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AUG 21 1964

Mr. John T. Conway
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Conway:

Attached is a copy of a statement of preliminary information concerning the nuclear criticality accident on July 24, 1964, at United Nuclear Corporation's U-235 scrap recovery facility, Wood River Junction, Rhode Island. This statement will be filed in the Commission's Public Document Room on August 24, 1964.

Sincerely yours,

Harold L. Price

Harold L. Price
Director of Regulation

Enclosure:
Statement re United Nuclear

C-18

AUG2 1 1964

CRITICALITY ACCIDENT AT UNITED NUCLEAR CORPORATION WOOD RIVER JUNCTION, RHODE ISLAND

The Director of Regulation, Atomic Energy Commission, today issued the following report of preliminary information concerning the nuclear criticality accident on July 24 at United Nuclear Corporation's U-235 scrap recovery facility, Wood River Junction, Rhode Island.

This report contains a narrative account of the accident, and no attempt is made to state conclusions at this time. The AEC Regulatory Staff is continuing its work of developing, analyzing, and evaluating all pertinent information. All information will be reviewed by a technical review committee before a final report is made on the accident. Before resuming operations, the company will submit its plans to the Atomic Energy Commission for approval.

The United Nuclear Corporation operates the Wood River Junction facility under license from the Commission. It recovers enriched uranium from unirradiated scrap material resulting from the fabrication of nuclear fuel.

The criticality accident—an accidental nuclear chain reaction—occurred in a room on the third floor of the plant about 6:05 p.m., Friday, July 24, while Mr. Robert Peabody, an operator employed by the company, was pouring liquid from a cylindrical polyethylene bottle, approximately five inches in diameter and 48 inches in length and

having a capacity of about 11 liters, into an open top chemical makeup tank approximately 18 inches in diameter and 25 inches deep. The geometry of the 11-liter bottle is such as to assure against criticality regardless of the uranium content of any solution in the bottle. This is not true of the tank into which the liquid was poured.

When nearly all the liquid had been poured from the bottle into the tank, the nuclear chain reaction occurred and the radiation alarms sounded. Mr. Peabody fell backward to the floor, arose, and ran from the building to an emergency shack about 200 yards from the main building. Four other employees, who were in the building but not in the room where the accident occurred, also went immediately to the emergency shack. The shift supervisor called an ambulance and notified the plant manager and other company officials by telephone. Mr. Peabody, accompanied by another employee, was taken in the ambulance to Westerly Hospital where it was diverted to the larger Rhode Island Hospital in Providence.

When the plant manager arrived at the plant, he and the shift supervisor—who was in the building when the accident occurred—made radiation surveys around the building and probed several entries to the building, using monitoring equipment obtained from the emergency shack. They then left the building and borrowed high-level radiation monitoring equipment from Civil Defense personnel who had arrived at the plant. The plant manager and the shift supervisor re-entered

the building and took steps to make sure that no further chain reaction could take place. They drained the makeup tank into a 3-inch diameter column below it and thence into critically safe containers. Both men then left the building and returned to the emergency shack.

After his admission to the hospital, Mr. Peabody's condition grew steadily worse. He died at 7:20 p.m., Sunday, July 26, approximately 49 hours after the accident. The initial estimate is that he received an exposure of about 7,000 rem.

The film badge reading for the plant manager indicated an exposure of approximately 50 rem. Medical tests have been performed on all employees involved in the accident. There were no observable effects of their exposure to radiation. All are scheduled for periodic re-examination.

Background Information

Trichloroethane (TCE), an organic liquid, is used at the plant to remove solvent from the product stream. This solvent contains small traces of uranium. Thus, when the used TCE is taken from the system, it contains some enriched uranium (as much as 1,000 parts per million).

Prior to July 17, the method of recovering this uranium from TCE was to place two or three liters of TCE in a 5-inch, 11-liter, critically safe bottle together with about six liters of sodium carbonate. The bottle was then shaken by hand and the liquids were allowed to separate. The enriched uranium was then removed.

Beginning on July 17, a new method was used on two shifts for removing uranium from TCE. This method made use of the sodium carbonate makeup tank on the third floor of the column area. The normal function of this tank is to make up sodium carbonate solution for a solvent washing operation. Its design did not contemplate any use involving uranium solution.

Mr. Peabody worked the 4:00 p.m. to midnight shift on July 17, as well as on July 24, the night of the accident, and had used the new method for removing uranium from TCE.

Early Thursday morning, July 23, an evaporator at the plant failed to operate properly. It was discovered that a pipe to the evaporator was plugged with uranium nitrate crystals. Steam was used to unplug the line. When the line was unplugged, material from the evaporator system was drained into several 5-inch, 11-liter bottles. This material had a relatively high concentration of uranium. Whether Mr. Peabody was using one of these bottles when the accident occurred has not been established.

Post-Accident Activities

The company developed plans for decontamination of the building and for determining, insofar as is possible, the magnitude of the nuclear criticality. In order to do this, the company established a task force of senior engineers from its White Plains, New York, and New Haven, Connecticut, divisions.

Samples of solutions and of pieces of equipment, tools, and materials have been obtained from the area where the chain reaction occurred. They are being analyzed to help determine the energy released by the criticality accident, the quantities of uranium, and the configuration of the system when the accident occurred. Other samples also have been taken from solutions found in bottles.

Technical Review Committee Appointed by AEC

In keeping with established Commission procedures, the AEC Director of Regulation has appointed a technical review committee to review and evaluate the information being assembled by the Regulatory Staff. The Committee will review all information, advise whether additional information should be gathered, and review and comment on information developed with respect to such matters as the nature of the accident, its cause or causes, and matters to be considered in order to minimize or preclude similar accidents. Its report will be made public.

Members of the Committee are Dr. Herbert J. C. Kouts of Brookhaven National Laboratory, Chairman; Dr. Hugh C. Paxton of Los Alamos Scientific Laboratory; Dr. Marvin M. Mann, AEC Assistant Director of Regulation for Nuclear Safety; Dr. Richard L. Doan, Director of the AEC Division of Reactor Licensing; Dr. Warren E. Winsche of Brookhaven National Laboratory; and Dr. C. Wayne Bills of the Commission's Idaho Operations Office.

The information gathered at the plant by Commission inspectors is being studied and evaluated and additional information is being collected by the inspectors. The company will furnish the AEC a report of the accident and this report will be made public. Numerous samples of materials that were taken from the plant have been sent to Commission laboratories for analysis. The results of these analyses will be available when the laboratory work is completed. The committee will review all of this information.