmed</p> <p>21:00 Water discharge from the sub-drain pit to the sea starts</p>
<p><b>5-Apr</b></p> <p>15:00 Sandbags are built around a breakwater on the south of the plant to prevent leakage of contaminated water</p> <p>During MHLW sets the radiation safety standard for fish to the day 2000Bq/kg, the same safety standard as for vegetables</p>		<p>Morning Two new bore holes are drilled near the pit into which a tracer is injected</p> <p>14:15 The tracer is seen leaking from the crack near the pit</p> <p>15:07 Coagulation agents (liquid glass) are injected into the drilled holes to block leakage of water</p> <p>During Iodine-131 density 7.5 million times the legal limit is found in water sample taken on April 2 near the bar screen</p>		<p>17:35 Water spraying operation from ground starts</p> <p>18:22 Water spraying operation from ground ends</p>		<p><b>5-Apr</b></p>
<p><b>6-Apr</b></p> <p>12:30 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p>		<p>5:38 The water leakage from the sidewall of the pit is confirmed to be sealed</p> <p>13:15 Rubber boards and jigs are installed to prevent further</p>				<p><b>6-Apr</b></p>
<p><b>7-Apr</b></p> <p>23:32 A M7.4 earthquake strikes off the coast of Miyagi prefecture</p> <p>No change is observed at the on-site radiation monitoring posts</p> <p>No change of operation is considered necessary at units 1-6</p>	<p>1:31 Nitrogen gas injection to the containment vessel is started to reduce the possibility of hydrogen combustion in the</p>	<p>13:29 Freshwater injection into the spent fuel pool starts</p> <p>14:34 Freshwater injection into the spent fuel pool ends</p> <p>During A hole is drilled for a water transfer hose in the wall of the day turbine building</p>	<p>6:53 Water spraying operation from ground starts</p> <p>8:53 Water spraying operation from ground ends</p> <p>During A hole is drilled for a water transfer hose in the wall of the day turbine building</p>	<p>18:23 Water spraying operation from ground starts</p> <p>19:40 Water spraying operation from ground ends</p> <p>During A hole is drilled for a water transfer hose in the walls of the day the turbine building</p>		<p><b>7-Apr</b></p>
<p><b>8-Apr</b></p> <p>11:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p>		<p>13:10 Water transfer from the water condenser to the condenser storage tank is complete</p>	<p>17:06 Water spraying operation from ground starts</p> <p>20:00 Water spraying operation from ground ends</p>		<p>12:14 Water discharge from the sub-drain pit to the sea is completed</p>	<p>12:14 Water discharge from the sub-drain pit to the sea is completed</p>
<p><b>9-Apr</b></p>				<p>17:07 Water spraying operation from ground starts</p> <p>19:24 Water spraying operation from ground ends</p>		<p><b>9-Apr</b></p>
<p><b>10-Apr</b></p> <p>13:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p> <p>15:59 A remote-controlled helicopter is sent to take photos of the buildings of units 1, 2, 3, and 4</p> <p>17:40 Water discharge from the Central Waste Treatment Facility to the sea is complete</p> <p>During Remote control vehicles clear radioactive debris the day</p>	<p>9:30 Water transfer from the water condenser to the condenser storage tank is complete</p>	<p>10:37 Freshwater injection into the spent fuel pool starts</p> <p>12:38 Freshwater injection into the spent fuel pool ends</p>	<p>17:15 Water spraying operation from ground starts</p> <p>19:15 Water spraying operation from ground ends</p>			<p><b>10-Apr</b></p>
<p><b>11-Apr</b></p> <p>8:45 Silt fences are installed around the breakwater on the south of the plant to prevent leakage of contaminated water</p> <p>12:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p> <p>17:16 A M7.1 earthquake occurs in Fukushima Prefecture The epicenter is Hamadori-68km from the plant</p> <p>No radiation change is observed at the on-site radiation monitoring posts</p>	<p>17:16 External power source is interrupted. Water injection into the reactor stops</p> <p>Nitrogen gas injection to the containment vessel stops</p> <p>18:04 External power source recovers. Water injection into the reactor is restarted</p> <p>23:34 Nitrogen gas injection to the containment vessel is restarted</p>	<p>17:16 External power source is interrupted. Water injection into the reactor stops</p> <p>18:04 External power source recovers. Water injection into the reactor is restarted</p>	<p>17:16 External power source is interrupted. Water injection into the reactor stops</p> <p>18:04 External power source recovers. Water injection into the reactor is restarted</p>			<p><b>11-Apr</b></p>
<p><b>12-Apr</b></p> <p>6:38 A fire breaks out in the housing outlet structure for cooling water for units 1 to 4</p> <p>9:12 The fire is extinguished manually</p> <p>12:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p> <p>During A provisional International Nuclear and Radiological the day Event Scale (INES) Level 7 is submitted</p> <p>Estimated total release to the atmosphere is used as a justification</p>		<p>19:35 Water transfer from the trench in the turbine building to the surface condenser starts</p> <p>During Installation of steel boards on the ocean side of the inlet the day bar screen starts</p>	<p>16:26 Water spraying operation from ground starts</p> <p>17:16 Water spraying operation from ground ends</p>			<p><b>12-Apr</b></p>
