

# **ENERGY NORTHWEST**

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May 26, 2004  
GO2-04-102

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

**Subject: COLUMBIA GENERATING STATION, DOCKET NO. 50-397  
CHANGE TO REPORTABILITY OF LICENSEE EVENT REPORTS NO.  
50-397/2003-003-00 and 50-397/2003-005-00**

Dear Sir or Madam:

Energy Northwest is changing the reporting basis for LERs 50-397/2003-003-00 and 50-397/2003-005-00 from reportable per 10 CFR 50.73(a)(2)(v) to "voluntary."

The two LERs involved interruption of flow in the Residual Heat Removal (RHR) system while in the shutdown cooling mode of operation. Prior to each event, the plant was shut down with one RHR pump running to remove decay heat. In each case, an error caused an inadvertent closing of an isolation valve in the common RHR suction line. Energy Northwest performed an evaluation of the first event and concluded it was not reportable. Later, after discussion with NRC Region IV, the first event was reported under 10 CFR 50.73(a)(2)(v) although Energy Northwest maintained that the event did not meet the reporting requirement. The second event was reported because of its similarity to the first event.

After an independent assessment of the reportability of these events by a recognized industry professional with a broad knowledge of reportability requirements and guidance, we have concluded that our reportability determination was correct and that these two events are not reportable under 10 CFR 50.73(a)(2)(v). Details regarding how we came to this conclusion are contained in the attachments to this letter.

On January 13, 2004 representatives of Energy Northwest met with the NRC staff at NRC headquarters to discuss the reportability of these two events and propose that they were not reportable based on our understanding of the regulations and the regulatory guidance available. The staff agreed at that meeting to review our basis for considering these events not reportable and to provide feedback within about 60 days.

The NRC's position was provided on May 5, 2004 during a telephone conference held between HN Berkow and other NRC staff and DK Atkinson, Vice President, Technical Services, and other Energy Northwest staff. Energy Northwest was informed that the NRC staff position has always been that any unplanned loss of shutdown cooling is reportable regardless of the details surrounding the event. It was implied that this has been a longstanding position within the staff.

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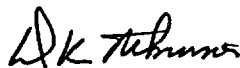
However, Energy Northwest does not believe that the current NRC guidance regarding reporting of events (NUREG 1022 Revision 2, Event Reporting Guidelines) supports the position communicated during the telephone conference.

Therefore, in order to fully understand the NRC staff position regarding this matter, Energy Northwest is continuing to pursue industry and NRC staff decisions or positions regarding reportability of shutdown cooling isolations. After completing this research we may request additional dialog with the NRC staff regarding this matter.

Energy Northwest acknowledges the usefulness of sharing these events with the NRC and the industry. Therefore, these reports are not being withdrawn, and the reason for reporting is being changed to "voluntary." In addition, Energy Northwest has requested that the NEI Licensing Action Task Force (LATF) evaluate and communicate with the NRC regarding this issue.

If you have any questions or require additional information, please contact Mr. DW Coleman, Regulatory Programs Manager at (509) 377-4323.

Respectfully,



DK Atkinson  
Vice President, Technical Services  
Mail Drop PE08

**Attachments:**

1. Summary of Reportability Reviews for LERs 50-397/2003-003-00 and 50-397/2003-005-00
2. Detailed Event Descriptions
3. Reportability Review Conducted on Shutdown Cooling Isolation on May 21, 2003

cc: BS Mallett - NRC - RIV  
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**Summary of Reportability Reviews for LERs 50-397/2003-003-00 and 50-397/2003-005-00**

**I. Summary of Events**

Each of the two events involved interruption of flow in the RHR system while the system was in the shutdown cooling mode of operation. Prior to each event, the plant was shut down with one RHR pump running to remove decay heat. In each case, an error caused an inadvertent closing of an isolation valve in the common RHR suction line.

**II. Event Descriptions**

Detailed descriptions of each event described below are contained in Attachment 2.

**Event 1**

Plant status: Refueling Mode 5, reactor pressure vessel head removed, about 22 feet of water above the flange, refueling doors open, one residual heat removal (RHR) pump running.

