

W3F1-97-0107  
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PR

May 6, 1997

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Actions to Resolve Issues Concerning Air Operated  
Containment Isolation Valves

Gentlemen:

NRC Inspection Report 50-382/96-24 dated November 23, 1996 identified an unresolved item concerning the closed safety function of certain containment isolation valves that receive an open engineering safety feature actuation signal and fail open on loss of air. Subsequent to the inspection, Waterford 3 provided additional information to the NRC as follows:

- Letter dated October 29, 1996 discussed actions concerning testing that was performed on the air accumulators for the outside isolation valves on the Containment Spray (CS) System and the Component Cooling Water (CCW) System to the Containment Fan Coolers (CFCs).
- Letter dated November 15, 1996 provided information concerning the original design and acceptance of the subject isolation valves.
- On March 21, 1997 Waterford 3 personnel traveled to NRC Headquarters to meet with the Staff and discuss aspects associated with this issue.

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in addition, Waterford 3 performed a detailed review of containment penetration isolation valves to ensure the application of appropriate design and testing criteria and identify valves within the scope of the identified concerns. On April 23, 1997, a meeting was conducted at Waterford 3. At this meeting Waterford 3 personnel presented to representatives from NRR and Region IV, actions that would be taken to resolve the identified concerns. Both short term and long term actions were identified with a commitment to complete short term actions prior to restart following the current refueling outage. The purpose of this letter is to document the NRC concerns, identify the scope of these concerns at Waterford 3, and describe the actions that will be taken to resolve these concerns as discussed in the April 23, 1997, meeting.

Waterford 3 discussed interim actions that would be taken concerning CS -125A(B) at the April 23, 1997 meeting. These actions would have credited CS-117 (a stop check valve located upstream of CS-125) as an isolation barrier. Plant modification (DC-3429) was also discussed. This modification will provide backup motive gas (nitrogen) supply to several containment isolation valve accumulators. Subsequent to the meeting, Waterford 3 expanded the scope of DC-3429 to include a backup motive gas supply to the accumulators for CS-125A(B).

The enclosed attachment provides a description of the concerns, scope and actions that will be taken to resolve each. Should you have any further questions please contact me at (504) 739-6242.

Very truly yours,



E.C. Ewing  
Director  
Nuclear Safety & Regulatory Affairs

ECE/PLC/ssf  
Attachment/Enclosures

cc: (w/Attachment & Enclosures)  
E.W. Merschoff (NRC Region IV), C.P. Patel (NRC-NRR),  
J. Smith, N.S. Reynolds, NRC Resident Inspectors Office

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

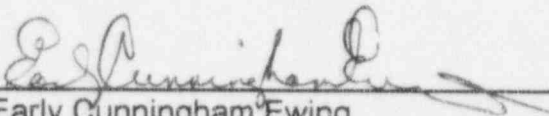
In the matter of )

Entergy Operations, Incorporated )  
Waterford 3 Steam Electric Station )

Docket No. 50-382

AFFIDAVIT

Early Cunningham Ewing, being duly sworn, hereby deposes and says that he is Director, Nuclear Safety & Regulatory Affairs - Waterford 3 of Entergy Operations, Incorporated; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached Actions to Resolve Issues Concerning Air Operated Containment Isolation Valves; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.


  
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Early Cunningham Ewing  
Director, Nuclear Safety & Regulatory Affairs -  
Waterford 3

STATE OF LOUISIANA )

) ss

PARISH OF ST. CHARLES )

Subscribed and sworn to before me, a Notary Public in and for the Parish and State  
above named this 6<sup>th</sup> day of July, 1997.

  
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Notary Public

My Commission expires at death

## Actions to Resolve Issues Concerning Air Operated Containment Isolation Valves

**Requirement** - Remote Manual Valves are acceptable in engineered safety feature systems (ESFS) or ESF related systems provided provisions are made to detect possible failure of the fluid lines inside and outside containment and the capability is maintained to remote manually isolate these lines.

**Concern** - The following valves cannot be closed when the ESFAS signal is present:

- Outside Containment Spray Isolation Valves CS-125A(B)
- Outside CCW to CFCs Containment Isolation Valves CC-808A(B), CC-822A(B), CC-807A(B), CC-823A(B)

**Short Term Action** - Design Change (DC)-3523 will be implemented during the current refueling outage. This DC will install keylock switches to allow operators to override emergency actuation signals to the respective valves and allow remote manual closure. The new switches will be located in the Auxiliary Building Relay Room on EL +35 level and will produce Control Room annunciation when they are moved from the normal accident position. The Containment Spray switches will return normal valve control to the control room and the Containment Fan Cooler (CFC) switches will close the inlet and outlet valves for CCW to the individual CFCs. The location of the keylock switches is in a low dose area expected to be accessible at all times during and after an accident. The DC will be evaluated pursuant to the provisions of 10 CFR 50.59. The control circuitry logic applied in the DC will be consistent with other previously approved logic circuitry design utilized at Waterford 3.