<p><b>13-Apr</b></p> <p>11:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p>		<p>13:15 Freshwater injection into the spent fuel pool starts</p> <p>14:55 Freshwater injection into the spent fuel pool ends</p> <p>17:04 Water transfer from the trench in the turbine building to the surface condenser is complete</p>	<p>13:50 Silt fences are installed in front of the inlet bar screens</p>	<p>0:30 Water spraying operation from ground starts</p> <p>6:57 Water spraying operation from ground ends</p> <p>13:50 Silt fences are installed in front of the inlet bar screens</p>		<p><b>13-Apr</b></p>
<p><b>14-Apr</b></p> <p>10:17 A remote-controlled helicopter is sent to take photos of the buildings of units 1, 2, 3, and 4</p> <p>12:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p> <p>12:20 Silt fences are installed along a sea wall on the North of the breakwater to prevent leakage of contaminated water</p>	<p>12:20 Silt fences are installed in front of the inlet bar screens</p>	<p>12:20 Silt fences are installed in front of the inlet bar screens</p>	<p>15:56 Water spraying operation from ground starts</p> <p>16:32 Water spraying operation from ground ends</p>			<p><b>14-Apr</b></p>

## Timeline of the Fukushima I nuclear accidents

Overview	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
<p><b>15-Apr</b></p> <p>8:02 A remote-controlled helicopter is sent to take photos of the buildings of units 1, 2, 3, and 4</p> <p>11:30 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p>	<p>17:00 The distribution board for the pump that injects water into the reactor pressure vessel is moved to higher ground</p> <p>During Two sandbags filled with Zeolite are placed between the inlet screen pump room of unit 1 and that of unit 2</p>	<p>17:00 The distribution board for the pump that injects water into the reactor pressure vessel is moved to higher ground</p> <p>Installation of steel boards on the ocean side of the inlet bar screen is completed</p> <p>During Two sandbags filled with Zeolite are placed between the inlet screen pump room of unit 1 and that of unit 2</p> <p>Five sandbags filled with Zeolite are placed between the inlet screen pump room of unit 2 and that of unit 3</p>	<p>17:00 The distribution board for the pump that injects water into the reactor pressure vessel is moved to higher ground</p> <p>During Five sandbags filled with Zeolite are placed between the inlet screen pump room of unit 2 and that of unit 3</p> <p>Three sandbags filled with Zeolite are placed between the inlet screen pump room of unit 3 and that of unit 4</p>	<p>14:08 Water spraying operation from ground starts</p> <p>18:29 Water spraying operation from ground ends</p> <p>During Three sandbags filled with Zeolite are placed between the inlet screen pump room of unit 3 and that of unit 4</p>		
		<p>10:13 Freshwater injection into the spent fuel pool start</p> <p>11:54 Freshwater injection into the spent fuel pool end</p>				
<p><b>16-Apr</b></p>						
<p><b>17-Apr</b></p> <p>14:34 The power supply to the common spent fuel pool is interrupted due to a short-circuit</p> <p>17:30 The power supply to the common spent fuel pool is recovered</p> <p>During TEPCO issues a "Roadmap towards Restoration from the day of the Accident at the Fukushima Daiichi Nuclear Power Station"</p>	<p>16:00 A remote-controlled robot is sent into the reactor building to assess the situation</p> <p>Radiation, temperature, and humidity are measured</p>		<p>11:30 A remote-controlled robot is sent into the reactor building to assess the situation</p> <p>Radiation, temperature, and humidity are measured</p>	<p>17:39 Water spraying operation from ground starts</p> <p>21:22 Water spraying operation from ground ends</p>		
<p><b>18-Apr</b></p>	<p>11:50 Water injection to the reactor is temporarily stopped to replace the hose</p>	<p>11:50 Water injection to the reactor is temporarily stopped to replace the hose</p> <p>13:42 A remote-controlled robot is sent into the reactor building to assess the situation</p> <p>Radiation, temperature, and humidity are measured</p> <p>During Coagulation agents (liquid glass) are injected into the trench</p>	<p>11:50 Water injection to the reactor is temporarily stopped to replace the hose</p> <p>14:17 Water spraying operation from ground starts</p> <p>15:02 Water spraying operation from ground ends</p>			
<p><b>19-Apr</b></p>	<p>10:23 Emergency diesel-powered generators at units 1 and 2 are connected to a power distribution unit</p>	<p>10:08 Water transfer from the trench in the turbine building to the central waste treatment center starts</p> <p>10:23 Emergency diesel-powered generators at units 1 and 2 are connected to a power distribution unit</p> <p>16:08 Freshwater injection into the spent fuel pool starts</p> <p>17:28 Freshwater injection into the spent fuel pool ends</p> <p>During Coagulation agents (liquid glass) are injected into the trench</p>	<p>10:23 Emergency diesel-powered generators at units 3 and 4 are connected to a power distribution unit</p>	<p>10:17 Water spraying operation from ground starts</p> <p>10:23 Emergency diesel-powered generators at units 3 and 4 are connected to a power distribution unit</p> <p>11:35 Water spraying operation from ground ends</p>		<p>11:00 Water transfer from the turbine building to the surface condenser starts</p> <p>15:00 Water transfer from the turbine building to the surface condenser ends</p>
<p><b>20-Apr</b></p>				<p>17:08 Water spraying operation from ground starts</p> <p>20:31 Water spraying operation from ground end</p>		
<p><b>21-Apr</b></p> <p>11:43 A remote-controlled helicopter is sent to take photos of the buildings of units 1, 2, 3, and 4</p> <p>12:00 An emulsion is sprayed over the common spent fuel pool to prevent the debris around it from scattering</p>				<p>17:14 Water spraying operation from ground starts</p> <p>21:20 Water spraying operation from ground ends</p>		
<p><b>22-Apr</b></p>		<p>15:55 Freshwater injection into the spent fuel pool starts</p> <p>17:40 Freshwater injection into the spent fuel pool ends</p>	<p>13:40 Test injection of freshwater into the spent fuel pool via the reactor water clean up system start</p> <p>14:00 Test injection of freshwater into the spent fuel pool via the reactor water clean up system end</p> <p>14:19 Water spraying operation from ground starts</p> <p>15:40 Water spraying operation from ground ends</p>	<p>17:52 Water spraying operation from ground starts</p> <p>23:53 Water spraying operation from ground ends</p> <p>During Meters are installed on the concrete pumping vehicle at the spent fuel pool</p> <p>The water level, water temperature, and others are measured</p>		
<p><b>23-Apr</b></p>				<p>12:30 Water spraying operation from ground starts</p> <p>16:44 Water spraying operation from ground ends</p>		
<p><b>24-Apr</b></p>				<p>12:25 Water spraying operation from ground starts</p> <p>17:07 Water spraying operation from ground ends</p>	<p>11:30 An emulsion is sprayed around the reactor building to prevent the debris around it from scattering</p>	
<p><b>25-Apr</b></p> <p>14:44 The high power panels of units 1 and 2, and of units 5 and 6 are connected</p>		<p>10:12 Freshwater injection into the spent fuel pool starts</p> <p>11:18 Freshwater injection into the spent fuel pool ends</p>		<p>18:15 Water spraying operation from ground starts</p>	<p>10:30 An emulsion is sprayed around the reactor building to prevent the debris around it from scattering</p>	
<p><b>26-Apr</b></p> <p>13:30 An emulsion is sprayed over the coastal side of units 1, 2, 3, and 4 to prevent the debris around it from scattering</p>	<p>11:35 A remote-controlled robot is sent into the building to assess the situation</p> <p>No change in the radiation dose rate is observed since April 17</p> <p>No significant leakage from the containment vessel is observed</p>		<p>12:25 Freshwater injection into the spent fuel pool via the reactor water clean up system start (after confirming the water level in the spent fuel pool)</p> <p>14:02 Freshwater injection into the spent fuel pool via the reactor water clean up system end</p>	<p>0:26 Water spraying operation from ground ends</p> <p>16:50 Water spraying operation from ground starts</p> <p>20:35 Water spraying operation from ground ends</p>		
<p><b>27-Apr</b></p>	<p>10:02 The amount of cooling water is increased from 6 m<sup>3</sup>/h to 10 m<sup>3</sup>/h in order to fill the primary containment vessel with water above the level of fuels in the reactor</p>		<p>11:00 An emulsion is sprayed over the coastal side of the unit to prevent the debris around it from scattering</p>	<p>12:18 Water spraying operation from ground starts</p> <p>15:15 Water spraying operation from ground ends</p>		
<p><b>28-Apr</b></p>		<p>10:15 Freshwater injection into the spent fuel pool starts</p> <p>11:28 Freshwater injection into the spent fuel pool ends</p>			<p>10:30 An emulsion is sprayed around the reactor building to prevent the debris around it from scattering</p>	
<p><b>29-Apr</b></p>	<p>10:14 The amount of cooling water is reduced from 10 m<sup>3</sup>/h to 6 m<sup>3</sup>/h</p> <p>11:36 A remote-controlled robot is sent into the building to assess the situation</p> <p>No significant leakage from the containment vessel is observed</p>	<p>9:16 Water transfer from the trench in the turbine building to the central waste treatment center is interrupted due to the maintenance</p>		<p>9:00 An emulsion is sprayed over the area east to the turbine building to prevent the debris around it from scattering</p>	<p>10:30 An emulsion is sprayed around the reactor building to prevent the debris around it from scattering</p>	
<p><b>30-Apr</b></p> <p>10:30 An emulsion is sprayed over the main building to prevent the debris around it from scattering</p>		<p>14:05 Water transfer from the trench in the turbine building to the central waste treatment center is restarted</p>	<p>11:34 The voltage of the external power is increased from 6900 volts to 66000 volts</p>	<p>11:00 An emulsion is sprayed over the area east to the turbine building to prevent the debris around it from scattering</p> <p>11:34 The voltage of the external power is increased from 6900 volts to 66000 volts</p>		