

NON-PUBLIC?: N
ACCESSION #: 9104080333
LICENSEE EVENT REPORT (LER)

FACILITY NAME: THREE MILE ISLAND UNIT 2 PAGE: 1 OF 04

DOCKET NUMBER: 05000320

TITLE: INADVERTENT VAPORIZATION OF ACCIDENT GENERATED WATER
EVEN

DATE: 03/08/91 LER #: 91-002-00 REPORT DATE: 04/05/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(i)

LICENSEE CONTACT FOR THIS LER:

NAME: E. D. Schrull - TMI Licensing TELEPHONE: (717) 948-8832
Engineer

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On March 8, 1991, the TMI-2 Processed Water Disposal System (PWDS) was operating in the "coupled mode" (i.e., evaporator coupled to the vaporizer) when a recirculation valve was found partially open. This condition permitted a portion of the accident generated water (AGW) feed to bypass the evaporator and mix with the evaporator effluent. The result was that approximately 120 gallons of AGW was vaporized and released to the atmosphere without being processed by the evaporator.

The event was the result of a design deficiency in that the location of the recirculation valve (i.e., floor level, in the middle of an equipment access path) requires the operators to routinely step over the valve to access equipment required for system operation. Apparently, an operator inadvertently kicked the valve/valve handwheel without realizing he had caused the valve to be repositioned. Upon discovery of the mispositioned

valve, it was immediately closed. Other corrective actions taken were to terminate operations pending an assessment of the event, install a latchable valve handle on the valve at issue, and lower the alert level on the vaporizer influent radiation monitor to provide earlier warning of an off-normal condition. A long-term corrective action under consideration is to relocate the valve to eliminate the tripping hazard problem.

TMI-2 Tech. Spec. 3.9.13 states, "ACCIDENT GENERATED WATER shall be disposed of in accordance with NRC-approved procedures." Per the NRC-approved PWDS operating procedure, the recirculation valve was required to be shut during coupled mode operations. Therefore, PWDS operation in this manner, although inadvertent, was prohibited by the plant's Tech. Specs. and the event is reportable per 10 CFR 50.73(a)(2)(i)(B).

END OF ABSTRACT

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I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

The TMI-2 facility was in Mode 3. The TMI-2 PWDS was operating in the "coupled mode." In the coupled mode of operation, AGW is pumped to the evaporator where it is processed into two forms: a concentrated liquid waste and a purified liquid distillate. The concentrated waste is then dried to a solid waste form and packaged for transport and burial. The liquid distillate is pumped to the vaporizer where it is discharged to the atmosphere as steam. The process operates in a continuous flow mode with the evaporator and vaporizer coupled.

II. STATUS OF STRUCTURES, COMPONENTS OR SYSTEMS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

N/A

III. EVENT DESCRIPTION

On March 8, 1991 at 12:30 p.m., the TMI-2 PWDS was operating in the coupled mode when the evaporator recirculation valve (RC-1) WD/SHV! was found partially open. This condition permitted AGW feed to bypass the evaporator and mix with the evaporator effluent. A review of the vaporizer influent radiation monitor (PWD-RML-1) strip chart recorder WD/RR! indicated that from approximately 8:30 a.m.

to 12:30 p.m. on March 8, 1991, there was a significant increase in activity, although below the alert level. Based on system operation during that period, it was determined that no more than 120 gallons of AGW bypassed the evaporator and was vaporized to the environment.

The location of valve RC-1 (i.e., floor level, in the middle of an equipment access path) has presented a tripping hazard to operators who routinely must step over the valve and adjacent piping during equipment operations. The original installed valve was a ball-type valve with a latchable handle which ensured that the valve remained in its intended position. However, the handle of the valve was in the vertical position when the valve was in the closed position. This condition exacerbated the trip hazard. In an effort to reduce this hazard, a round handwheel was installed on the valve. However, this modification eliminated the valve latching device. Apparently, at about 8:30 a.m. on March 8, 1991, an evaporator operator inadvertently kicked the RC-1 valve/valve handwheel without realizing he had repositioned the valve. The modification to the valve (i.e., installation of a handwheel) reduced the likelihood that the operator would have readily detected inadvertent valve mispositioning.

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At about 11:40 a.m. on March 8, 1991, an Auxiliary Operator obtained the required four-hour reading on radiation monitor PWD-RML-1. He expressed his concern relative to the increased count rate to the TMI-2 Control Room Operator (CRO). The radiation monitor was then checked and found to be operating properly with an approximately normal reading. Note that this normal reading was due to the cyclical nature of the AGW inleakage that was a result of system pressure differentials. The slightly elevated strip chart trace was attributed to electronic noise.