The override function of DC-3523 will be tested as part of post-modification testing. Additionally, Waterford 3 will incorporate a periodic test into the plant surveillance program to verify the override capability of valves when that capability facilitates a safety function.

In general, provisions for detecting leakage from remote manually controlled systems are available. These provisions allow the operator in the main control room to know when to isolate, by remote manual means, fluid systems that have a post-accident safety function. These provisions include instrumentation to measure flow rates, pressure and sump water levels in the safety equipment area and the penetration area, and instrumentation to measure radiation levels. Administrative controls will be provided in the Emergency Engineering Resource Guide located in the Technical Support Center and the Emergency Operations Facility that will describe instructions to isolate the above listed penetrations upon failure or malfunction.

All remote manual containment isolation valves discussed herein will be capable of being closed in less than 10 minutes from the point at which the control room recognizes the need to isolate the penetration. However, if the remote manual valves were not closed within the specified 10 minutes, an increase in off site dose consequences due to leakage from containment would be negligible. The affected penetrations are Containment Spray, Charging and Component Cooling Water to the Containment Fan Coolers. The Containment Spray and Charging System are closed water-filled systems outside containment, each containing several barriers. In order to postulate leakage from the containment atmosphere to the outside atmosphere, multiple failures or single failures plus leakage through multiple barriers would have to be assumed in addition to the postulated LOCA. These systems are Seismic Category I, Safety Code Class 2 and protected from high energy line break and jet impingement. The Component Cooling Water to the Containment Fan Cooler penetrations constitute a closed water-filled system inside containment. This portion of the system is Seismic Category I, Safety Code Class 2 and protected from high energy line break and jet impingement. Thus, a catastrophic failure of the line is not expected to occur. The need to isolate these penetrations would most likely be for some other reason than the isolation valves being exposed to containment atmosphere.

**Long Term Action - NONE**

**Requirement** - Containment isolation criteria requires that containment integrity be maintained post accident for a period of 30 days. Some containment isolation valves are air operated valves and fail open on a loss of air. Since the instrument air system which supplies the motive force for air operated valves is non safety it cannot be relied upon to ensure containment integrity post accident. Those valves which are fitted with safety related air accumulators do not have sufficient capacity to alone assure 30 day valve closure capability.

**Concern** - The following valves are air operated fail open valves equipped with safety related air accumulators capable of providing motive force to close the valve following a loss of the instrument air system for a period of 10 hours (with the exception of CS-125A(B) accumulators that are rated for 6 hours):

**Penetration 23**

CC 641 RCP Seal, Coolers and CEDM Fan Coolers Inlet, Outside Containment

**Penetration 24**

CC 710 RCP Seal, Coolers and CEDM Fan Coolers Outlet, Inside Containment

CC 713 RCP Seal, Coolers and CEDM Fan Coolers Outlet, Outside Containment

**Penetration 18**

CC 807 A CCW to CFC , Outside Containment



**Penetration 15**

CC 807 B CCW to CFC , Outside Containment

**Penetration 20**

CC 808 A CCW to CFC , Outside Containment

**Penetration 22**

CC 808 B CCW to CFC , Outside Containment

**Penetration 19**

CC 822 A CCW to CFC , Outside Containment

**Penetration 21**

CC 822 B CCW to CFC , Outside Containment

**Penetration 17**

CC 823 A CCW to CFC , Outside Containment

**Penetration 16**

CC 823 B CCW to CFC , Outside Containment

**Penetration 34**

CS 125 A CS Inlet, Outside Containment

**Penetration 35**

CS 125 B CS Inlet, Outside Containment

The following air operated valve is not equipped with an air accumulator. In addition, the solenoid in the air supply to the actuator is not class 1E:

**Penetration 27**

CVC-209 Charging System Outside Isolation Valve

**Short Term Actions (Excluding Penetration 27 Charging)** - Design Change 3429 will implement a safety related system to provide motive gas to the accumulators for the valves listed above (excluding CVC-209).

These valves are fail open containment isolation valves. CFC and CS valves fail open for accident mitigation and CCW RCP valves fail open for Reactor coolant pump seal reliability.

These valves do not have the motive power to assure closure for the duration of a postulated accident that assumes the loss of instrument air. The accumulators for each valve are sized for 2 strokes, 10 hours (with the exception of CS-125A/B) accumulators that are rated for 6 hours) post accident. This time is not sufficient for post accident containment isolation, which is postulated to be a total of 30 days.

DC 3429 will install safety related tubing and valves under the provisions of 10 CFR 50.59 to provide a backup source of nitrogen gas, if instrument air is unavailable, to the accumulators for each of the valves (excluding CVC-209). DC 3429 will provide the required 30 day closure capability.

A set of nitrogen bottles will be installed on EL +21 level in the RAB which is a low dose area expected to be accessible at all times during and after an accident. The location of the nitrogen bottles will be just above the set of valves it will serve.

CCW to CFC containment isolation valves and CCW RCP containment isolation valves are located on EL -4 level in the RAB wing area. The CS (CS-125) containment isolation valves are located on EL -35 level, also in the RAB wing area, just below the valves on the -4 wing area. Enclosure 1 provides a basic flow diagram.

All tubing and valves will be installed to ASME Section III, Code Class 3. The nitrogen bottles will be standard gas cylinders, and will be dedicated safety related for this use. All equipment will be installed Seismic Category I.

All valves and tubing associated with DC 3429 will be tested in accordance with ASME Code and or 10 CFR 50 Appendix B requirements as required. In addition, a pressure check on the nitrogen bottles will be added to the Operations shift logs. These additions will be considered a support system for the associated containment isolation valves.

**Long Term Actions (Excluding Penetration 27 Charging)** - No additional actions are considered necessary at this time. The additions as described above resolve the identified concern.

**Short Term Action for Penetration 27 Charging** - The outside containment isolation valve in the Charging line is an air operated gate valve. This valve is not equipped with an air accumulator and the solenoid in the air supply to the actuator is not Class 1E. The position indication for this valve is also not Class 1E. The valve is designed to fail open, its normal position is locked open and the post-accident position is open. Additional barriers included in the Charging line up stream of the outside containment isolation valve are, a normally open manual valve (CVC-208), Charging pump discharge check valve (CVC-194A, A/B, B), a positive displacement pump, RWSP to Charging suction check valve (CVC-508) and RWSP to Charging suction isolation motor operated valve (CVC-507).

For Fuel Cycle 9 Waterford 3 will credit closure of CVC-208 in the event containment isolation valve CVC-209 is not able to perform the closed safety function. CVC-208 is a reach-rod operated valve, equipped with local mechanical position indication and located approximately 3 feet upstream of CVC-209 (see attached Enclosure 2). The valve and associated piping is Seismic Category I, Safety Class 2 and the valve remote operator is located on EL +21 level in the RAB switchgear area. This area is a low radiation dose area expected to be accessible at all times during and following an accident. As previously stated, the valve would be capable of being closed in less than 10 minutes from the point at which the control room recognizes the need to isolate the penetration. The administrative controls provided in the Emergency Engineering Resource Guide will also describe instructions to isolate penetration 27 if required.

Prior to implementing administrative controls to credit closure of CVC-208, Waterford 3 will exercise the valve and verify that the mechanical position indicator shows the correct position. CVC-208 will be added to the Inservice Testing program. The maintenance history for CVC-208 has been reviewed and there was no indication that the valve would not be suitable for performing a containment isolation function.

The NRC previously approved the Charging System containment isolation characteristics based on information provided in response to FSAR Question 480.43 dated June 1981, and letter dated March 16, 1994. This information describes the Charging System as an "essential system" necessary to mitigate the affects of an accident, the piping is of high pressure design (i.e. greater than RCS pressure 3125 psig at 250°F) and equipped with multiple barriers. In addition, CVC-209 was identified as a locked open valve capable of being closed from the control room in less than 10 minutes. The only difference from the previous position to that described in this short term action is that the operator must leave the control room to isolate the Charging penetration.

**Long Term Actions Penetration 27 Charging** - The following long term actions will be implemented for CVC-209 during Refueling Outage (RF) 9 or an outage prior to RF9 of sufficient duration following development of the design change (DC 3529) currently scheduled for June 1998. This time duration will allow for final project scoping, material lead time and modification package development. DC 3529 will include:

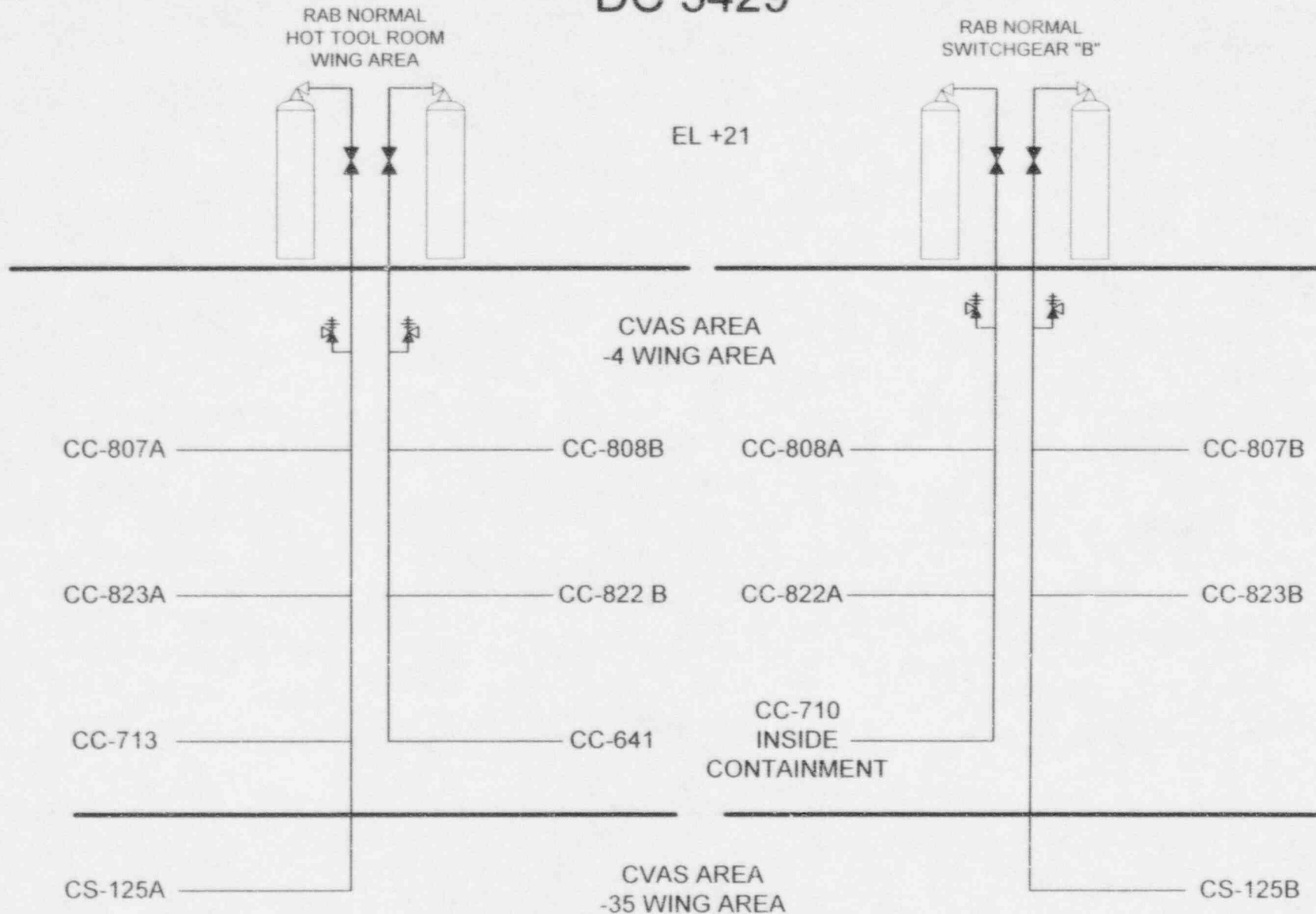
- 30 day closure capability
- Class 1E power
- Remote position indication pursuant to RG 1.97

**Concern** - Concerning the CVR essential instrument lines that are the topic of License Amendment Request dated August 21, 1996. Will there be an administrative local leak rate test limit to validate the "closed system" assumption?

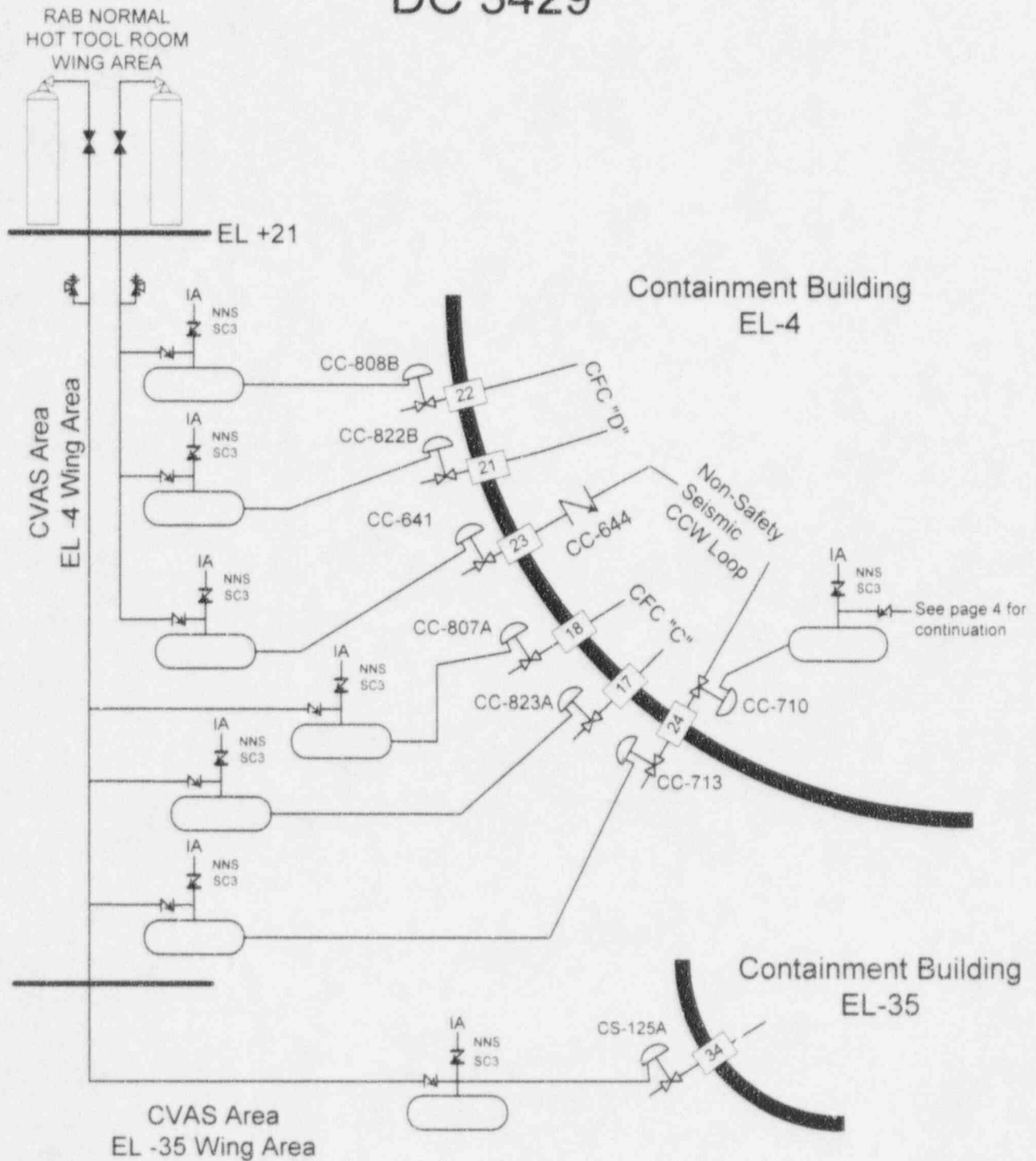
**Short Term Action** - Waterford 3 will impose a 500 sccm limit (the current administrative limit per the Containment Leakage Testing Program is 5,000 sccm) to validate the closed system assumption. The leak rate test will be performed at intervals prescribed by the Containment Leakage Testing Program in accordance with plant procedure STA-001-004. Waterford 3 had previously indicated in letter dated March 17, 1997 that this test would be included in Plant Operating Procedure OP-903-110. However, OP-903-110 does not account for bypass leakage whereas STA-001-004 includes consideration of bypass leakage.

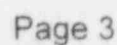


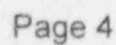
# Proposed Alternate Fill for Containment Isolation Valves DC 3429



# Proposed Alternate Fill for Containment Isolation Valves DC 3429







**CHEMICAL and VOLUME CONTROL - CHARGING SYSTEM  
PENETRATION 27  
(SIAS/No RAS Alignment Shown)**

