

Accidents and Breakdowns at Nuclear Power Plants and Nuclear Fuel Facilities (FY2019: April 1, 2019 to March 31, 2020)				
Year	Date	Facility name	Accident overview	Report Classification
2019	Apr 17	Hamaoka 4	In maintenance inspection work on measuring equipment, when an inspection of a pressure indicator switch on the outlet of a mechanical valve lever lubrication pump on an emergency diesel generator was carried out, it was found that the switch contact was malfunctioning. (The contact resistance had increased.)	
	Apr 22	Ohi 3	When the work to remove the fuel was being implemented at the start of a regular inspection, an alarm sounded during transfer of the 112th fuel assembly out of a total charge of 193 assemblies to indicate that the fuel transfer device had overshot the correct position of the spent fuel pit. Kansai Electric Power Company presume that the cause of the overshoot was the faulty installment of the speed selector switch.	
	May 10	Hamaoka 4	During an inspection of the nuclear reactor and its auxiliary equipment, in an inspection of a diesel generator starter air compressor (B-1), it was confirmed that the gap between the first stage piston ring No.1 and the ring groove deviated from the stipulated value.	
	May 16	Shimane 1 and 2	Of the records that should be kept for 10 years, it was found that the records for the "Dose equivalent rate on the side wall of the radiation shielding in radioactive waste disposal facilities, etc." and the "Weekly dose equivalent rate relating to external radiation in controlled areas, the weekly average concentration of airborne radioactive substances, and density of radioactive substances on the surface of objects contaminated with radioactive substances" had been mistakenly disposed of.	
	May 20	Fukushima Daiichi 2	It was found that there was an error in the minimum value of the measurement scope of the nitrogen gas sealing flow rate meter installed on the containment vessel nitrogen gas sealing equipment (error: 5m <sup>3</sup> /hr, correct: 10m <sup>3</sup> /hr). Due to this error, measurement values at or below 10m <sup>3</sup> /hr could not be read, and it was found that it was not possible to confirm whether the necessary flow rate (5m <sup>3</sup> /hr) was being secured or not.	
	Jun 21	Genkai 3	During implementation of an inspection of control rod clusters at the fuel inspection pit, when attempting to place the plugging device scheduled for use in the next operating cycle on the inspection mount for inspection, one part of the plugging device was deformed.	
	Jun 27	Fukushima Daini 3	On a patrol, a seeming foreign object (looking like a washer) was confirmed to be in the spent fuel pool on the 6th floor of the Reactor Building. The object was recovered from the pool and was confirmed to be a nut (metal, approximately 2.7cm × 2.4cm, thickness approximately 1 cm and inner diameter approximately 1.6cm.).	

2019	Jul 5	Shika 2	A fire occurred in the high voltage power supply vehicle positioned in the vicinity of the disaster prevention equipment and materials warehouse. Cause of the fire presumed by Hokuriku Electric Power Company: When the high voltage power supply vehicle cable was relaid in response to a recall by the vehicle maker, the cable length was insufficient to take into account occasions when the battery was pulled out. When the power supply device maker pulled out the battery in a close inspection, a metal part became exposed when the cable was pulled out of a connector. When an attempt was made to drive the high voltage power supply vehicle, the engine would not start, and when the power supply device maker conducted a hands-on check to confirm the situation, the metal part came into contact with an air pipe. This caused an electric current to flow in the air pipe, which heated the pipe, resulting in two plastic antivibration clips attached to the pipe to catch fire.	
	Jul 16	Fukushima Daiichi 5	During preparation for a manual startup test for an emergency diesel generator (B), the liquid level in the valve gear lubrication tank was higher than normal and it was found that there was a possibility that lubricating oil in the valve gear lubrication tank was being contaminated with the diesel fuel in the emergency diesel generator. As a result of an inspection, TEPCO presumes that diesel fuel was leaking from the loose joint between fuel valve of cylinder L7 and the high pressure union causing the fluid level in the valve gear lubrication tank to rise.	
	Jul 17	Ikata 1	During regular operation of an air-cooled emergency generating device No.1, an auxiliary piece of machinery (a lubricating oil priming pump) did not start up, and an inspection of the control panel confirmed that the cable had discolored to a black color. Shikoku Electric Power Company presumes that the cable connector screwed onto the terminal block in the auxiliary machinery control panel had become abnormally heated due to a heating phenomenon caused by cuprous oxide and that the auxiliary machinery cable had thus become discolored and disconnected.	
