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THE TOKAI-MURA JCO CRITICALITY ACCIDENT
AND
THE ACTIVITIES OF THE ACCIDENT COUNTERMEASURE SUPPORT TEAM
OF
ELECTRIC POWER COMPANIES, JAPAN

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A criticality accident occurred at the JCO Tokai-mura nuclear fuel processing plant on September 30, 1999. This accident brought the damages which were unrivaled in the history of atomic energy development in Japan, seriously influencing the citizen life to such an extent as requesting for 320,000 inhabitants within 10 kilometers radius to stay indoors for as long as 18 hours. However, it could be said that though three workers suffered fatal injuries, no substantial hazards were made upon the regional inhabitants due to little release of radioactive substances.

This video recorded the activities of the Accident Countermeasure Support Team of the Electric Power Companies immediately after the accident occurred, showing the chronological overview of the particulars of the accident..

THE PARTICULARS FROM ACCIDENT OCCURRENCE
TO WITHDRAWAL OF EVACUATION REQUEST

September 30

- 10:35 Accident occurred
- 11:15 JCO reported an accident occurrence to the related organizations.
- 12:15 Tokai-mura local government established Disasters Countermeasure Headquarters
- 12:30 Tokai-mura started public announcements via emergency radio system throughout the village
- 14:30 The Science and Technology Agency established Accident Countermeasure Headquarters.
- 15:00 Evacuation was requested of the inhabitants within 350m from the spot.
- 15:30 The Atomic Energy Safety Committee decided to call the Technical Advisory Council of Emergencies
- 16:00 Ibaraki Prefecture established Accident Countermeasure Headquarters
- 21:00 The Government decided to establish Accident Countermeasure Headquarters
- 22:30 Ibaraki Prefecture requested the inhabitants within 10 km radius of the facilities to stay indoors

October 1

- 2:54 Preparations started for draining the cooling water out of the precipitation tank
- 4:00 The neutron dose rate at the site boundary of the facilities begun to decrease around this time.
- 6:30 The criticality situation was ended by completion of draining the cooling water.
- 8:40 The injection of the neutron absorbing boric acid solution into the precipitation tank started
- 16:40 Ibaraki Prefecture withdrew its request of indoor stay for the inhabitants within 10km radius

October 2

- 18:30 Ibaraki Prefecture withdrew its request of evacuation for the inhabitants within 350m from the spot.

THE CAUSE OF ACCIDENT

JCO is in charge of the UF₆-to-UO₂ re-conversion of uranium in the nuclear fuel cycle. Most of the products of JCO are low-enriched uranium (2-5% enriched in U₂₃₅) to be made into fuels for nuclear power plants. It was a special process to manufacture the uranium solution of the fast breeder experimental reactor "Jyoyo" that the criticality accident took place at this time. More rigorous attention should have been paid in comparison with the usual work, because they were processing 18.8% U₂₃₅ enriched uranium solution.

JCO could plan and conduct their operations, seeing that, as far as they observed the procedures permitted by the Science and Technology Agency, criticality could not happen owing to the criticality-safe equipment. But, a uranium solution was prepared in a bucket at their actual operations, instead of the accident preventive equipment in use. And yet they tried to directly put and stir the bucketful solution into a 45cm diameter precipitation tank. This additional solution was poured into the precipitation tank where uranium solutions had already been collected. The uranium solutions exceeded the permissible quantity to be collected in the tank, and, as a result, a criticality condition was established. In other words, it was an accident where the device of the safety function was set aside, and a manual operation was in place.

THE ACTIVITIES OF THE ACCIDENT COUNTERMEASURE SUPPORT TEAM OF ELECTRIC POWER COMPANIES

Immediately following the accident, the Government requested the Federation of Electric Utilities to extend its supports, such as on-site radiation monitoring. 11 companies, namely, 9 domestic electric power companies, and Japan Nuclear Fuel Ltd. and The Japan Atomic Power Co.(JAPC), organized the JCO Countermeasure Electric Power Team with JAPC assigned as their coordinator.

The Headquarters of the Electric Power Team was soon set up at the Public Relations Center of JAPC (Japan Atomic Power Co.), Tokai Tera Park. It began to receive Team members from all over the nation. Total number of the supporters amounted to 700, and 11 monitoring cars arrived one after another at the site, and they were mobilized, responding to the requests of the local governmental bodies. Tokyo Electric Power Co. team started its monitoring work early in the day after the accident.

Each of other electric power teams decided its responsible area respectively, too. Radiation monitoring activities of the 11 companies were well coordinated. Every corner of the areas, like public facilities, schools, nurseries, farms, parks, etc. were monitored in response to the request from the self-governing bodies.

The JAPC President Sumi encouraged the Electric Power teams at Tokai-mura. Monitoring was done for the whole area within 350m from the accident spot. Monitoring of the neighboring residents was done at the Tokai-mura Central Community Center to personally serve every citizen who was feared of any accidental effects. Prime Minister Obuchi inspected Tokai-mura on October 6. These activities were reported by the Electric Power Team representative, and he gave a word of appreciation.

The number of the dispatched people was about 2600 cumulative for the one week activities since October 1. All the measurements stayed in the range of normal values, and no decontamination work was required.

With respect to our immediate emergency responses to the requests by the Government and the local self-governing bodies, the solidarity of the joint teams was so great that the team members shared the feeling of achievement for the concerted tasks, with some future lessons also learned.