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SUBJECT: Submits 120-day response to GL 97-01, "Degradation of CR Drive Mechanism Nozzle & Other Vessel Closure Head Penetrations."

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July 30, 1997

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

Subject: Catawba Nuclear Station Units 1 & 2
Docket Nos. 50 -413, 414
TAC Nos. M98554, M98555
McGuire Nuclear Station Units 1 & 2
Docket Nos. 50 -369, 370
TAC Nos. M98573, M98574
Oconee Nuclear Station Units 1, 2, & 3
Docket Nos. 50 -269, 270, 287
TAC Nos. M98579, M98580, M98581
Response to Generic letter 97-01: Degradation
of Control Rod Drive Mechanism Nozzle and Other
Vessel Closure Head Penetrations

Generic Letter (GL) 97-01, "Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations," dated April 1, 1997, requested licensees to describe their program for ensuring the timely inspection of PWR control rod drive mechanism (CRDM) and other vessel closure head penetrations. This information was requested by the staff to verify compliance with 10 CFR 50.55a and 10 CFR Part 50, Appendix A, GDC 14, and to determine whether an augmented inspection program is required pursuant to 10 CFR 50.55a(g) (6) (ii).

Additionally, the GL required that licensees submit two responses. First, within 30 days, utilities were to submit a written response indicating whether or not the requested actions will be completed and whether or not the requested information will be submitted within the requested time period. The response was also to describe any alternative

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actions. Second, within 120 days, utilities were to submit a written report that included information regarding the control rod drive mechanism nozzle and other vessel head closure penetrations inspection activities. In addition, the responses were to include a description of any resin bead intrusions, as described in IN 96-11, "Ingress of Demineralizer Resins Increases Potential for Stress Corrosion Cracking of Control Rod Drive Mechanism Penetrations, that have exceeded the current EPRI PWR Primary Water Chemistry Guidelines recommendations for primary water sulfate levels.

A written response was submitted by Duke on April 28, 1997 indicating that the requested actions would be completed and submitted within the requested time period.

Duke is a participant in the Babcock and Wilcox Owners Group (BWO) and the BWO has a program to address the issues in GL 97-01. By letter dated July 25, 1997, the BWO submitted the information requested in the 120 day response to the NRC on behalf of its member utilities via Topical Report, BAW-2301. In addition to the Topical Report, summaries of the applicable ASME Boiler and Pressure Vessel Code Section XI inspections are provided for Oconee Nuclear Site in Attachment 1. This information constitutes the 120 day response for Oconee Nuclear Site.

Duke is also a participant in the Westinghouse Owners Group (WOG)/NEI RPV head penetration integrated inspection program. The McGuire and Catawba Nuclear Sites 120 day responses to GL 97-01 are provided in Attachments 2 and 3, respectively.

I declare under penalty of perjury that these statements are true and correct to the best of my knowledge.

If you have questions or need additional information, please contact Allison Jones-Young at (704) 382-3154.

Very truly yours,



M.S. Tuckman
Executive Vice President
Nuclear Generation

Attachments

U.S. NRC
July 30, 1997
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ATTACHMENT 1

OCONEE NUCLEAR STATION'S 120 DAY RESPONSE

TO

GENERIC LETTER 97-01:

"DEGRADATION OF CONTROL ROD DRIVE MECHANISM NOZZLE
AND OTHER VESSEL CLOSURE HEAD PENETRATIONS"

Oconee Unit 1

The following is a listing of inspections and results obtained for answering questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B1.18.001	1RPV-CRD-04WH9	UT	First	6	08-07-81	Clear
B-O	B1.18.002	1RPV-CRD-52WH9	UT	First	6	08-07-81	Clear
B-O	B1.18.003	1RPV-CRD-43WH9	UT	First	6	08-07-81	Clear
B-O	B14.010.001	1RPV-CRD-58WH9	PT	Second	9	03-06-86	Clear
B-O	B14.010.002	1RPV-CRD-66WH9	PT	Second	12	05-08-90	Clear
B-O	B14.010.003	1RPV-CRD-59WH9	PT	Second	13	08-27-91	Clear
B-O	B14.010.001	1RPV-CRD-47WH9	PT	Third	16	11-24-95	Clear
B-O	B14.010.002	1RPV-CRD-66WH9	PT	Third	19	* See Note 09-19-2000	Not Tested
B-O	B14.010.003	1RPV-CRD-59WH9	PT	Third	20	* See Note 03-25-2002	Not Tested
B-E	B1.05.001	1RPV-CRDM	VIS	First	4	10-23-78	Clear
B-E	B1.05.001	1RPV-CRDM	VIS	First	6	12-24-81	Clear
B-P	B4.11.048	1-Hydro-100A-1	VIS	First	6	12-24-81	REC
B-P	B4.11.048	1-Hydro-100A-1	VIS	First	7	08-16-83	Clear
B-E	B04.012.001	1RPV-CRDM	VIS	Second	8	11-27-84	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	8	11-27-84	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	9	05-01-86	Clear
B-E	B04.012.001	1RPV-CRDM	VIS	Second	10	11-04-87	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	10	11-04-87	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	11	02-13-89	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	12	06-04-90	Clear

Continued from Page 1

Oconee Unit 1

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-E	B04.012.001	1RPV-CRDM	VIS	Second	13	09-26-91	Clear
B-P	B15.010.001	1RPV-LK-Test	VIS	Second	13	09-26-91	Clear
B-P	B15.011.001	1RPV-HYDRO	VT-2	Second	14	01-29-93	Clear
B-P	B15.010.001	Class A Leakage	VT-2	Second	15	06-22-94	Clear
B-P	B15.010.001	Class A Leakage	VT-2	Third	16	12-07-95	Clear
B-P	B15.010.001	Class A Leakage	VT-2	Third	17	* See Note 09-05-97	Not Tested
B-P	B15.010.001	Class A Leakage	VT-2	Third	18	* See Note 03-10-99	Not Tested
B-P	B15.010.001	Class A Leakage	VT-2	Third	19	* See Note 09-19-2000	Not Tested
B-P	B15.010.001	Class A Leakage	VT-2	Third	20	* See Note 03-25-2002	Not Tested
B-E	B04.012.001	Class A Hydro	VT-2	Third	20	* See Note 03-25-2002	Not Tested
B-P	B15.010.001	Class A Leakage	VT-2	Third	21	* See Note 09-21-2003	Not Tested

* Note: These dates are the dates that the outages are tentatively scheduled to start and the inspections should be performed sometime during the outage.