	Jul 18	Kashiwazaki-Kariwa 7	A problem occurred in the watertight door of the airconditioner room inside the service area room of the Turbine Building 1A. The lower door locking mechanism would not come out due to a fault with the lower locking bolt. When dismantling the interior parts, it was discovered that the locking mechanism did not function normally due to overlooking the assembly of the key part that should be coupled with the vertical shaft.	
	Jul 22	Shika 1	It was found that seawater was leaking from the backwash water exit pipe of the Seawater Heat Exchanger Building turbine auxiliary machinery cooling seawater system seawater strainer (C). It was presumed that the seawater leak was caused by corrosion on the inner surface of the pipe.	

2019	Jul 25	Fukushima Daiichi 5 and 6	A worker discovered smoke emitting from Units 5 and 6 66kV Futaba Line No.1 inside the Units 5 and 6 switching station onsite at Fukushima Daiichi Nuclear Power Station. The result of an examination showed that there had been a misconnection in which the sheath circuit had not been grounded. The result of an analysis showed that immediately following power income, a voltage of approximately 7kV had been applied to the anticorrosion layer protection device, conducting a current of approximately 1.3A 100 times per second. TEPCO presumes that as the conduction continued for some time, the anticorrosion layer protection device was damaged (discharging energy along the element), leading to the breakout of the fire.	
	Jul 30	Fukushima Daiichi	At the equipment undressing area (controlled zones where eating and drinking are prohibited) nearby the entrances to the Units 5 and 6 guardhouse and the guardhouse for the protected zone in the surroundings of Units 1-4, TEPCO employees confirmed the presence of a water server (Units 5 and 6) and a cooler box (Units 1-4) that had been left in those places.	
	Aug 6	Fukushima Daiichi 2	At the time of a system test of the Unit 2 nitrogen gas sealing equipment, as a necessary safety measure, when the work to switch the nitrogen gas sealing channel from the reactor pressure vessel line to the containment vessel sealing line, a problem occurred in which the nitrogen gas flow rate in both the reactor pressure vessel line and the containment vessel line became 0m <sup>3</sup> /hr. TEPCO presumes that this problem was due to a mistake in the written tag on the system composition operation valve, such that an unintended system composition arose when implementing operation of the valve.	
	Aug 16	Ikata 3	When the containment vessel spray pump test line valve (full flow valve) was operated for regular operation of the containment vessel spray pump 3A on 1F of the nuclear reactor auxiliary building, it was found that the valve was inoperable due to the protecting chain preventing opening of the valve being caught in the gap between the valve cover and valve shaft.	
	Aug 21	Onagawa 3	A radiation monitor on the 3rd floor of the nuclear reactor building (fuel exchange area) had ceased to be used since January 2018 due to malfunction, but as this meant that for a long time the number of radiation monitors stipulated in the safety regulations (114 in the whole of the nuclear power plant) had not been secured, this was judged by the Nuclear Regulation Authority to be a violation of the safety regulations. The radiation monitor was restored on September 26 by reconstructing the measurement circuit and replacing the detector.	

2019	Aug 26	Shimane 2	As a check of analytical input errors in the effectiveness assessment of severe accident, etc. handling equipment, when the maker performed a check to confirm the validity of the input of analytical conditions for circulation pump trips and matters other than nuclear reactor output changes, of the input values for the analytical program REDY, which uses an analysis by the analytical program SAFER, it was found that instead of the correct condition of 1.05 seconds for the "nuclear reactor water level SCRAM," the analysis had been performed using the condition 0.3 seconds. As the REDY code is also used for "In-operation abnormal excessive change analysis," etc., out of 10 analytical cases, when the input for the analysis "total loss of water supply flow," which uses the nuclear reactor water level SCRAM, was investigated, it was reported by the maker that the same error existed in the analysis at the time of application for the Shimane Units 1 and 2 fuel alteration, which had already received approval.	
	Aug 26	Rokkasho Reprocessing Facility	An alarm sounded in the No.1 exhauster of the waste treatment equipment in the Mixed Uranium/Plutonium Denitration Building and it was found that of the two exhauster systems, one of the exhausters in operation (system B) had stopped. (One further exhauster (system A) was undergoing inspection.) The No.2 exhauster, in the same system, was able to operate continually and negative pressure was maintained inside the facility. It was found that all five of the drive belts (V belts) connecting the monitor and the exhauster had fallen off. This was because a grade of V belt with lower durability than that required had been used.	