At about 12:30 p.m. on March 8, 1991, an evaporator operator noticed that valve RC-1 was partially open. The valve was immediately shut. At approximately 2:30 p.m. on March 8, 1991, the TMI-2 CRO informed a TMI-2 engineer of the sporadic increased count rate. At about 2:45 p.m., the engineer informed the evaporator cognizant engineer of the increased count rate and they began immediate follow-up to determine the cause. Surveillance of the radiation monitor determined that the instrument was functioning properly. At approximately 3:30 p.m. on March 8, 1991, the evaporator cognizant engineer was informed of the earlier discovery of the partially opened valve and its subsequent closure by the evaporator operator. The evaporator cognizant engineer directed the evaporator/ vaporizer

shutdown pending an assessment of the inadvertent operation with RC-1 partially open. Vaporizer discharge was terminated at approximately 4:00 p.m. on March 8, 1991.

IV. ROOT CAUSE

The root cause of the event was a design, deficiency in the location and configuration of the recirculation valve (RC-1). RC-1 is positioned at floor level which has presented a tripping hazard to operators who must routinely step over the valve to access equipment required for system operation. Apparently, an evaporator operator inadvertently kicked the RC-1 valve/valve handwheel without realizing the valve had been repositioned. The valve's configuration, i.e., a round handwheel, reduced the likelihood that the operator would readily detect that the valve was mispositioned.

An identified inappropriate action in the event was the failure of the evaporator operations personnel to immediately notify the TMI-2 Control Room of the mispositioned valve. Although not a contributor to the event, this action warranted management attention.

V. CORRECTIVE ACTIONS

Upon discovery of the mispositioned valve, the immediate corrective action taken was to close the valve which stopped the vaporization of unprocessed AGW. Other corrective actions taken were to terminate operations pending

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an assessment of the event, install a latchable valve handle, and lower the alert level on the radiation monitor to provide earlier warning of an off-normal condition. These actions are considered adequate to prevent recurrence of the event.

The "failure to notify" has been resolved via the issuance of a "Standing Order" requiring notification of the TMI-2 Control Room and the evaporator cognizant engineer of "...any event, condition, or potential condition which has caused or is likely to cause an unplanned radiological release." In addition, all evaporator operations personnel have been counselled as to the appropriate actions and notifications required, including immediate notification of the TMI-2 Control Room, when a valve is found in an incorrect position.

In addition, this event is currently the subject of a Human

Performance Enhancement System (HPES) review. A preliminary recommended long-term corrective action from this review is to relocate RC-1 to eliminate the hazard the valve presents. This recommendation is under consideration.

VI. COMPONENT FAILURE DATA

N/A

VII. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The safety function performed by valve RC-1 in the closed position is to prevent inadvertent vaporization of AGW that has bypassed the evaporator. It is estimated that no more than 120 gallons of AGW was vaporized without being processed by the evaporator. The results of an extremely conservative calculation are that the organ dose to the maximally exposed individual is $1.3E-2$ mrem. This dose is an order of magnitude less than the natural background radiation exposure in the Harrisburg area of $1.4E-1$ mrem which is derived from the 300 mrem/yr natural background value prorated for the approximately 4 hour period that the AGW was vaporized without being processed by the evaporator.

Thus, this event did not pose a potential public health and safety concern.

VII. PREVIOUS EVENTS OF A SIMILAR NATURE

None

* The Energy Industry Identification System (EIIS), System Identification (SI) and Component Function Identification (CFI) Codes are included in brackets, "SI/CFI!," where applicable, as required by 10 CFR

50.73(b)(2)(ii)(F).

ATTACHMENT 1 TO 9104080333 PAGE 1 OF 1

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April 5, 1991
C312-91-2020
C000-91-1256

US Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Dear Sir:

Three Mile Island Station Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Licensee Event Report 91-02

Attached is Licensee Event Report 91-02 concerning an inadvertent vaporization of approximately 120 gallons of Accident Generated Water that had bypassed the evaporator of the TMI-2 Processed Water Disposal System.

This event is reportable pursuant to Title 10 of the Code of Federal Regulations, Section 50.73(a)(2)(i)(B).

Sincerely,

R. L. Long
Director, TMI-2

EDS/dlb

Attachment
cc: T. T. Martin - Regional Administrator, Region I
M. T. Masnik - Project Manager, PDNP Directorate
L. H. Thonus - Project Manager, TMI Site
F. I. Young - Senior Resident Inspector, TMI

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