Definitions & Additional Info:

1. VIS or VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. REC = Recordable indication and this means that an indication was identified during the examination; however, the indication met the acceptance criteria of ASME Sect. XI
5. The inspections for category B-O are all CRDM Housing Body to Adapter welds.

Oconee Unit 2

The following is a listing of inspections and results obtained for answering questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B1.18.001	2RPV-CRD-60WH9	UT	First	5	03-04-82	Clear
B-O	B1.18.002	2RPV-CRD-59WH9	UT	First	5	03-04-82	Clear
B-O	B1.18.003	2RPV-CRD-58WH9	UT	First	5	03-04-82	Clear
B-O	B14.010.003	2RPV-CRD-60WH9	PT	Second	8	09-09-86	Clear
B-O	B14.010.002	2RPV-CRD-47WH9	PT	Second	10	06-08-89	Clear
B-O	B14.010.001	2RPV-CRD-58WH9	PT	Second	12	01-29-92	Clear
B-O	B14.010.003	2RPV-CRD-63WH9	PT	Third	15	04-11-96	Clear
B-O	B14.010.002	2RPV-CRD-47WH9	PT	Third	17	* See Note 09-08-99	Not Tested
B-O	B14.010.001	2RPV-CRD-58WH9	PT	Third	19	* See Note 09-08-2002	Not Tested
B-E	B1.5.2	CRDM Penetration J-Groove Welds	VIS	First	3	12-18-78	Clear
B-E	B1.05.001	2RPV-CRDM	VIS	First	5	04-28-82	Clear
B-P	B4.11.005	2-HYDRO-100A-2	VIS	First	5	04-28-82	REC
B-P	B4.11.005	2-HYDRO-100A-2	VIS	First	6	12-06-83	Clear
B-E	B04.012.001	2RPV-CRDM	VT-2	Second	7	04-20-85	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	7	04-20-85	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	8	10-15-86	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	9	04-06-88	Clear
B-E	B04.012.001	2RPV-CRDM	VT-2	Second	10	07-02-89	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	10	07-02-89	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	11	10-25-90	Clear

Oconee Unit 2

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-E	B04.012.001	2RPV-CRDM	VT-2	Second	12	03-03-92	Clear
B-P	B15.010.001	2RPV-LK-Test	VIS	Second	12	03-03-92	Clear
B-P	B15.011.001	2RPV-Hydro	VT-2	Second	13	06-20-93	Clear
B-P	B15.010.001	Class A Leakage	VT-2	Second	14	11-15-94	Clear
B-P	B15.050.001	Class A Leakage	VT-2	Third	15	05-04-96	REC
B-P	B15.050.001	Class A Leakage	VT-2	Third	16	* See Note 02-20-98	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	17	* See Note 09-08-99	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	18	* See Note 03-09-2001	Not Tested
B-E	B04.012.001	Class A Hydro	VT-2	Third	19	* See Note 09-08-2002	Not Tested
B-P	B15.051.001	Class A Hydro	VT-2	Third	19	* See Note 09-08-2002	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	20	* See Note 02-28-2004	Not Tested

* Note: These dates are the dates that the outages are tentatively scheduled to start and the inspections should be performed sometime during the outage.

Definitions & Additional Info:

1. VIS or VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. REC = Recordable indication and this means that an indication was identified during the examination; however, the indication met the acceptance criteria of ASME Sect. XI
5. The inspections for category B-O are all CRDM Housing Body to Adapter welds.

Oconee Unit 3

The following is a listing of inspections and results obtained for answering questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B1.18.1.1	Location B-6	UT	First	5	01-10-81	Clear
B-O	B1.18.1.2	Location D-5	UT	First	5	01-10-81	Clear
B-O	B1.18.1.3	Location D-12	UT	First	5	01-10-81	Clear
B-O	B14.010.001	3RPV-CRD-46WH9	PT	Second	8	09-18-85	Clear
B-O	B14.010.009	3RPV-CRD-54WH9	PT	Second	10	08-29-88	Clear
B-O	B14.010.005	3RPV-CRD-62WH9	PT	Second	12	02-26-91	Clear
B-O	B14.010.005	3RPV-CRD-62WH9	PT	Third	16	10-29-96	Clear
B-O	B14.010.009	3RPV-CRD-54WH9	PT	Third	17	* See Note 07-28-98	Not Tested
B-O	B14.010.001	3RPV-CRD-46WH9	PT	Third	20	* See Note 03-03-2003	Not Tested
B-E	B1.5.2	CRDM Penetration J-Groove Welds	VIS	First	3	07-12-78	Clear
B-E	B1.05.001	3RPV-CRDM	VIS	First	6	09-30-82	Clear
B-P	B4.11.006	3HYDRO-100A-3	VIS	First	6	09-30-82	Clear
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	8	10-05-85	Clear
B-E	B04.012.001	3RPV-CRDM	VT-2	Second	9	03-28-87	Clear
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	9	03-28-87	Clear
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	10	09-21-88	Clear
B-E	B04.012.001	3RPV-CRDM	VT-2	Second	11	12-18-89	Clear
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	11	12-18-89	Clear
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	12	03-23-91	Clear
B-E	B04.012.001	3RPV-CRDM	VT-2	Second	13	09-25-92	Clear