	Sep 4	Kashiwazaki-Kariwa 6 and 7	The alarm buzzer warning that the watertight door of Unit 6 and 7 Control Building staircase room was open was sounding continually even when the door was closed. When an inspection of the door was conducted, it was confirmed that the inner shaft of the door had fractured. TEPCO presumed that the shaft had undergone a fatigue fracture.	
	Sep 5	Ikata 3	When implementing regular operation of high pressure injection pump 3B on the 2nd floor basement of the nuclear reactor auxiliary building, as the operator confirmed something similar to white smoke emanating from the vicinity of the electric motor bearings, the regular operation was suspended. It was found by an inspection of the vicinity of the bearings of the high pressure injection pump 3B that oil inside the bearings was being ejected from the bearings as spray.	
	Sep 8	Takahama 4	Of the 3 steam generators (SG), the alarm for the steam flow rate of A-SG was repeating a cycle of sounding and returning to normal. When checking the relevant meters, it was confirmed that of the 2 systems of A-SG main steam flow rate meters, the indicated value of one system was repeating a cycle of falling and returning to normal. It was not possible to identify the cause.	
	Sep 9	Materials Testing Reactor (JMTR)	The cooling tower of the secondary cooling system was blown over by a gale during a typhoon. JMTR was not in operation and the fallen tower is in the process of being cleared away.	○

2019	Oct 17	Takahama 4	In a heat transfer capillary tube eddy current test of the 3 steam generators (SG), signals that appeared to signify a thickness reduction were discovered in the vicinity of the outer surface of the tube support plate for 5 heat transfer capillary tubes in A-SG (1), B-SG (1) and C-SG (3). As a result of a mini-camera investigation, it was confirmed that all the capillary tubes where the signal was found had lesions of a width of 4mm to 8mm on the outer surface and in a circumferential direction. All of these capillary tubes had stoppers attached so that they could no longer be used.	○
	Oct 18	Kashiwazaki-Kariwa 5	When a worker carrying out an incoming power operation on the power supply board in the Ominato side Auxiliary Boiler Building operated the incoming power switchover on the power supply board, as smoke was emitted from the power supply board, the worker extinguished the fire using a fire extinguisher. Examining the interior of the power supply board, it was found that an internal part (an operating coil on the switch) had burned out.	
	Oct 26	Onagawa 1,2 and 3	Trouble occurred with the data transfer of all monitors (Nos.1-6) of the monitoring posts measuring radiation at the site boundaries of Onagawa Nuclear Power Plant. As a result of a later investigation, it was found that a part of the central line of the cable transferring the measurements at No.1 monitoring post had become disconnected. This caused confusion in the data transfer system of the monitoring posts, leading to a cessation of all monitors.	
	Oct 28	Fukushima Daiichi	In subdrain pit No.204, installed near the Unit 1 Reactor Building, the water level difference with the northwest area of the Unit 1 Reactor Waste Treatment Building became 205mm, and it was confirmed that this was less than the 400mm limit value for water level difference that was set while taking instrument error into account. For this reason, the operational restriction "The level of water retained in the Unit 1 reactor waste treatment building must not exceed that of the water level in the neighboring subdrains" was violated. TEPCO presumes that the cause of the rise in water level in the area was due to heavy rain on October 25.	
	Nov 19	Tsuruga 2	When a worker engaged in inspection work on an elevator changed clothes to enter a controlled area, the person left behind the personal dosimeter, entering the area without the dosimeter. The worker soon realized the lack of the personal dosimeter and immediately retreated from the controlled area.	
	Nov 22	Kashiwazaki-Kariwa 1, 2, 3, 4, 5 and 6	As a countermeasure against water inundation in emergency safety countermeasures based on the Fukushima Daiichi Nuclear Power Station accident, a measure was carried out to plug the gaps in the doors leading to the outside of the nuclear reactor buildings, heat exchanger buildings and others with caulking material. In a later investigation it was found that in 9 locations in Unit 2 and Unit 4, it was no longer possible to open the doors on evacuation routes due to the caulking treatment and that doors in 5 locations, such as in Unit 1 and the Arahama side Incinerator Building, had also received the caulking treatment to raise their airtightness. Further, it was also discovered that doors in 7 locations on evacuation routes could not be opened or closed, or that there were obstacles preventing the opening and closing of doors.	

2019	Nov 26	Hamaoka 5	During an inspection of dust removal equipment installed on the inlet pipe of the nuclear reactor auxiliary cooling seawater system heat exchanger, it was found that a metal filter was damaged.	
	Nov 26	Fukushima Daiichi 6	As a seat leak was discovered on the valve element of the pressure suppression vessel suction valve of residual heat removal system B, when a manual operation to tighten the shut-off side of this solenoid valve was carried out, the shaft of the manual operation handle broke off. Because of this, the residual heat removal system B lost the function to resupply the fuel pool water.	○
	Nov 28	Fukushima Daiichi	In Units 1 and 2 drain sump pit, where rainwater had accumulated due to entering the Units 1 and 2 exhaust stack, the phenomenon occurred whereby the water level was dropping even when work to transfer the rainwater was not being carried out, and it was found that there was a possibility that contaminated water was leaking from the sump pit. The capacity of the Units 1 and 2 sump pit is approximately 1m <sup>3</sup> . When the water level rises up to 400mm above the floor of the pit, a transfer pump automatically starts, transferring the water to a buffer tank (4m <sup>3</sup> ), drawing up water until the level of water falls to 330mm from the floor of the pit. However, after typhoon No.19 struck on October 12, the water level was falling despite the transfer pump not starting up, the water level being repeatedly maintained at around 325mm from the floor of the pit. TEPCO considers that there is a possibility that contaminated water at a high dose rate was flowing out of the pit, but as the area has a high dose rate (a maximum of 950mSv/h as measured on October 12, 2015, and 30-100mSv/h as measured on December 9, 2019) the cause has not been identified. TEPCO estimates that the amount of water that has flown out of the pit is 370 liters, and that the radioactive substances included in the water, based on the concentration in the pit water, are 8.3 billion becquerels total gamma and 7.4 becquerels total beta.	○
	Dec 10	Genkai	The Genkai transformer station alarm signifying a fire outbreak sounded and charred remains and damage were confirmed in the distribution board located in the Genkai transformer station. At the time of the outbreak of the fire, a restoration operation was implemented after a planned power interruption on the Karatsu Yokotake Line No.2. Kyushu Electric Power Company resumes that when the breaker for incoming power to the transformer station was turned on, as there was a mistaken connection position on the downstream side breaker coupling equipment, a short occurred, causing the fire to break out in the distribution board.	
	Dec 24	Tomari	It was found that there was an error in the in the reported values of the amounts of gaseous waste materials (noble gasses, iodine, all particulate matter) released from the Radioactive Waste Treatment Building. Of the gaseous waste released from the Radioactive Waste Treatment Building, the gasses released from the incinerator chimney are diluted with almost the same volume of air and released to the atmosphere after measurement. However, this was not taken into account in calculating the values for the reports to the municipalities and the Nuclear Regulation Authority, which showed values of around 60% lower than the actual released volumes.	

2020	Jan 4	Fukushima Daini 4	A "nuclear reactor system alarm auxiliary panel malfunction" alarm sounded and it was confirmed that the nuclear reactor system alarm auxiliary panel malfunction display 1B (CPU-2) had malfunctioned.	
	Jan 6	Ikata 3	In work to inspect the Central Control Room emergency circulation system, it became clear that as the decision for the setting of the timing of the implementation of the inspection had been delayed, the safety regulation limit had not been observed.	
	Jan 12	Ikata 3	To do the preparation work to remove the fuel from the nuclear reactor, after unharnessing the control rod clusters from the drive shaft in preparation work to remove the fuel from the nuclear reactor, while implementing the removal work for the structural parts above the reactor core, it was found that one control rod cluster (position M-4) was almost completely hauled up with the structural parts above the reactor core, leaving only 25cm of the end of the cluster in the reactor core. The unharnessing work was redone the following day, and the removal of the structural parts above the reactor core was completed. At the time of shifting to a cold shutdown after halting the reactor, the boron concentration in the primary coolant had been increased in order to maintain the reactor core in a state of non-criticality. Sludge had become affixed to the vicinity of the connector of this control rod cluster. It was confirmed that sludge had also become affixed to 2 other control rod clusters. Shikoku Electric Power Company presumes that it is possible that sludge had seeped into the connector connecting the control rod cluster and the drive shaft and that the unharnessing had failed to complete because of this.	○
	Jan 17	Kashiwazaki-Kariwa 7	When the fuel transfer pump on the emergency diesel generator (C) was inspected, it was discovered that the cable supplying electricity to the pump had an insulation failure. When the cable was pulled out of the conduit for inspection, it was found that the insulating covering had been damaged and that the conduit also had similar damage in the same place. TEPCO presumes that the conduit and cable were damaged when concrete drilling work was carried out as part of tornado countermeasures.	
	Jan 20	Ikata 3	A signal (transmitted when the suspended load on the spent fuel pit crane falls below the the set weight) indicating that a fuel assembly had fallen during transfer was transmitted during inspection work on fuel assemblies in the spent fuel storage pit. It was found that when the spent fuel assembly inspection device rack was inserted, the assembly was struck by the top of the rack frame.	
	Jan 25	Ikata 1, 2 and 3	During work to confirm the operation of the protective relay, which operates the 187kV busbar breaker in the Units 1 and 2 interior switching station, when attempting to operate the busbar disconnector to switch over the startup transformer No.2 system, the 187kV busbar protection device operated, stopping all incoming power from the the 187kV distribution line No.4, connected to the busbar. Units 1 and 2 switched over to incoming power from the backup 66kV backup distribution line, but Unit 3, after receiving power by starting up emergency diesel generators, switched over to the 55kV distribution line. Shikoku Electric Power Company presumes that a short occurred in the busbar disconnector.	

2020	Jan 28	Hamaoka 1&2	A construction error occurred in that piping on the Units 1 and 2 exhaust system tritium measurement device, in operation since February 2018, was installed with the inlet and outlet the wrong way around. It was found that because of this the calculated values for tritium releases, e.g. cited in the report on dose rates for persons engaged in radioactive work, etc., were lower than they should have been.	
	Jan 29	Fukushima Daiichi 2	As the water level in the Unit 2 Turbine Building northeast area was discovered to be 165mm higher than that in the No.34 subdrain pit installed in the surroundings of the Unit 2 Turbine Building, the operating limit "the water level of water accumulated in the turbine building must not exceed that of the neighboring subdrains" was violated.	
	Feb 3	Ohma (Under construction)	A fire broke out in the vicinity of the water tank of a chemical fire truck in the nuclear power station construction site garage. As the power for the anti-freeze heater was on while the tank was empty, the heater overheated and melted, causing a fire when it came into contact with the tank.	
	Feb 6	Shika 1	When regular testing of the emergency diesel generator 1B was implemented, lubricating oil was found to be leaking from the welded joint of the pipe that supplies lubricating oil to the diesel motor fuel spray pump, and a linear lesion of about 6mm in length was confirmed on the surface of the edge of the weld.	
	Feb 18	Takahama 3	In the heat transfer capillary tube eddy current test of the 3 steam generators (SG), abnormal signals that appeared to signify a thickness reduction were discovered in the vicinity of the outer surface of the tube support plate for 2 heat transfer capillary tubes in B-SG (1) and C-SG (1). As a result of a mini-camera investigation, it was confirmed that the capillary tube in B-SG had a lesion of a width of 4mm and that of C-SG had lesions of a width of 1mm and 4mm. A foreign object in the form of a metal fragment was found on the flow distribution plate of steam generator C, and a similar metal fragment was also discovered on the flow distribution plate of A-SG.	○
	Feb 18	Shimane	It became clear that on 32 days since 2002 the controlled area patrol work had not been carried out for the Site Bunker Building, a facility for storage and treatment of radioactive waste on the site, and that the area entry report had been falsified.	
	Mar 21	Rokkasho Reprocessing Facility	A fire broke out when a protective sheet caught fire after molten metal pierced a flame-retardant sheet during welding work on a conduit support at the construction site of the Emergency Countermeasures Building.	
	Mar 26	Onagawa 2	It was confirmed that a worker conducting a disassembly test on a valve installed for sampling nuclear reactor water from the recirculation system had contamination on the face when taking the contamination test upon exiting the controlled area. After decontamination and exiting the facility, it was found from an internal contamination test that the person had ingested a trace amount of cobalt-60, which was assessed as an exposure dose of 0.05mSv by TEPCO. Contamination remained on the finely corrugated surface of the valve shaft, but the worker had conducted the work without wearing a protective mask.	