Summary of event: During repairs in a control room cabinet on May 5, 2001, maintenance technicians disconnected the wrong relay, causing the inboard isolation valve in the common RHR suction line to close. The running RHR pump tripped on low suction pressure. The problem was diagnosed and corrected within about 10 minutes. After all required checks were completed, the RHR train was declared to be operable 36 minutes after the isolation. (Reference: LER 2003-003-00)

**Event 2**

Plant status: Cold shutdown Mode 4, reactor coolant temperature about 112F, one RHR pump running.

Summary of event: On June 16, 2003, while performing a Containment Isolation Logic System Functional Test, a general outboard containment isolation signal was received, causing the outboard isolation valve in the common RHR suction line to close. The running RHR pump tripped on low suction pressure. The problem was diagnosed and corrected and the RHR train was declared to be operable 12 minutes after the isolation. Reactor coolant temperature increased about 1 degree, to 113F. (Reference: LER 2003-005-00)

**III. Evaluation of Reportability**

A reportability evaluation conducted after the first event occurred concluded the first event was not reportable. The details of this reportability evaluation are contained in

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Attachment 3. Later, after discussion with the NRC Resident Inspector and his Branch Chief, the event was reported under 10 CFR 50.73(a)(2)(v).

However, after performing an independent assessment of the reportability of these events using an outside contractor with a broad knowledge of reportability requirements and guidance, it was concluded that the initial reportability determination was correct and that these events are not reportable under 10 CFR 50.73(a)(2)(v). This conclusion is based on the following general points:

1. The NRC's event reporting guidelines in NUREG-1022, Revision 2, state that the standard for reporting under 50.72(a)(2)(v) is a reasonable expectation of preventing fulfillment of the safety function (see page 53) or reasonable doubt that the system would have performed its safety function if called upon (see page 57). This standard is based on several discussions in the "Statements of Considerations" that were published in the Federal Register (65 FR 63769) with the reporting rules (10 CFR 50.72 and 50.73).
2. Operation of the RHR system in the shutdown cooling mode is manually initiated. It does not need to be initiated (or re-initiated) on an urgent or short-time basis. Initiation within about an hour is sufficient. In fact, Columbia Technical Specification 3.9.8 (applicable to RHR shutdown cooling operation in Mode 5) and Technical Specification 3.4.10 (applicable to RHR shutdown cooling operation in Mode 4) allow the required RHR shutdown cooling subsystem(s) to be "removed from operation" for up to 2 hours per 8 hour period.
3. During both events, the plant staff diagnosed and corrected the cause of the isolation within about 10 minutes. (In the first case, an erroneously disconnected relay was reconnected; in the second case, a test lineup was returned to normal.) Even if the cause of the isolation had not been corrected, the plant's procedures would have led directly to opening the valve manually. This could have been done within about an hour.

The following points also apply:

1. NUREG-1022, Rev. 2, states, "For example, if a single RHR suction line valve should fail in such a way that RHR cooling cannot be initiated, the event would be reportable." For both of these events, shutdown cooling could have been initiated by manually opening the isolation valve, even if the cause of the isolation had not been quickly diagnosed and corrected.
2. One of the events occurred when the plant was in the refueling mode with more than 22 feet of water above the reactor vessel flange. The bases for the Columbia Technical Specifications state that under these conditions, "an RHR train is considered operable if it can be manually aligned (remote or local) in the shutdown cooling mode." Throughout the event, operators could have manually aligned an RHR train by opening the closed valve.

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3. Frequently, events such as these have not considered reportable by others in the industry per 10 CFR 50.73 (a)(2)(v). We are aware of several similar events at different plants that occurred during the past few years where shutdown cooling isolations were not considered reportable under this criterion. In addition, we have benchmarked several other plants and found that they do not consider similar events to be reportable.

#### **IV. Conclusions**

The RHR system in the shutdown cooling mode does not need to start rapidly in order to fulfill its safety function. Thus, a condition that causes a modest delay would not prevent the system from fulfilling its safety function. Accordingly, there was not any reasonable expectation of preventing the RHR system from fulfilling its intended safety function.

