

ORGANIZATION: ANCHOR DARLING VALVE COMPANY  
WILLIAMSPORT, PENNSYLVANIA

REPORT NO.:	99900053/83-01	INSPECTION DATE(S)	1/25-28/83	INSPECTION ON-SITE HOURS:	27
CORRESPONDENCE ADDRESS: Anchor Darling Valve Company ATTN: Mr. A. E. Carod President 701 First Street Williamsport, Pennsylvania 17701					
ORGANIZATIONAL CONTACT: Mr. G. W. Kneiser, Quality Assurance Manager TELEPHONE NUMBER: (717) 323-6121					
PRINCIPAL PRODUCT: Nuclear valves.					
NUCLEAR INDUSTRY ACTIVITY: The Anchor Darling Valve Company (ADVC) contribution to the nuclear industry represents approximately 55 percent of its total workload.					
ASSIGNED INSPECTOR:		<u>I. Barnes</u> W. D. Kelley, Reactive & Component Program Section (R&CPS)		<u>4-7-83</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY:		<u>I. Barnes</u> I. Barnes, Chief, R&CPS		<u>4-7-83</u> Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> : This inspection was made as a result of: (1) the NRC resident inspector identification of under torqued bolting of ASME Section III valves received at the Commonwealth Edison Company (CEC), La Salle County Station, Units 1 and 2; (2) a 10 CFR Part 50.55(e) report by Louisiana Power and Light (Cont. on next page)					
PLANT SITE APPLICABILITY: (1) Under torqued bolting: 50-373 & 50-374; (2) Potential failure of valve actuator < 65° F: 50-382; and (3) Valve stem failure: 50-324.					
DESIGNATED ORIGINAL Certified By <u>Deanne Clark</u>					

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SCOPE: (Cont.) Company (LP&L) concerning the potential failure of feedwater isolation valves that were furnished to the Waterford Generating Station, Unit 3, to close within the specified time; and (3) a Licensee Event Report by Carolina Power and Light Company (CP&L) concerning the stem failure of a core spray isolation valve that was furnished to the Brunswick Steam Electric Station, Unit 2.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, paragraph 7.4.3 in Section 7.0 of the Quality Assurance Manual (QAM), paragraph 2 in the Ebasco Services, Incorporated (Ebasco) Specification No. 88-70, and the Ebasco valve list:
  - a. The Design Report for 900-pound feedwater isolation valves furnished to Waterford Generating Station, Unit 3, did not address or demonstrate the validity of the design with respect to closing of the valve within the required time at temperatures as low as 0° F.
  - b. Closing speed design adequacy at temperatures as low as 0° F was not verified as evidenced by Wyle Laboratories Report No. 43847-2, Revision C, which indicated that the lowest temperature of the hydraulic actuator during qualification testing was 70° F.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and paragraph 7.4.4 in Section 7.0 of the QAM, modification documents pertaining to site installation of an electric heater and shroud on the 20-inch feedwater isolation valves were not reconciled with the Design Report in regard to the effect of the modification on the validity of the seismic calculations.

C. UNRESOLVED ITEMS:

None

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D. OTHER FINDINGS OR COMMENTS:

1. Under Torqued Valve Bolting at the CEC La Salle County Station, Units 1 and 2:

- a. The NRC inspector reviewed the ADVC Instruction Manual for the valves supplied to the CEC La Salle County Station, Units 1 and 2, and ascertained that the manual: (1) contained the following receiving inspection instruction, ". . . all bonnet, yoke and Limitorque bolting should be checked to ensure that the joints are secure. Bolting, on occasion, may become loosened during shipment and handling."; (2) instructed maintenance personnel, as follows, "When replacing the bonnet studs and nuts . . . on bolted bonnet valves, consult a torque table for correct torque to assure tightness of seal. . . ."; and (3) included a sketch providing torquing sequence instructions for different bonnet bolting configurations.
- b. The NRC inspector noted by observation in the shop assembly area that all torque wrenches had been calibrated and were current in calibration status. It was additionally observed that a torque value chart had been posted which had an effective date of June 20, 1980.
- c. Paragraph 12.4.4 of the QAM states, in part, "The Quality Engineer shall advise the Project Engineer of required in-process inspection operations to be performed during manufacture. This information is transmitted on the SOI. . . ." The Quality Engineer had not designated the torquing of bolting as an operation requiring in-process inspection.

2. Potential Failure of Feedwater Isolation Valves at the LP&L Waterford Generating Station, Unit 3, to Close Within the Specified Time at Temperatures Below 65° F:

- a. The NRC inspector ascertained by review of the design specification, correspondence, and interoffice memoranda that: (1) the design specification required the main feedwater isolation valves to be 20-inch 900-pound flex wedge gate valves with an electric motor actuator suitable for outdoor installation in an ambient temperature range from 0° F to 104° F; (2) ADVC was requested by their customer to change the main feedwater isolation valve actuator to permit emergency closure

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within 5 seconds; (3) ADVC indicated in their letter of February 22, 1977, that a flex wedge electric motor actuated gate valve was not suitable for the intended service and offered a double disc parallel seated gate valve with a self-contained hydraulic operator; and (4) after customer acceptance of the ADVC proposal, the responsibility for design and manufacturing was transferred from the ADVC Hayward, California, plant to the Williamsport plant. All customer contacts were to be made, however, through the Hayward, California, plant.

- b. Review by the NRC inspector determined that the design report for the feedwater isolation valves did not address closing of the valves at temperatures as low as the 0° F required by the design specification, and, that qualification testing of the hydraulic actuator was performed at temperatures of 70° F and above. This was identified as a nonconformance (see paragraph B.1).
  - c. The NRC inspector verified by review of correspondence that the corrective action agreed between Ebasco and ADVC was the installation of a metal shroud (containing an electric heater and controls) over the hydraulic actuator in order to maintain the ambient temperature above 65° F.
  - d. The NRC inspector reviewed the original seismic calculations for the valve and noted that corrections had been made to the calculations by use of paste-ons, paste-overs, and white outs. Review of the design specification did not reveal any requirement which would specifically preclude use of such practices for document revision. A nonconformance was, therefore, not identified in regard to this subject. However, ADVC stated the practice had been discontinued and corrective action would be taken to prevent recurrence. One nonconformance was identified in regard to the failure to reconcile the effects of the shroud modification on the validity of the seismic calculations (see paragraph B.2).
3. Core Spray Isolation Valve Stem Failure at the CP&L Brunswick Steam Electric Station, Unit 2:
- a. The NRC inspector determined by review of two ADVC Notification and Resolution of Abnormal Occurrence Reports, one letter, two drawings, and a telephone log that: (1) a CP&L maintenance

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engineer had notified ADVC on June 24, 1982, in regard to a possible stem or disc failure in a 10-inch 600-pound gear operated gate valve; (2) CP&L had notified the NRC resident inspector at the Brunswick Steam Electric Station that a stem failure had occurred during a functional test of a ADVC 10-inch 600-pound manually operated core spray isolation valve at a location approximately 10 inches below the threaded section and that there were indications that the cracks may have existed for a period of time; (3) in telephone conversations between CP&L personnel and the ADVC technical director, ADVC was informed that the Brinell hardness of the failed stem varied from approximately 300 at each end to approximately 400 in the failure area; (4) a CP&L failure evaluation engineer had notified ADVC on December 13, 1982, in regard to the failure by intergranular fracture of a stem in a 20-inch 300-pound motor operated valve at approximately 10 inches above the "T" head and that the failure was probably due to stress corrosion and similar to the previously reported failure of the 10-inch valve stem; (5) the broken stems were from Heat Nos. 825737 (10-inch valve) and 823749 (20-inch valve).

- b. The NRC inspector determined by review of ADVC drawings, heat treatment records, and memoranda that: (1) the 10-inch gate valves were designed and manufactured at the now closed ADVC Hayward, California, plant; (2) the 10-inch and 20-inch valve stems were specified on the assembly drawing bill of materials to be ASTM A276, Type 410 material and heat treated to a Brinell hardness range of 282 to 320; (3) the valves were designed in accordance with the requirements of ANSI B16.5; and (4) the 10-inch valve stems were heat treated at 1825° F for 2 hours, oil quenched, and drawn at 1050° F for 4 hours. The Brinell hardness readings after heat treatment were identified to be within the range specified on the assembly drawings.
- c. As of this inspection, ADVC had not received either samples from the failed stems or a report from CP&L addressing failure mechanism and the reasons for high hardness in the failure area. This subject will be further reviewed during a subsequent inspection after receipt of pertinent technical information on the reasons for the failures.

ORGANIZATION: Anchor Darling Valve Co

Inspector W<sup>m</sup> D. Kelley

Williamsport, Pennsylvania Scope/Module \_\_\_\_\_

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PERSONS CONTACTED

APPENDIX \_\_\_\_\_

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NAME (Please Print)

TITLE (Please Print)

ORGANIZATION

A. E. Carod

President

ADVC - Rednor, PA

J. Chappell

Manager of Engineering

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G. W. Kreiser

Quality Assurance Mgr.

W. G. Knecht

Technical Director

T. Garces

Project Engineer









ORGANIZATION: Anchor Darling Valve Co. INSPECTOR: W<sup>m</sup> D. Kelley  
Williamsport, Pennsylvania SCOPE: Failure of Feedwater Isolation Valve  
to Close Within Specified Time

REPORT NO.: 99900053/83-01		DOCUMENTS EXAMINED	APPENDIX — PAGE of	
ITEM NO.	DOC TYPE	TITLE/SUBJECT	DOC DATE	DOC. REV
01	4	ADVC Quality Assurance Manual - Issue No 2	2/1/80	
02	3	ADVC Standard ES-2 Preparation of Master Drawing Lists & Material Drawing List		1
03	3	ADVC Standard ES-10 Preparation and Use of Shop Order Instructions		F
04	3	ADVC Standard ES-11 Design Control and Interface Procedure		F
05	3	ADVC Standard ES-12 Project Engineer Qualification Requirements		B
06	2	Ebasco Services Inc. Spec. EB-70 station High Pressure Steel Valves ... Nuclear Safety Class 2 & 3		2
07	6	ADVC - Subject: Reply to Ebasco Services Telex of 2/18/81	2/20/81	
08	11	Ebasco Telex Subject: FW Isolation Valves PO NY-403461 Item 52 & 53 - NRC Question 10.36	2/18/81	
09	11	ADVC Telex Subject: UR Telex 2/18/81 NRC Question 10.36	2/24/81	
10	12	Ebasco Valve List Contract NY-403461		1
11	7	ADVC letter to Ebasco Subject: LPALC High Pressure Valves PO No 403461	2/22/81	
12	6	ADVC Subject: Ebasco PO No 403461 Main Feedwater Isolation Valves	4/30/81	
13	1	ADVC Dwg 94-15050 20" X 18" X 20" FWIV ... Double Disc, Feedwater Isolation Valve with A/DV Hydraulic Actuator		K
14		ADVC Bill of Lading R9770-1, 2, 3	10/28/81	

Document Types:

- |                  |                  |                           |
|------------------|------------------|---------------------------|
| 1. Drawing       | 5. Purchas Order | 9. <u>Log</u>             |
| 2. Specification | 6. Internal Memo | 10. <u>Docket Package</u> |
| 3. Procedure     | 7. Letter        | 11. <u>Telex</u>          |
| 4. QA Manual     | 8. <u>Report</u> | 12. <u>List</u>           |