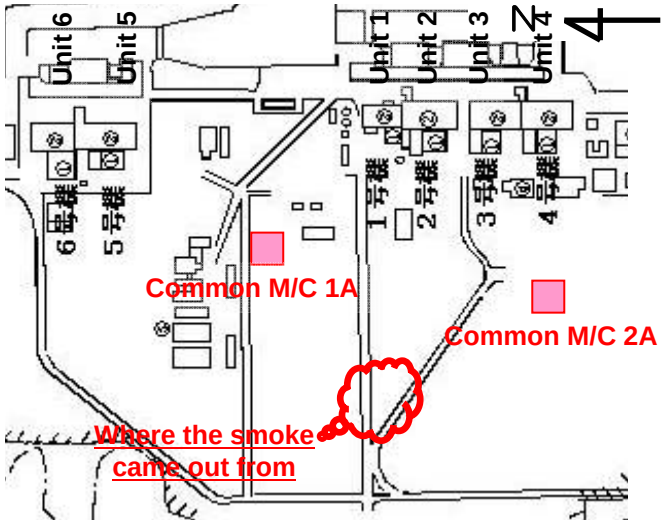
< Reference >
November 27, 2012
Tokyo Electric Power Company

Smoke Coming out of Damaged Power Cable at Fukushima Daiichi Nuclear Power Station: Causes and Countermeasures

[Outline]

Day and time: November 2, 2012 at 9:25 AM
Location: Fukushima Daiichi Nuclear Power Station
Outline
While installing cable connecting M/C 1B and 2B at Units 1-4, the Eflex pipe connecting the common M/C 1A and 2A was cut by mistake when trying to cut another Eflex pipe to prepare for high-voltage cable installation. As the cable got damaged, an earth fault occurred which resulted in smoke coming out from the location.
Affected equipments
The following equipments were stopped due to power supply suspension.
- Nitrogen gas separator A
- Unit 1 PCV nitrogen injection equipment and S/C nitrogen injection equipment

These systems were restarted after switching the power supply. There was no impact on the plant condition.



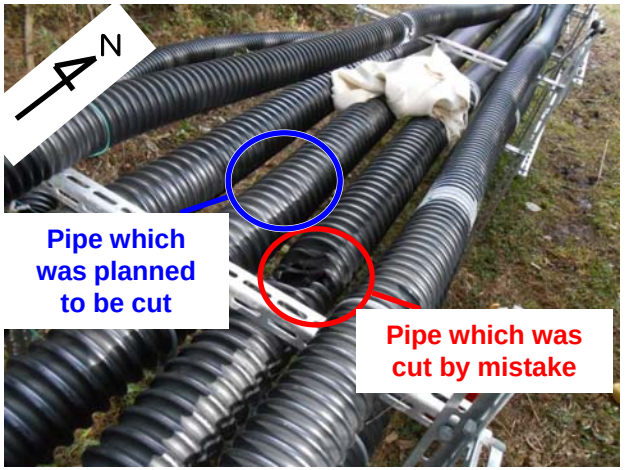


Photo taken on November 2, 2012 by TEPCO

[Incident in chronological order]

9:25 AM: The incident occurred and a TEPCO employee found the alarm going off ("Common M/C 1A main line earth fault" and "Common M/C 2A main line earth fault").

9:47 AM: A main contractor worker who engaged in cable installation work reported a TEPCO supervisor that the high voltage cable had been damaged.

10:20 AM: Upon on-site confirmation, the supervisor reported the recovery group on smoke coming out of the damaged portion of the cable.

10:25 AM: The incident was reported to Tomioka Fire Department

10:49 AM: Common M/C 1A was stopped (earth fault alarm was cleared)

10:51 AM: Smoke was confirmed to have stopped coming out of the cable.

11:00 AM: Common M/C 1A received power (from M/C 5A)

[Direct causes]

- As the safety meeting (called “TBM-KY”) was not held at the site, checking of the location to cut and safety measure implementation were insufficient.
- The lamp indicating that power goes through the cable inside the EFLEX pipe was not displayed near the place of operation.
- The EFLEX pipe was cut all at once without checking if there was cable running inside.

[Issues which may have indirectly caused the incident]

- Safety evaluation was not done before work as similar work was done in the past.
- Risks of working near cable with power going through it were not considered at the meeting held at the main contractor in prior to work implementation.
- It was not stated in the work instructions that the work location was near cable that power goes through.
- Workers did not check with the group leader (main contractor) about the work at the site.
- Though there were text signs indicating that cable runs inside the pipe, they were installed on 30m intervals.

[Countermeasures] (: Common for all operations)

- Require the main contractor workers in charge of work to participate in the safety meeting.
- When the safety meeting is held in places other than the site, use photos or go through the precautions and work process among multiple number of workers involved.
- Put a warning sign on the Eflex pipe in which power goes through the cable inside.
- Check the inside of the pipe before cutting it all the way

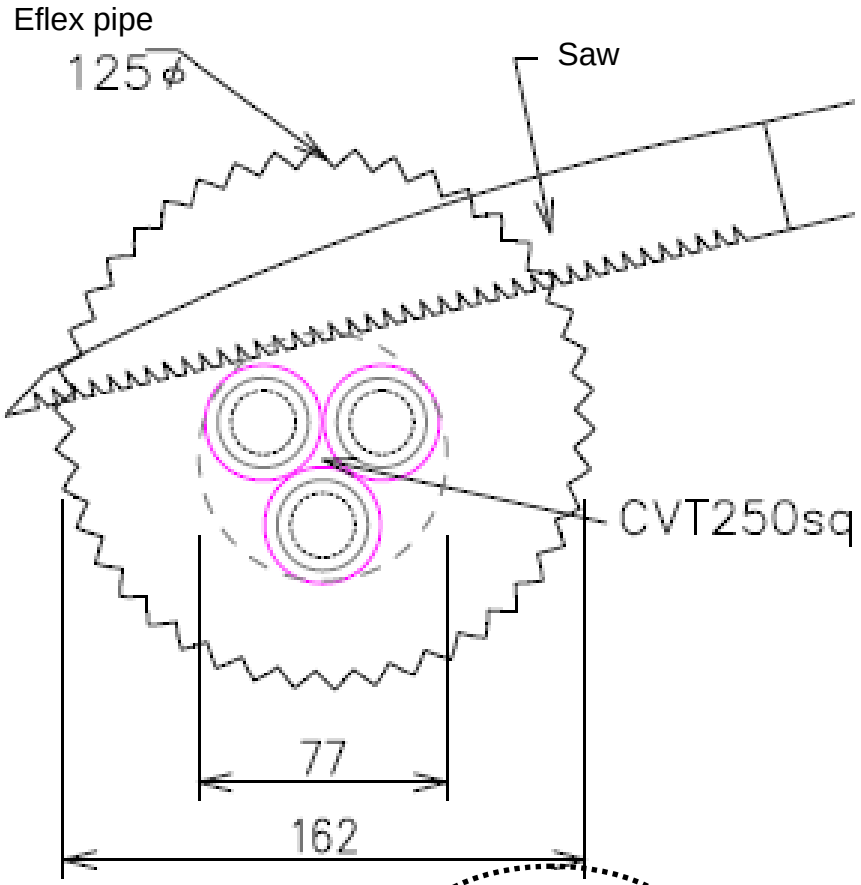
For work unique to Fukushima Daiichi NPS

- Safety evaluation to be done by TEPCO in prior to work implementation.
- Review work items in the meeting held at the main contractor in prior to work and discuss them in detail.

When working near cable that power goes through

- Clarify in the work instructions that the work location is near cable that power goes through (in accordance with the safety rules)
- TEPCO supervisor must read through the work instructions. The main contractor workers involved in the work must report the supervisor after work completion.
- Repeatedly remind workers of the basic operations and safety rules in order to enhance safety awareness.
- Install easy-to-see signs for the cable

[Photo taken at the site (Cutting the Eflex pipe)]



Photos taken on November 3, 2012 by Kandenko