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**Attachment 2**

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**Detailed Event Descriptions**

**Event 1 (LER 50-397/2003-003-00)**

On May 21, 2003, Columbia Generating Station (Columbia) was in Mode 5 (refueling) with the reactor head removed, the reactor cavity flooded to greater than or equal to 22 feet above the top of the reactor pressure vessel flange, and the fuel pool gates removed. At approximately 1155 PDT, an isolation of Residual Heat Removal (RHR) shutdown cooling (SDC) occurred. RHR SDC subsystem A was operating in the shutdown cooling mode and RHR SDC subsystem B was out of service for planned maintenance. In addition, operators were making preparations to remove RHR SDC subsystem A from service to support scheduled testing activities requiring a suspension of shutdown cooling.

The SDC isolation was caused by an isolation of RHR-V-9, a containment isolation valve in the common suction line for both RHR SDC subsystems. Closure of RHR-V-9 subsequently tripped RHR SDC pump 2A (RHR-P-2A).

The isolation occurred during performance of planned maintenance in control room panel H13-P622. A maintenance team was assigned to repair the B4 lug terminal wire on relay MS-RLY-K72A (K72A) in cabinet H13-P622 under a planned work order. This relay is part of the Recirculation System Sample Isolation Valve logic. After a pre-job brief, the technicians went to the Control Room to walk-down the job. They peer-checked the location of the relay, noted the style of lug required and obtained a lug from stores. After returning from stores the technicians once again peer-checked the location of the relay. Believing they had identified the proper relay, they proceeded with the work. The technicians checked the voltage on the relay (zero volts) and after a final peer-check, they removed the B4 wire from the relay, cut off the old lug, replaced it, and re-installed the wire. After the technicians lifted the wire from the B4 terminal, operators observed RHR-P-2A had tripped.

An investigation by the technicians, their supervisor, and the control room staff determined the technicians had worked on the wrong relay. The correct relay as identified in the work order, was relay MS-RLY-K72A. However, the technicians had lifted the B4 wire on relay MS-RLY-K72 (K72). Both relays are located in control room panel H13-P622, and "A" is the only distinct identifier differentiating the two relays.

Removing the B4 wire on relay K72 disrupted the daisy-chained neutral associated with relay MS-RLY-K29 (K29). This relay is normally energized. Opening the neutral to K29 relay caused it to de-energize resulting in a Nuclear Steam Supply Shutoff System (NSSSS) inboard isolation signal (group 6) which closed RHR-V-9.

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Operators noticed RHR-P-2A had tripped and at 1155 PDT declared the required shutdown cooling subsystem inoperable. They then entered Technical Specification (TS) Required Actions 3.9.8.A, 3.9.8.B.1, 3.9.8.B.2, 3.9.8.B.3, 3.9.8.B.4, 3.9.8.C.1, and 3.9.8.C.2. Within approximately ten minutes the neutral wire was reconnected to contact B4 on K72. After verifying no other spurious actuation signals were present which would cause RHR-V-9 to close, Control Room Operators reset the NSSSS logic, opened RHR-V-9, and declared RHR SDC subsystem A operable at 1226 PDT.

**Event 2 (LER 50-397/2003-005-00)**

On June 16, 2003, Columbia Generating Station (Columbia) was in Mode 4 (cold shutdown) with the reactor coolant temperature at approximately 112 degrees Fahrenheit. At approximately 1330 PDT, an isolation of Residual Heat Removal (RHR) Shutdown Cooling (SDC) common suction header occurred when the outboard primary containment isolation valve, RHR-V-8 closed. The RHR SDC isolation occurred while performing surveillance procedure TSP-CONT/ISOL-B501, "Containment Isolation LSFT," [Logic System Functional Test] section 7.6, Manual Initiation. Step 7.6.42 of this surveillance procedure required depressing the manual Nuclear Steam Supply Shutoff System (NSSSS) initiation logic B pushbutton (MS-RMS-S25B). Depressing this pushbutton causes an isolation signal to 16 NSSSS isolation valves, including RHR-V-8.

At the time of the event, RHR SDC subsystem A was operating in the shutdown cooling mode and RHR SDC subsystem B was available for SDC service, but not in operation. Reactor Recirculation Pump 1B (RRC-P-1B) was running to support reactor core circulation and was unaffected by the RHR SDC isolation. The condensate system was available as an alternate means of decay heat removal by injection into the RPV with heat rejection to the main condenser.

The SDC isolation was caused by closure of RHR-V-8, the outboard primary containment isolation valve in the common suction line for both RHR SDC subsystems. Closure of RHR-V-8 subsequently tripped RHR SDC pump 2A (RHR-P-2A). Operators entered abnormal condition procedure ABN-RHR-SDC-LOSS, "Loss of Shutdown Cooling," and the appropriate Technical Specification (TS) Required Action (TS 3.4.10.A). Technical Specification Required Action 3.4.10.A.1 requires verification that an alternate source of decay heat removal is available for each inoperable RHR SDC subsystem within one hour.

All isolation signals were reset and RHR SDC was restored approximately 12 minutes after RHR-V-8 closed. During the time that RHR SDC was out of service, reactor coolant temperature increased from approximately 112 to 113 degrees Fahrenheit.

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**Reportability Review Conducted on Shutdown Cooling Isolation on May 21, 2003**

**I. Summary**

During performance of work in control room panel H13-P622, workers lifted the leads to contact B4 on relay MS-RLY-K72 rather than contact B4 on relay MS-RLY-K72A. Lifting the leads to contact B4 on MS-RLY-K72 caused RHR-V-9 to close. RHR-V-9 is one of two primary containment isolation valves in the common suction piping to both RHR shutdown cooling loops.

The event described in PER 203-1861 is not reportable under 10 CFR 50.72 or 50.73 because:

1. It did not result in a condition prohibited by the plant's Technical Specifications.
2. It did not result in a general isolation signal (only one valve was affected) and did not result in an ECCS system actuation.
3. It was not a condition that alone could have prevented the fulfillment of the safety function of systems or structures that are needed to remove residual heat.
4. It was not a condition that caused two independent trains or channels to become inoperable in a single system designed to remove residual heat.

**II. Description of Issue**

On May 21, 2003, during performance of work in control room panel H13-P622, workers lifted the leads to contact B4 on relay MS-RLY-K72 rather than contact B4 on relay MS-RLY-K72A. Lifting the leads to contact B4 on MS-RLY-K72 caused RHR-V-9 to close. RHR-V-9 is one of two primary containment isolation valves in the common suction piping to both RHR shutdown cooling loops. The plant was shutdown for refueling and in Mode 5.

The closure of RHR-V-9 caused a trip of the operating RHR pump RHR-P-2A. Operators noticed that the pump had tripped, and at 1155 PDT declared the required RHR-A shutdown cooling subsystem inoperable and entered TS Required Actions 3.9.8.A, 3.9.8.B.1, 3.9.8.B.2, 3.9.8.B.3, 3.9.8.B.4, 3.9.8.C.1, and 3.9.8.C.2. Within approximately ten minutes, the leads were reconnected to contact B4 on MS-RLY-K72. After verifying that no other spurious actuation signals were present that would cause RHR-V-9 to close, operators declared the RHR-A shutdown cooling subsystem operable at 1226 PDT.

**III. Applicable Reportability Criteria**

This issue was considered potentially reportable under the following:

1. **10CFR 50.73 (a)(2)(i)(B):** Any operation or condition that was prohibited by the plant's Technical Specifications.



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2. **10 CFR 50.73(a)(2)(iv):** Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section except when:
  - a. The actuation resulted from and was part of a preplanned sequence during testing or reactor operation; or,
  - b. The actuation was invalid and:
    1. Occurred while the system was properly removed from service; or,
    2. Occurred after the safety function had already been completed.

Note: The potentially applicable systems listed in paragraph (a)(2)(iv)(B) of this section are: 1) General containment isolation signals affecting containment isolation valves in more than one system or multiple main steam isolation valves; and 2) ECCS for BWRs including: high-pressure and low pressure core spray systems; high-pressure coolant injection system; low pressure injection function of the residual heat removal system.
3. **10 CFR 50.73 (a)(2)(v)(C):** Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to remove residual heat.
4. **10 CFR 50.73 (a)(2)(vii)(C):** Any event where a single cause or condition caused at least one independent train or channel to become inoperable in multiple systems or two independent trains or channels to become inoperable in a single system designed to remove residual heat.

**IV. Analysis of Issue**

A description of the event is given in Section II above. The strategy employed in this section is to discuss each of the reportability criteria listed above and whether this event is considered reportable under each criterion.

- A. **10CFR 50.73 (a)(2)(i)(B):** The event described is not considered reportable as a condition prohibited by the plant's Technical Specifications. NUREG 1022, Revision 2, Event Reporting Guidelines, provides guidance concerning reporting of events under 10 CFR 50.72 and 73. NUREG 1022 specifies that an LER is not required under 10CFR 50.73 (a)(2)(i)(B) unless the applicable Limiting Condition for Operation and associated Completion Times are not met.

In this case, the LCO for TS 3.9.8 was conservatively assumed by operators to not be met. However, in this case, all of the applicable TS 3.9.8 Completion Times were met.

1. TS 3.9.8, Action A.1 requires verification that an alternate method of decay heat removal is available within one hour. If not verified within one hour, then the following actions are required immediately; no irradiated fuel assemblies are being loaded into the reactor (Action B.1), secondary containment is operable (Action B.2), both trains of standby gas treatment are operable (Action B.3), and all required secondary containment penetration flow paths have isolation capability

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(Action B.4). Coincidentally, the unplanned isolation of RHR-V-9 occurred shortly before (about 5 minutes) the start of scheduled testing activities requiring a suspension of shutdown cooling. Since the actions specified in TS 3.9.8 Actions B.1 through B.4 were pre-established, Operators conservatively assumed the TS 3.9.8 B Actions would be required, and simply documented that they were completed.

2. TS 3.9.8, Action C.1 requires verification of reactor coolant circulation by an alternate method within one hour. This Completion Time requirement was not exceeded. RHR-A shutdown cooling was declared operable in approximately 33 minutes, and reactor coolant circulation by an alternate method (natural circulation) was verified in approximately 32 minutes.

**B. 10 CFR 50.73(a)(2)(iv):** The event described above is not considered to be reportable under this criterion. The event described above did not result in a general isolation signal (only one valve was affected) and did not result in an ECCS system actuation. This conclusion is based on the following:

1. The event did not result in a General Containment Isolation Signal affecting containment isolation valves in more than one system or multiple main steam isolation valves:
  - a. The containment isolation valve (RHR-V-9) isolation signal was not a valid signal because it was not initiated in response to actual plant parameters satisfying the requirements for initiation of the safety function of the system. Rather, the erroneous lifting of the leads to the contact B4 on MS-RLY-72 caused the actuation.
  - b. When the workers lifted the leads to the B4 contact to relay MS-RLY-72 they also caused MS-RLY-29 to de-energize. This relay provided a NSSSS inboard isolation signal (Group 6) that closed RHR-V-9. The only valve that this relay closes is RHR-V-9.
  - c. Since the plant was shutdown for refueling and in Mode 5, the safety function of the primary containment isolation valves is considered complete. Only the RHR shutdown cooling system isolation function is required to remain operable and in operation during Mode 5. The RHR shutdown cooling system isolation on reactor vessel water level – low, Level 3, supports actions to ensure that the RPV water level does not drop below the top of the active fuel during a vessel draindown event caused by a leak (e.g., pipe break or inadvertent valve opening) in the RHR Shutdown Cooling System. The reactor vessel water level – low, Level 3 Function associated with RHR shutdown cooling isolation is not directly assumed in any transient or accident analysis since bounding analyses are performed for large breaks such as MSLBs. (Reference TS Bases Item 5.d on page 3.3.6.1-27).

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2. The event did not result in actuation of an ECCS System for BWRs:
  - a. The shutdown cooling isolation function is not considered an ECCS function. The reactor vessel water level – low, Level 3 Function associated with RHR shutdown cooling isolation is not directly assumed in any transient or accident analysis since bounding analyses are performed for large breaks such as MSLBs.

- C. **10 CFR 50.73 (a)(2)(v)(C):** The event described above is not considered to be reportable under this criterion based on the following:

The TS bases provide the following background information concerning the RHR shutdown cooling system while in Mode 5. (Reference TS Bases 3.9.8.)

“The purpose of the RHR System in MODE 5 is to remove decay heat and sensible heat from the reactor coolant, as required by GDC 34 (Ref. 1). Each of the two shutdown cooling loops of the RHR System can provide the required decay heat removal. Each loop consists of one motor driven pump, a heat exchanger, and associated piping and valves. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after it has been cooled by circulation through the respective heat exchanger, to the reactor via the associated recirculation loop. The RHR heat exchangers transfer heat to the Standby Service Water (SW) System. The RHR shutdown cooling mode is manually controlled.

In addition to the RHR subsystems, the volume of water above the reactor pressure vessel (RPV) flange provides a heat sink for decay heat removal.”

This description is significant in that it indicates that; 1) the RHR shutdown cooling mode is manually controlled; and, 2) there is a large volume of water above the RPV flange that provides a heat sink for decay heat removal.

The isolation of RHR-V-9 caused RHR-P-2A to trip. Therefore, there was no forced flow to the reactor vessel. Even if the cause of the RHR-V-9 isolation signal had not been discovered quickly, procedural controls exist that would have allowed operators to restore (i.e. manual control) RHR shutdown cooling prior to the system being unable to perform its intended safety function. Abnormal Procedure ABN-RHR-SDC-LOSS, Loss of Shutdown Cooling, Step 4.1.a) requires the following:

“IF RHR-V-9 cannot be opened due to equipment problems, THEN **PERFORM** the following:

- 1) **ENSURE** RHR-V-8 is operable.
- 2) **OPEN** RHR-42-8BA2A (disconnect for RHR-V-9)  
(E-MC-8BA, compartment 2A).
- 3) **MANUALLY OPEN** RHR-V-9.

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- 4) **DOCUMENT** opening the disconnect.
- 5) **ENTER RHR-V-9** as inoperable in the Plant Logging System.”

The Bases section of ABN-RHR-SDC-LOSS (4.1.b) states:

“There are several things that could cause a failure of RHR-V-9 in the closed position. These include an invalid isolation signal (instrument failure, relay failure, logic power supply failure, etc.) or a failure of RHR-MO-9 (motor overload, motor failure, power supply failure, etc.). This step permits manually opening RHR-V-9 if RHR-V-8 and the associated outboard isolation logic are operable. Documentation can be accomplished with either a CSCO or a clearance order. RHR-V-9 is also inoperable and must be documented as such.”

Based on the above discussion it is reasonable to conclude that the RHR shutdown cooling system was capable of fulfilling its intended safety function and this event is not considered reportable in accordance with 10 CFR 50.73 (a)(2)(v)(C).

- D. **10 CFR 50.73 (a)(2)(vii)(C):** The event described above is not considered to be reportable under this criterion based on the following:

The TS 3.9.8 Bases describe requirements for an Operable RHR shutdown cooling subsystem. Specifically it states:

“Only one RHR shutdown cooling subsystem is required to be OPERABLE in MODE 5 with irradiated fuel in the RPV and the water level > 22 ft above the RPV flange. Only one subsystem is required because the volume of water above the RPV flange provides backup decay heat removal capability. An OPERABLE RHR shutdown cooling subsystem consists of an RHR pump, a heat exchanger, a SW pump providing cooling to the heat exchanger, valves, piping, instruments, and controls to ensure an OPERABLE flow path.

Additionally, each RHR shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in the shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. However, to ensure adequate core flow to allow for accurate average reactor coolant temperature monitoring, nearly continuous operation is required. A Note is provided to allow a 2-hour exception to shut down the operating subsystem every 8 hours.”

Based on this description of what constitutes an operable RHR shutdown cooling subsystem, it is concluded that the RHR-A shutdown cooling subsystem did meet the definition of OPERABLE for the entire duration of the event. That is, RHR-A shutdown cooling subsystem was capable of being manually aligned by remote operation (opening) of RHR-V-9 in accordance with Abnormal Procedure ABN-RHR-SDC-LOSS.

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Based on the above discussion it is reasonable to conclude that the RHR shutdown cooling system was capable of fulfilling its intended safety function and this event is not considered reportable in accordance with 10 CFR 50.73 (a)(2)(vii)(C).

**V. Conclusions**

The event described above is not considered reportable in accordance with any of the 10 CFR 50.73 reporting criteria.