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Oconee Unit 3

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-P	B15.010.001	3RPV-LK-Test	VT-2	Second	13	09-25-92	Clear
B-P	B15.050.001	Class A Leakage	VT-2	Third	15	07-17-95	REC
B-P	B15.050.001	Class A Leakage	VT-2	Third	16	03-03-97	Clear
B-P	B15.050.001	Class A Leakage	VT-2	Third	17	* See Note 07-28-98	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	18	* See Note 02-11-2000	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	19	* See Note 09-02-2001	Not Tested
B-E	B04.012.001	Class A Hydro	VT-2	Third	20	* See Note 03-03-2003	Not Tested
B-P	B15.051.001	Class A Hydro	VT-2	Third	20	* See Note 03-03-2003	Not Tested
B-P	B15.050.001	Class A Leakage	VT-2	Third	21	* See Note 09-12-2004	Not Tested

* Note: These dates are the dates that the outages are tentatively scheduled to start and the inspections should be performed sometime during the outage.

Definitions & Additional Info:

1. VIS or VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. REC = Recordable indication and this means that an indication was identified during the examination; however, the indication met the acceptance criteria of ASME Sect. XI
5. The inspections for category B-O are all CRDM Housing Body to Adapter welds.

ATTACHMENT 2

MCGUIRE NUCLEAR STATION'S 120 DAY RESPONSE

TO

GENERIC LETTER 97-01:

"DEGRADATION OF CONTROL ROD DRIVE MECHANISM NOZZLE
AND OTHER VESSEL CLOSURE HEAD PENETRATIONS"

2.1 Introduction

Generic Letter 97-01 (GL), *Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations*, was issued to request licensees to describe their program for insuring the timely inspection of PWR control rod drive mechanism (CRDM) and other closure head penetrations. This response provides the McGuire Nuclear Station information relative to the information requested by the GL.

Prior to issuance of the GL, McGuire Nuclear Station (MNS) has worked with the Westinghouse Owners Group (WOG), the Electric Power Research Institute (EPRI), the B&W Owners Group (BWO), the Combustion Engineering Owners Group (CEOG), and the Nuclear Energy Institute (NEI) to understand the operational experience, identify technical issues, cause factors, relative importance, and solutions to the cracking of Alloy 600 Closure Head Penetrations. One of these tasks was the development of safety evaluations that characterized the initiation of damage, propagation and consequences. These safety evaluations for WOG utilities were submitted in WCAP 13565, "Alloy 600 Reactor Vessel Head Adapter Tube Cracking Safety Evaluation," and are applicable to MNS. The NRC reviewed the safety evaluations and issued a safety evaluation report (SER) to NEI on November 19, 1993 stating that this was not an immediate safety issue. In order to assure the assumptions of the above safety evaluation remain valid, MNS is participating in the WOG/NEI Reactor Pressure Vessel Head Penetration Integrated Inspection Program and will evaluate the need to inspect on a continuing bases.

From a fabrication standpoint, there are three types of closure head penetrations on the two MNS reactor vessels. They consist of the following:

- 78 CRDM type penetrations of which 53 are used as CRDM nozzles, 8 as part length nozzles, 12 are capped and, 5 are used as thermocouple nozzles.
- 4 auxiliary adapter penetrations.
- 1 head vent penetration.

These penetrations are shown in Figures 2.1, 2.2 and 2.3. The auxiliary adapter nozzle is welded to a buildup on the O.D. of the RV head. This full penetration weld is part of MNS's ISI plan and is inspected volumetrically using ultrasonic testing. The head vent penetration is 1" nominal pipe size (NPS) and is welded to the I.D. of the RV head in a manner similar to the CRDM penetrations. EPRI has performed a stress analysis on the head vent penetration which shows that hoop stress predominates such that any

cracks would be axial which means the penetration would leak before it broke.

2.2 Response to Requested Information Item 1.1:

In response to item 1.1 of Generic Letter 97-01, a summary of this information compiled by the WOG is contained in Section 1.3 of WCAP-14901, which was submitted to the NRC by letter dated July 18, 1997. Summaries of the applicable ASME Boiler and Pressure Vessel Code Section XI, ISI inspections are provided for MNS-1 and -2 in Table 2.1 and Table 2.2, respectively. These results have been previously submitted to the NRC in the form of ISI Inspection Reports which are due no later than 90 days after startup. In addition, MNS performs visual inspections in response to Generic Letter 88-05 for boric acid corrosion of pressure boundary components.

2.3 Response to Requested Information Item 1.2 through 1.3:

In response to item 1.2 and 1.3 of Generic Letter 97-01, MNS is a participant in the WOG/NEI Reactor Vessel Head Penetration Integrated Inspection Program.

2.4 Response to Requested Information Item 1.4:

In response to item 1.4 of Generic Letter 97-01, MNS is a participant in the WOG analysis program in which a plant specific probability analysis using the methodology described in Section 4 of WCAP-14901 has been performed. The plant specific input parameters to the analysis are shown in Tables 2.3 and 2.4. The analysis results will be incorporated into the WOG/NEI integrated inspection program for use in determining the need for a plant specific inspection. This integrated inspection program includes all three PWR owners groups, EPRI, and NEI who are cooperatively working to compile information on the estimated operating time from January 1, 1997 that is needed to initiate and propagate a 75% through wall crack in a vessel penetration for all of the Reactor Vessel heads in the United States. This information will be evaluated to determine if an adequate number of plants have or are planning to inspect closure head penetrations in the near future. This evaluation will be completed and detailed inspection plans

for the industry will be provided to the NRC by the end of 1997. MNS-1 and -2 are ranked low in near term susceptibility due mainly to RV head temperature (560°F). Time of operation (MNS-1 3,724 EFPD & MNS-2 3,650 EFPD as of January 1, 1997) and moderate yield strength also contribute to the low susceptibility.

2.5 Response to Requested Information Item 2.1 through 2.6:

TECHNICAL SPECIFICATIONS SIMILARITIES TO THE EPRI GUIDELINES

The MNS Unit 1 and Unit 2 plant specifications follow the EPRI guidelines for chloride, fluoride and oxygen. The technical specification steady state limits for chloride, fluoride and oxygen are equivalent to the action level 3 limits in the guidelines. Sulfates are not part of the technical specifications. However, sulfate is a control parameter for MNS with the action limits listed in the guidelines.

RCS CHEMISTRY EXCURSIONS THAT EXCEED ADMINISTRATIVE LIMITS FOR SULFATES, CHLORIDE, FLUORIDES, OXYGEN, BORON AND LITHIUM

A review of plant data from 1985 to present indicate the following:

Sulfates - There were no excursions that exceeded administrative limits

Chlorides - McGuire Unit 2 exceeded 100 ppb chloride in June 1993 for 1 day with a peak of 220 ppb due to an addition of lithium chloride

Fluorides - There were no excursions that exceeded administrative limits

Oxygen - There were no excursions that exceeded administrative limits

Boron - There were no excursions that exceeded administrative limits

Lithium - Small lithium excursions occur on an infrequent basis due to the production of lithium in the core. These excursions are not drastically out of specification.

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Prior to 1985, MNS did not measure conductivity on a set frequency; however, any large excursions would have been investigated and cleaned up.

CONDUCTIVITY EXCURSIONS THAT MAY INDICATE RESIN INTRUSIONS

MNS Unit 1 and Unit 2 have not had any conductivity excursions from 1985 to present that would indicate an intrusion of resin.

TABLE 2.1

McGuire Unit 1

The following is a list of inspections and the results that were developed to answer questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B14.010.011	IRPV-CRDM65	PT	1	6	02/20/90	Clear
B-O	B14.010.016	IRPV-CRDM70	PT	1	4	09/29/87	Clear
B-O	B14.010.017	IRPV-CRDM71	PT	1	4	09/29/87	Clear
B-O	B14.010.010	IRPV-CRDM64	PT	2	10	12/26/95	Clear
B-O	B14.010.011	IRPV-CRDM65	PT	2	8	04/15/93	Clear
B-F	B05.010.017	IRPV-1-462A-SE	UT	1	4	10/05/87	Clear
B-F	B05.010.018	IRPV-1-462A-SE	PT	1	4	10/04/87	Clear
B-F	B05.010.019	IRPV-1-462B-SE	UT	1	4	10/05/87	Clear
B-F	B05.010.020	IRPV-1-462B-SE	PT	1	4	10/04/87	Clear
B-F	B05.010.021	IRPV-1-462C-SE	UT	1	4	10/05/87	Clear
B-F	B05.010.022	IRPV-1-462C-SE	PT	1	4	10/04/87	Clear
B-F	B05.010.023	IRPV-1-462D-SE	UT	1	4	10/05/87	Clear
B-F	B05.010.024	IRPV-1-462D-SE	PT	1	4	10/04/87	Clear
B-F	B05.010.009	IRPV 1-462A-SE	UT	2	11	02/22/97	Clear/Limited**
B-F	B05.010.009A	IRPV 1-462A-SE	PT	2	11	02/22/97	Clear
B-F	B05.010.010	IRPV 1-462B-SE	UT	2	11	02/22/97	Clear/Limited**
B-F	B05.010.010A	IRPV 1-462B-SE	PT	2	11	02/22/97	Clear
B-F	B05.010.011	IRPV 1-462C-SE	UT	2	11	02/22/97	Clear/Limited**
B-F	B05.010.011A	IRPV 1-462C-SE	PT	2	11	02/22/97	Clear
B-F	B05.010.012	IRPV 1-462D-SE	UT	2	11	02/22/97	Clear/Limited**

TABLE 2.1

Continued from Page 1

McGuire Unit 1

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-F	B05.010.012A	1RPV 1-462D-SE	PT	2	11	02/22/97---	Clear
B-P	B15.010.001	1RPV	VT-2	1	***	***	Clear
B-P	B15.011.001	1RPV	VT-2	1	7	12/07/91	Clear
B-P	B15.010.001	1RPV	VT-2	2	***	***	Clear
B-P	B15.011.001	1RPV	VT-2	2	13	10/11/99*	N/A
B-E	B04.012.001	1RPV-CDRM	VT-2	1	6	05/17/90	Clear
B-E	B04.012.001	1RPV-CDRM	VT-2	2	13	10/11/99*	N/A

* Note: These are the dates the outages are tentatively scheduled to start, and the inspections should be performed during the outage.

** Note: Limited examinations, only 89.13% examination coverage obtained. A Request for Relief will be filed.

***Note: These System Leakage Tests are performed after each Refueling Outage.

Definitions & Additional Inf.:

1. VIS or VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. REC = Recordable indication means that an indication was identified during the examination, however, the indication met the acceptance criteria of ASME Sect. XI

TABLE 2.2

McGuire Unit 2

The following is a list of inspections and the results that were developed to answer questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B14.010.015	2RPV-CRDM69	PT	1	3	05/29/87	Clear
B-O	B14.010.017	2RPV-CRDM71	PT	1	3	05/29/87	Clear
B-O	B14.010.022	1RPV-CRDM76	PT	1	7	01/30/92	Clear
B-O	B14.010.015	2RPV-CRDM69	PT	2	3	09/18/97*	N/A
B-O	B14.010.017	2RPV-CRDM71	PT	2	9	12/21/94	Clear
B-O	B14.010.022	1RPV-CRDM76	PT	2	14	09/18/97*	N/A
B-F	B05.010.009	2RPV-W51-01-SE	UT	1	3	06/03/87	Clear/Limited
B-F	B05.010.009A	2RPV-W51-01-SE	PT	1	3	05/29/87	Clear
B-F	B05.010.010	2RPV-W51-02-SE	UT	1	3	06/03/87	Clear/Limited
B-F	B05.010.010A	2RPV-W51-02-SE	PT	1	3	05/29/87	Clear
B-F	B05.010.011	2RPV-W51-03-SE	UT	1	3	06/03/87	Clear/Limited
B-F	B05.010.011A	2RPV-W51-03-SE	PT	1	3	05/29/87	Clear
B-F	B05.010.012	2RPV-W51-04-SE	UT	1	3	06/03/87	Clear/Limited
B-F	B05.010.012A	2RPV-W51-04-SE	PT	1	3	05/29/87	Clear
B-F	B05.010.009	2RPV-W51-01-SE	UT	2	11	9/18/97*	N/A
B-F	B05.010.009A	2RPV-W51-01-SE	PT	2	11	9/18/97*	N/A
B-F	B05.010.010	2RPV-W51-02-SE	UT	2	11	9/18/97*	N/A
B-F	B05.010.010A	2RPV-W51-02-SE	PT	2	11	9/18/97*	N/A
B-F	B05.010.011	2RPV-W51-03-SE	UT	2	11	9/18/97*	N/A
B-F	B05.010.011A	2RPV-W51-03-SE	PT	2	11	9/18/97*	N/A
B-F	B05.010.012	2RPV-W51-04-SE	UT	2	11	9/18/97*	N/A

TABLE 2.2

Continued from Page 1

McGuire Unit 2

Sect. XI Examination Category	Item Number w	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-F	B05.010.012A	2RPV-W51-04-SE	PT	2	11	9/18/97*	N/A
B-F	B05.050.017	2RPV-W52-01	UT	1	3	06/03/87	Clear
B-F	B05.050.017A	2RPV-W52-01	PT	1	3	06/03/87	Clear
B-F	B05.050.017B	2RPV-W52-01	UT	1	3	06/03/87	Clear
B-F	B05.050.018	2RPV-W52-02	UT	1	3	06/03/87	Clear
B-F	B05.050.018A	2RPV-W52-02	PT	1	3	06/03/87	Clear
B-F	B05.050.018B	2RPV-W52-02	UT	1	3	06/03/87	Clear
B-F	B05.050.019	2RPV-W52-03	UT	1	3	06/03/87	Clear
B-F	B05.050.019A	2RPV-W52-03	PT	1	3	06/03/87	Clear
B-F	B05.050.019B	2RPV-W52-03	UT	1	3	06/03/87	Clear
B-F	B05.050.020	2RPV-W52-04	UT	1	3	06/03/87	Clear
B-F	B05.050.020A	2RPV-W52-04	PT	1	3	06/03/87	Clear
B-F	B05.050.020B	2RPV-W52-04	UT	1	3	06/03/87	Clear
B-F	B05.130.017	2RPV-W52-01	UT	2	3	09/18/97*	N/A
B-F	B05.130.017A	2RPV-W52-01	PT	2	3	09/18/97*	N/A
B-F	B05.130.017B	2RPV-W52-01	UT	2	3	09/18/97*	N/A
B-F	B05.130.018	2RPV-W52-02	UT	2	3	09/18/97*	N/A
B-F	B05.130.018A	2RPV-W52-02	PT	2	3	09/18/97*	N/A
B-F	B05.130.018B	2RPV-W52-02	UT	2	3	09/18/97*	N/A
B-F	B05.130.019	2RPV-W52-03	UT	2	3	09/18/97*	N/A
B-F	B05.130.019A	2RPV-W52-03	PT	2	3	09/18/97*	N/A
B-F	B05.130.019B	2RPV-W52-03	UT	2	3	09/18/97*	N/A

TABLE 2.2

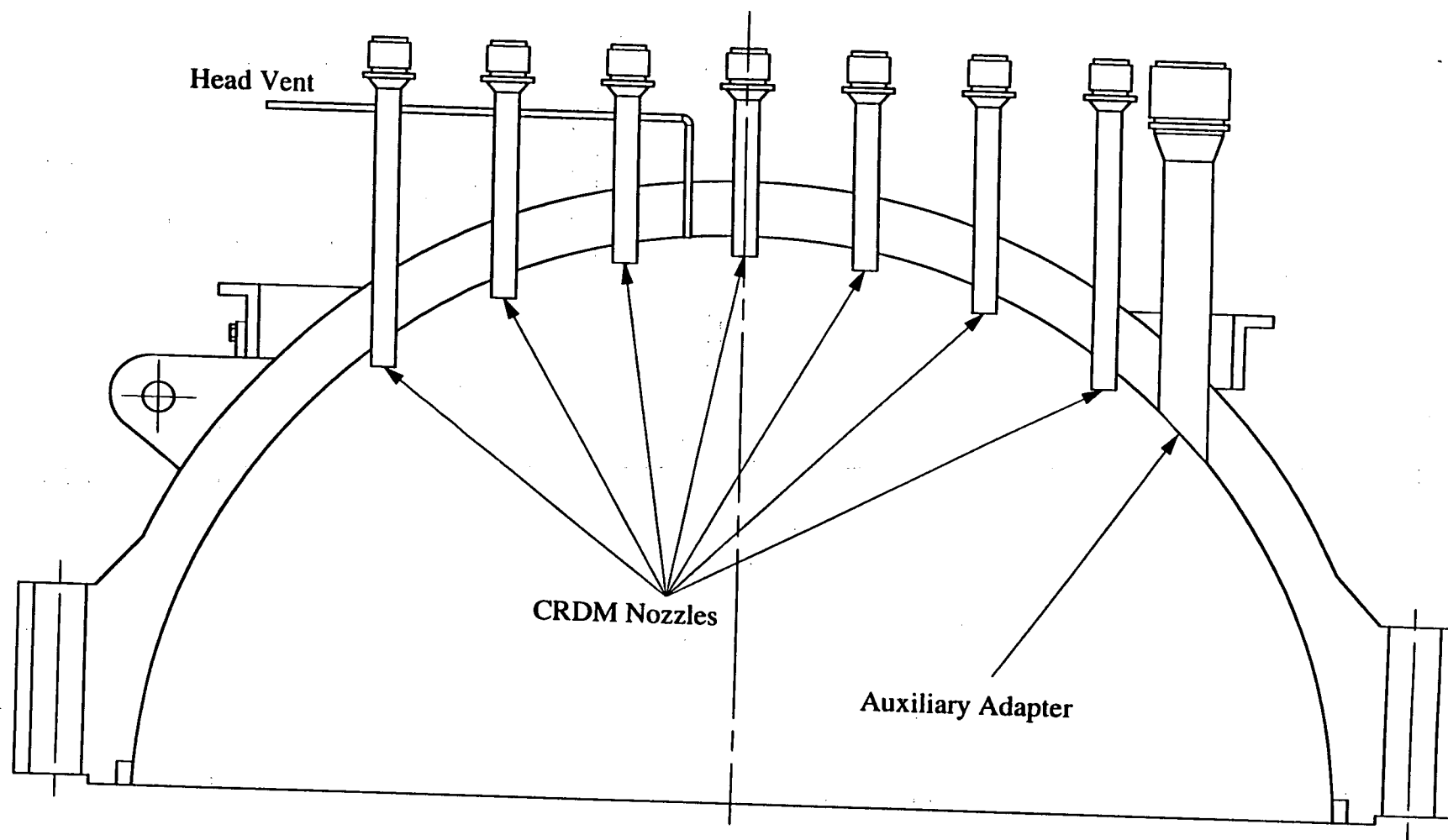
B-F	B05.130.020	2RPV-W52-04	UT	2	3	09/18/97*	N/A
B-F	B05.130.020A	2RPV-W52-04	PT	2	3	09/18/97*	N/A
B-F	B05.130.020B	2RPV-W52-03	UT	2	3	09/18/97*	N/A
B-P	B15.010.001	2RPV	VT-2	1	**	**	Clear
B-P	^w B15.011.001	2RPV	VT-2	1	7	03/14/92	Clear
B-P	B15.010.001	2RPV	VT-2	2	**	**	Clear
B-P	B15.011.001	2RPV	VT-2	2	14	12/11/02*	N/A
B-E	B04.012.001	2RPV-CDRM	VT-2	1	7	03/14/92	Clear
B-E	B04.012.001	1RPV-CDRM	VT-2	2	14	12/11/02*	N/A

* Note: These are the dates the outages are tentatively scheduled to start, and the inspections should be performed during the outage.

**Note: These System Leakage Tests are performed after each Refueling Outage.

Definitions & Additional Inf.:

1. VIS or VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. REC = Recordable indication means that an indication was identified during the examination, however, the indication met the acceptance criteria of ASME Sect. XI



Side View of Reactor Vessel Head, CRDM Nozzles, Auxiliary Adapter and Head Vent

Figure 2.1

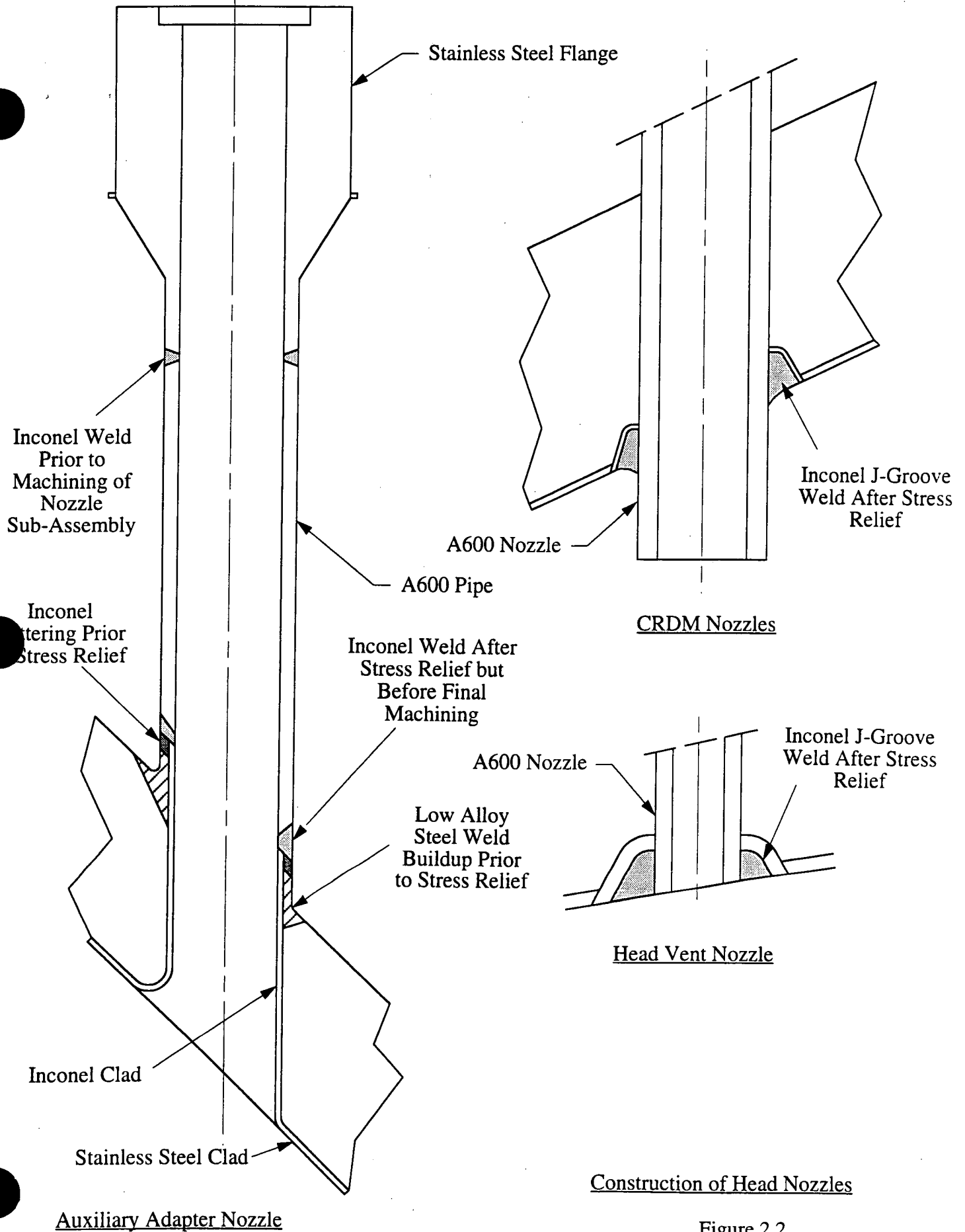
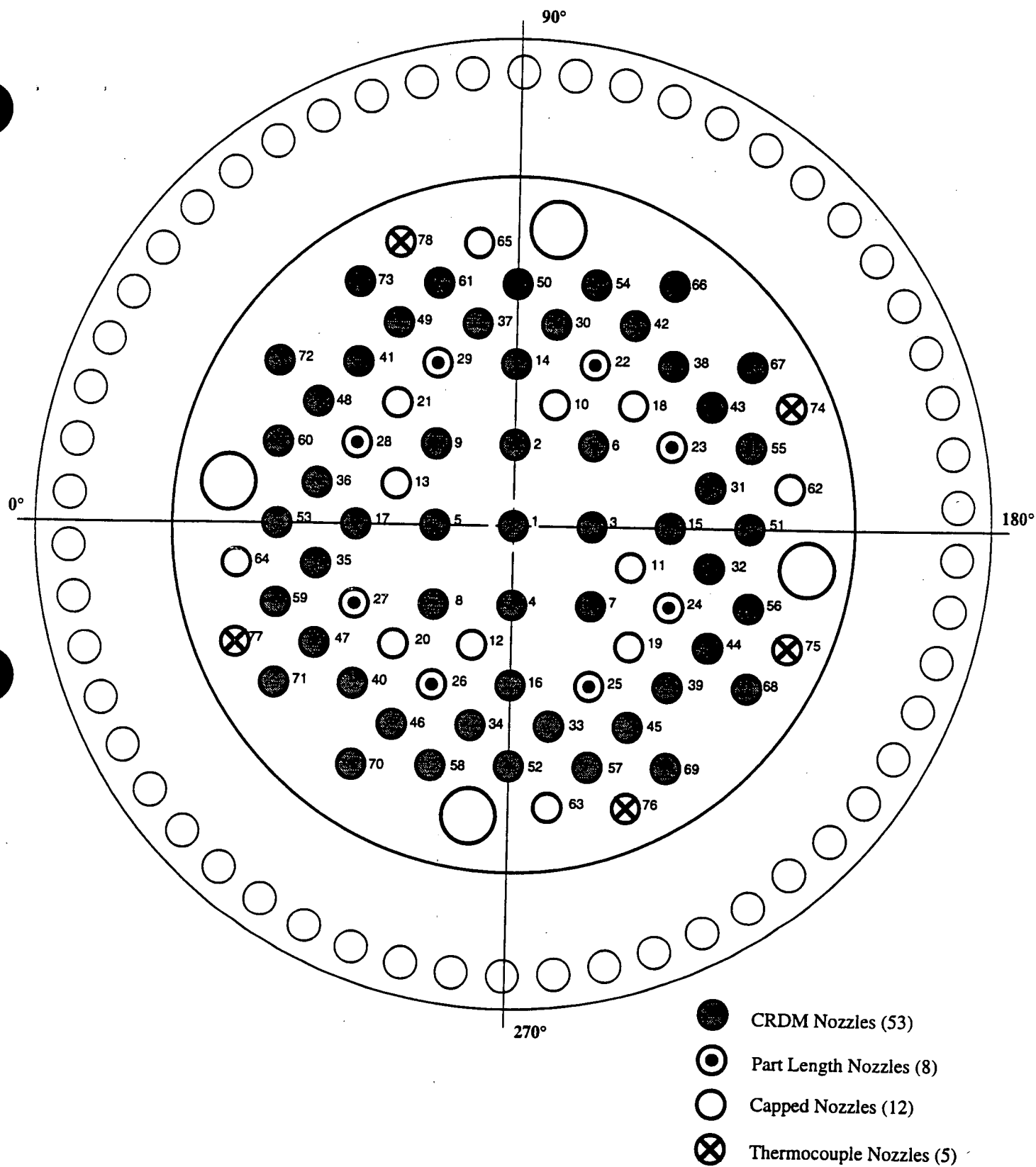


Figure 2.2



Location of Nozzle Types on McGuire Vessel Heads

Figure 2.3

TABLE 2.3
MCGUIRE UNIT 1
INPUT VALUES FOR PROBABILISTIC ANALYSIS

Case	Pen. No.	Temp.	Set-up Angle (°)	Y.S. (ksi)	GBC (%)
1	74 thru 78	560°F	48.8	35.0	86.6
2	66 thru 70		45.4	38.5	57.7
3	71 thru 73		45.4	35.0	86.6
4	63 thru 65		44.3	38.5	57.7
5	62		44.3	45.0	75.2
6	54		38.6	40.0	37.3
7	55 thru 57, 60		38.6	44.0	78.7
8	61		38.6	45.0	75.2
9	50 thru 53		36.3	40.0	37.3
10*	42 thru 49		35.1	40.0	37.3

*This case is also used to bound penetrations 1 through 41 and 58 and 59.

TABLE 2.4
MCGUIRE UNIT 2
INPUT VALUES FOR PROBABILISTIC ANALYSIS

Case	Pen. No.	Temp.	Set-up Angle (°)	Y.S. (ksi)	GBC (%)
1	74	560°F	47.0	42.7	68.1
2	77		47.0	40.7	53.4
3	75, 76, 78		47.0	42.2	81.5
4	66 thru 68 70 thru 73		43.8	42.7	68.1
5	69		43.8	42.2	81.5
6	63 thru 65		42.8	42.7	68.1
7	62		42.8	42.2	81.5
8	55 and 58		37.4	38.8	61.0
9	54, 56, 57, 59 and 61		37.4	42.7	68.1
10	60		37.4	42.2	81.5
11*	52 and 53		35.2	42.7	68.1

*This case is also used to bound penetrations 1 through 51.

ATTACHMENT 3

CATAWBA NUCLEAR STATION'S 120 DAY RESPONSE

TO

GENERIC LETTER 97-01:

"DEGRADATION OF CONTROL ROD DRIVE MECHANISM NOZZLE
AND OTHER VESSEL CLOSURE HEAD PENETRATIONS"

3.1 Introduction

Generic Letter 97-01 (GL), *Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations*, was issued to request licensees to describe their program for insuring the timely inspection of PWR control rod drive mechanism (CRDM) and other closure head penetrations. This response provides the Catawba Nuclear Site (CNS) information relative to the information requested by the GL.

Prior to issuance of the GL, CNS has worked with the Westinghouse Owners Group (WOG), the Electric Power Research Institute (EPRI), the B&W Owners Group (BWOG), the Combustion Engineering Owners Group (CEOG), and the Nuclear Energy Institute (NEI) to understand the operational experience, identify technical issues, cause factors, relative importance, and solutions to the cracking of Alloy 600 Closure Head Penetrations. One of these tasks was the development of safety evaluations that characterized the initiation of damage, propagation and consequences. These safety evaluations for WOG utilities were submitted in WCAP 13565, "Alloy 600 Reactor Vessel Head Adapter Tube Cracking Safety Evaluation," and are applicable to CNS. The NRC reviewed the safety evaluations and issued a safety evaluation report (SER) to NEI on November 19, 1993 stating that this was not an immediate safety issue. In order to assure the assumptions of the above safety evaluation remain valid, CNS is participating in the WOG/NEI Reactor Pressure Vessel Head Penetration Integrated Inspection Program and will evaluate the need to inspect on a continuing bases.

From a fabrication standpoint, there are three types of closure head penetrations on the two CNS reactor vessels. They consist of the following:

- 78 CRDM type penetrations of which 53 are used as CRDM nozzles, 0 as part length nozzles, 20 are capped and, 5 are used as thermocouple nozzles.
- 4 auxiliary adapter penetrations.
- 1 head vent penetration.

These penetrations are shown in Figures 3.1, 3.2 and 3.3. The auxiliary adapter nozzle is welded to a buildup on the O.D. of the RV head. This full penetration weld is part of CNS's ISI plan and is inspected volumetrically using ultrasonic testing. The head vent penetration is 1" nominal pipe size (NPS) and is welded to the I.D. of the RV head in a manner similar to the CRDM penetrations. EPRI has performed a stress analysis on the head vent penetration which shows that hoop stress predominates such that any cracks would be axial which means the penetration would leak before it broke.

3.2 Response to Requested Information Item 1.1:

In response to item 1.1 of Generic Letter 97-01, a summary of this information compiled by the WOG is contained in Section 1.3 of WCAP-14901, which was submitted to the NRC by letter dated July 18, 1997. Summaries of the applicable ASME Boiler and Pressure Vessel Code Section XI, ISI inspections are provided for CNS-1 and -2 in Table 3.1 and Table 3.2, respectively. These results have been previously submitted to the NRC in the form of ISI Inspection Reports which are due no later than 90 days after startup. In addition, CNS performs visual inspections in response to Generic Letter 88-05 for boric acid corrosion of pressure boundary components.

3.3 Response to Requested Information Item 1.2 through 1.3:

In response to item 1.2 and 1.3 of Generic Letter 97-01, CNS is a participant in the WOG/NEI Reactor Vessel Head Penetration Integrated Inspection Program.

3.4 Response to Requested Information Item 1.4:

In response to item 1.4 of Generic Letter 97-01, CNS is a participant in the WOG analysis program in which a plant specific probability analysis has been performed using the methodology described in Section 4 of WCAP-14901. The plant specific input parameters to the analysis are shown in Tables 3.3 and 3.4. The analysis results will be incorporated into the WOG/NEI integrated inspection program for use in determining the need for a plant specific inspection. This integrated inspection program includes all three PWR owners groups, EPRI, and NEI who are cooperatively working to compile information on the estimated operating time from January 1, 1997 that is needed to initiate and propagate a 75% through wall crack in a vessel penetration for all of the Reactor Vessel heads in the United States. This information will be evaluated to determine if an adequate number of plants have or are planning to inspect in the near future. This evaluation will be completed and detailed inspection plans for the industry will be provided to the NRC by the end of 1997. CNS-1 and -2 are ranked low in near term susceptibility due mainly to RV head temperature (560°F).

Time of operation (CNS-1 3214 EFPD & CNS-2 2921 EFPD as of January 1, 1997) and moderate yield strength also contribute to the low susceptibility.

3.5 Response to Requested Information Item 2.1 through 2.6:

TECHNICAL SPECIFICATIONS SIMILARITIES TO THE EPRI GUIDELINES

The CNS Unit 1 and Unit 2 plant specifications follow the EPRI guidelines for chloride, fluoride and oxygen. The technical specification steady state limits for chloride, fluoride and oxygen are equivalent to the action level 3 limits in the guidelines. Sulfates are not part of the technical specifications. However, sulfate is a control parameter for CNS with the action limits listed in the guidelines.

Reactor Coolant System (RCS) CHEMISTRY EXCURSIONS THAT EXCEED ADMINISTRATIVE LIMITS FOR SULFATES, CHLORIDE, FLUORIDES, OXYGEN, BORON AND LITHIUM

A review of plant data from 1985 to present indicate the following:

Sulfates - