

PRECURSOR DESCRIPTION AND DATA

NSIC Accession Number: 167611

Date: June 30, 1981

Title: Inadvertent Spray Initiation and Draining of Reactor Coolant System at Sequoyah 1

The failure sequence was:

1. The unit was in cold shutdown on RHR train and preparing to bring RHR train B on line.
2. To effect this, the unit operator sent an assistant unit operator (AUO) to open locally operated valves 1-HCV-74-37 and 531. Because the RHR containment spray valve 1-FCV-72-40 had been tested for operability earlier in the day, the auxiliary unit operator was also instructed to check it for closure.
3. A later telephone conversation between the unit operator and auxiliary unit operator apparently confused the AUO regarding the valves to be opened, and he opened all three valves which resulted in initiation of containment spray.
4. The RCS began to blow down through the B RHR train and spray line to the containment.
5. RCS pressure and pressurizer level decreased rapidly.
6. The operators, believing a LOCA had possibly occurred, tripped the operating RC pumps.
7. The containment was evacuated.
8. Standard emergency (LOCA) procedures were implemented:
 - a. containment purge was terminated,
 - b. the charging pumps were aligned to the RWST,
 - c. RHR suction valve to the RWST was opened.
9. Pressurizer level began to increase.
10. Forty three minutes after the event began, the operators learned that the AUO had opened the spray valves and verified its being open from the control board indicators. The valve was closed and the RCS stabilized.
11. During the event, approximately 105,000 gallons of water had been sprayed into the containment; 40,000 gallons from the RCS and 65,000 gallons from the RWST.

Corrective action:

An extensive initial investigation subsequently resulted in the following actions:

1. In order to clarify the duties and responsibilities of the shift employees including the shift engineer, the structure of the operating shift was revised and issued. The general responsibilities and authorities of each position are described in the job description provided to the individuals when they are appointed to the position. Administrative Instruction AI-2 has been revised to describe the responsibilities and authorities of each operating station.

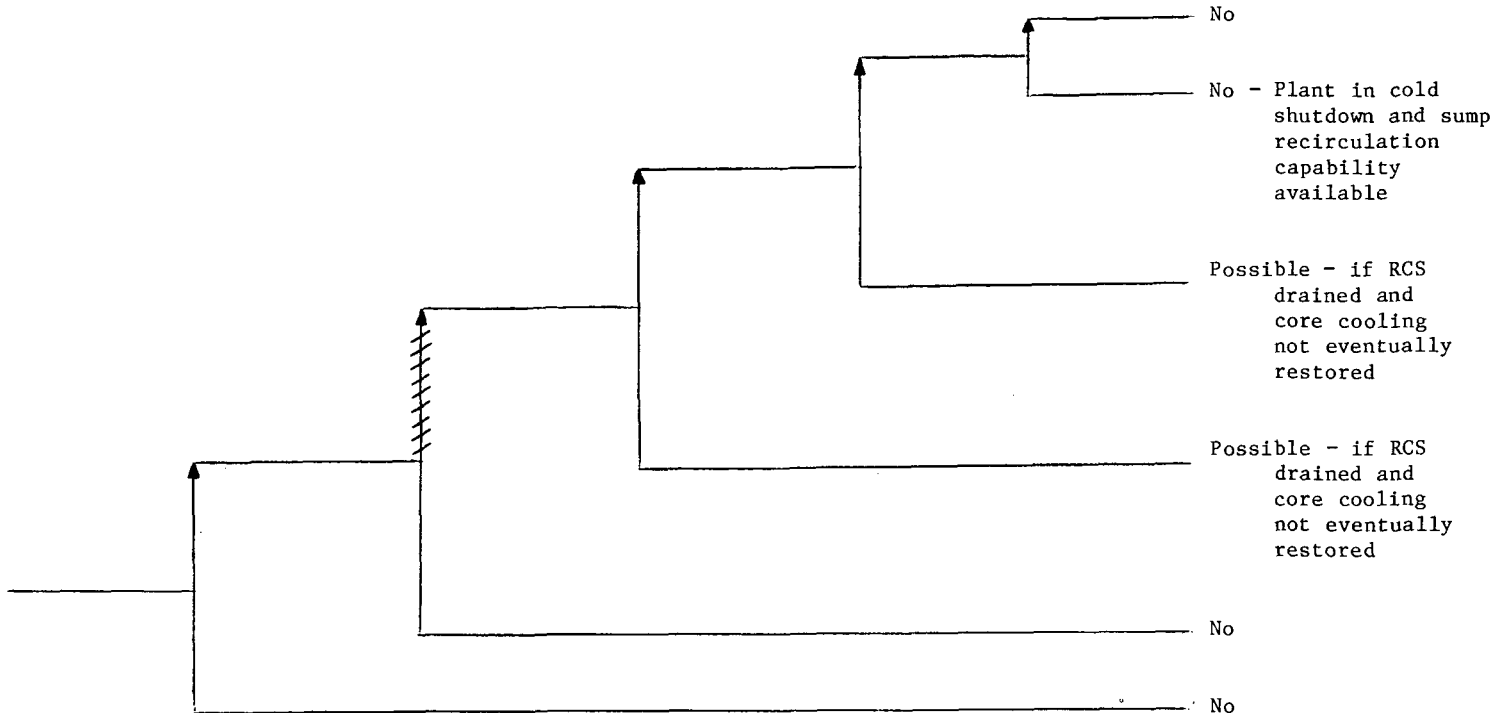
2. In order to improve communications between shift personnel and between shift personnel and management, clearer lines of communication were provided between operating positions within a shift as well as between operating shifts and other sections by revising the shift structure, clarifying the communication paths, establishing work location routines, improving the maintenance of telephones, and investigating additional or different radio communications.
3. The environment in the main control room was improved by closer supervision and compliance with established policies regarding conduct, access, and housekeeping.
4. The Assistant Superintendent and Operations Supervisor met with each shift crew before restart to emphasize the conduct required by AI-2. These discussions stressed clear communications, control room atmosphere, authorities and responsibilities of operating personnel, and status control of safety-related systems. Discussions were also held with all key supervisors emphasizing the requirements to keep the shift engineer informed of work in progress and his responsibility to keep control of activities affecting safety.
5. An in-plant on-the-job training and certification system of non-licensed operating personnel was established.
6. All future nonlicensed operating employees will, upon assignment to Sequoyah, receive on-the-job break-in training and examinations before assuming responsibility for any job position. A Sequoyah Standard Practice describing this break-in was issued and implemented.
7. In order to ensure that only qualified employees are assigned to perform functions that can affect the safety of operations, TVA evaluated nonlicensed operating employees, specifically the assistant unit operators and fourth-period student operators, to determine each individual's qualifications and competence in regard to performing operating functions that can affect the safety of operations. The result of this evaluation is a qualification status list which reflects the spectrum of nonlicensed operating personnel's operating experience at Sequoyah. This list will be used to fill vacant shift positions.

Design purpose of failed system or component:

The spray system provides water to the containment atmosphere for containment depressurization and radionuclide scavenging. The RHR system provides core cooling during plant shutdown.

Reactor at cold shutdown with RHR train A in operation	Assistant unit operator sent to open RHR train B valves 1-HCV-74-37 and -531 to prepare for starting train B and to check closed containment spray valve 1-FCV-72-40	After opening RHR valves, AUC opened spray valve in lieu of checking it closed, initiating containment spray through RHR system	Rapid RCS pressure and pressurizer level decrease results in initiation of LOCA emergency procedure	Charging pumps aligned to RWST; RHR suction valves to RWST opened	Spray valve discovered opened and closed
--	--	---	---	---	--

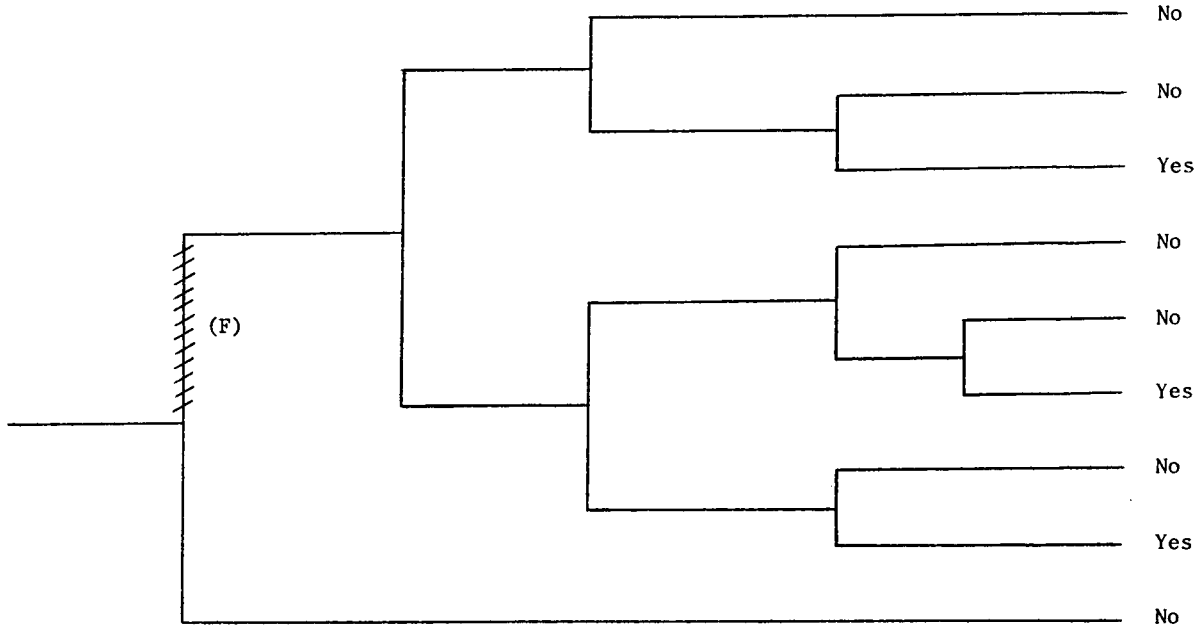
Potential
Severe
Core
Damage



Reactor Recently Placed in RHR Following Shutdown From Power	Containment Spray Valve Inadvertently Opened in Lieu of Checking Closed	RHR Pumps Continue to Operate After Loss of NPSH Following RCS Depressurization	LOCA Procedures Initiated; Charging Pumps Aligned to RWST and Started, RHR RWST Isolation Valves Opened	Spray Valve Found Opened and Closed	Charging Pumps Provide Adequate RCS Makeup
--	---	---	---	-------------------------------------	--

Potential Severe Core Damage

Sequence No.



NSIC 167611 - Sequence of Interest for Inadvertent Spray Initiation and Draining of Reactor Coolant System at Sequoyah 1

CATEGORIZATION OF ACCIDENT SEQUENCE PRECURSORS

NSIC ACCESSION NUMBER: 167611

LER NO.: 81-021 Rev. 1

DATE OF LER: June 30, 1981

DATE OF EVENT: February 11, 1981

SYSTEM INVOLVED: Residual heat removal and containment spray

COMPONENT INVOLVED: Spray isolation valve

CAUSE: Operator error

SEQUENCE OF INTEREST: Small break LOCA while on RHR

ACTUAL OCCURRENCE: Inadvertent spray initiation and RCS draining

REACTOR NAME: Sequoyah 1

DOCKET NUMBER: 50-327

REACTOR TYPE: PWR

DESIGN ELECTRICAL RATING: 1128 MWe

REACTOR AGE: 0.6 year

VENDOR: Westinghouse

ARCHITECT-ENGINEERS: Tennessee Valley Authority

OPERATORS: Tennessee Valley Authority

LOCATION: 9.5 miles NE of Chattanooga, Tennessee

DURATION: N/A

PLANT OPERATING CONDITION: Cold shutdown

TYPE OF FAILURE: Made inoperable

DISCOVERY METHOD: Operational event

COMMENT: