Focus Two

Maintaining Our Safety-First Principle

Safety is our prime priority in all business activities. Tragically, in FY2009 one of our workers was killed during an inspection at one of our power stations. The number of industrial accidents has unfortunately fluctuated in recent years.

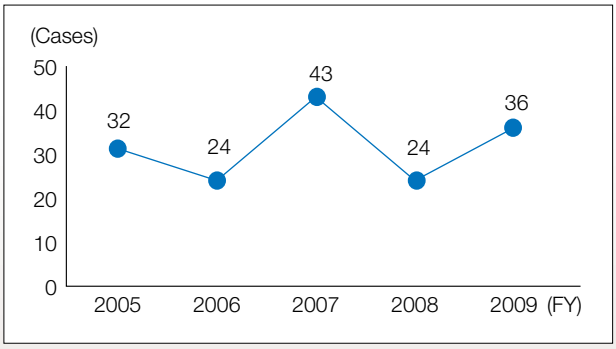
Several accidents attributable to human error interrupted the supply of power during the year, although these events thankfully did not result in injury or death.

Many of these accidents resulted from complacency, as successes over the years reduced risk awareness. We consider it necessary to prevent recurrences by bolstering safety awareness in the corporate culture while providing more fail-safes in recognition that people do make mistakes. We therefore intend to boost risk prediction by drawing on experiences to strengthen safety awareness, sharing accident information, and providing more exposure in training to potentially dangerous situations. At the same time, we will improve facilities to maintain and enhance public safety and supply reliability.

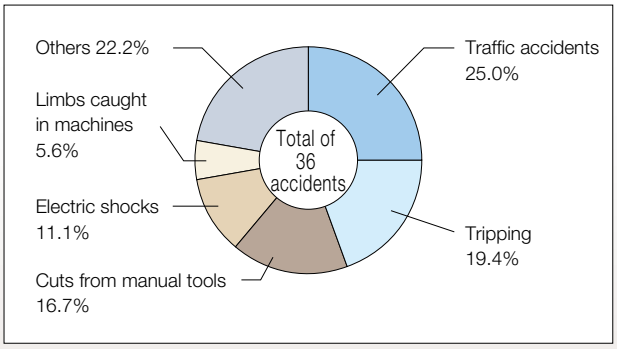
In FY2010, we will establish the Safety Promoters Department to gather relevant information from all business units and help them improve safety management, thus deepening safety awareness in the corporate culture.

Safety will remain our top priority as we improve awareness of this issue in our corporate culture and build safer facilities.

▼ Number of occupational accidents



▼ Occupational accidents by category in FY2009



▼ Main power outages caused by human error in FY2009

Date	Number of households affected	Outage times (minutes)	Accident description
04/17/09	250	1	Operated wrong switch when inspecting facility
06/15/09	54	21	During power recovery operation, connected cable while earthing and short-circuit device was still fitted
10/20/09	153	28	Incorrectly transmitted power through wrong high-voltage cable (6-kilovolts) during noninterruptive work
11/16/09	148	11	Cut cable using wrong noninterruptive switching procedure
12/22/09	4,500	5	Mistakenly severed control cable that was still operating during cable removal at substation
01/19/10	7,700	28	Power generator stopped due to misoperation in regular facility inspection during shutdown at internal combusion power plant
01/24/10	1,659	5	Operated wrong switch after replacing power pole

Glossary
Human error
Fail-safe

Analyzing and Preventing Recurrence of Fatal Electric Arc Accident during Generating Facility Inspection

In January 2010, one worker was killed and six were injured owing to an electrical arc during outage work as part of a regular facility inspection at the Sendai Nuclear Power Station.

Accident Cause

The accident seems to have stemmed from contact between grounding equipment and a live terminal when the workers were trying to fit an earth wire. This apparently triggered an electrical arc that ignited gas and burned the workers. We assume that several factors combined to cause this accident, including that the workers were insufficiently aware that their job was near a live terminal.

Recurrence Prevention Measures

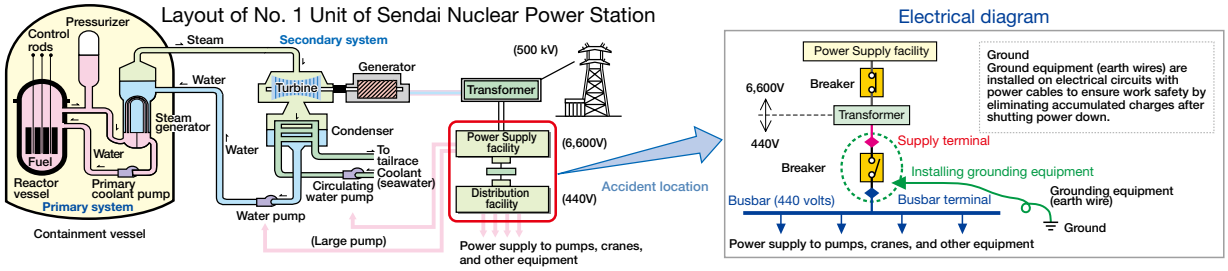
As we were unable to conduct a full hearing to investigate the above factors, we implemented all possible measures to prevent a recurrence.

■ Clarification of procedures and precautions

- Describe in the operational procedure manual whether participants have confirmed whether or not a job is near an electricity source and that voltage from both busbar and supply terminals is detected.
- Label to identify supply and busbar terminals.
- For each task, clearly define the scope of tasks requiring power shutdowns to ensure safety.
- It should be clearly written in work rules that power should be completely off in two circuit locations if at all possible. In principle, work near live electrical sources is prohibited. If working near a live terminal, protective covers and other safety measures shall be used.

■ Informing and educating related parties

- Inform related parties about these and other measures.
- Educate related parties about the objectives and importance of electrical inspections and appropriate techniques
- Strengthen hazard prediction activities.



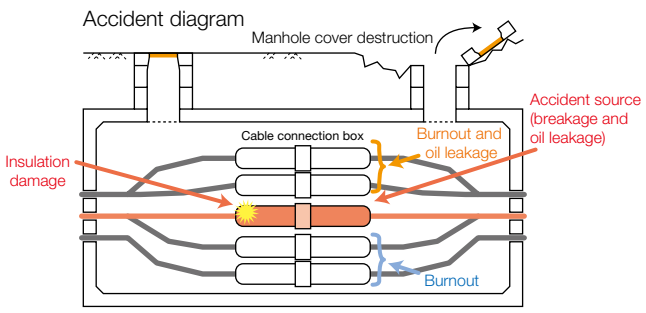
Analyzing and Preventing Recurrence of Breakage of 220 kV Underground Cable

In December 2009, a 220 kV underground cable in Kitakyushu snapped, destroying a manhole cover and damaging the road, nearby houses, and vehicles.

Accident Cause

The accident was attributable to cable insulation slippage because of mechanical and thermal stresses, which reduced dielectric strength. The mechanical stress on the cable was caused by installation in an area where there were large curves on a slope, and the thermal stress stemmed from the cable being used in an environment of extremely large daily fluctuation of power flows.

We concluded that cable broke because voltage overwhelmed the dielectric capacity because the charge accumulated on the cable was retransmitted instead of discharging.



Recurrence Prevention Measures

We took the following steps to prevent a recurrence of cable and manhole cover damage.

■ Proper discharging

- Add discharge confirmation step and operational explanation.
- Improve education and training.
- Add fail-safe function to the computer control system.

■ Diagnose cable deterioration

Identify locations in which insulation could deteriorate because of similar installation and usage conditions, sampling to conduct destructive checks and assess deterioration.

■ Safeguarding entrance hole for workers

To ensure that damage to the manhole cover does not cause damage outside the hole if a similar accident occurs, we will strongly connect the cover and entrance of all oil-filled electric cables by FY2011.

We will cover all 220 kV cables in the manholes with highly inflammable tape to prevent fire from spreading between cables. That is because one cable burnt others nearby and increased the damage.

Glossary
Electric Arc
Earth wire
Manhole cover
Fail-safe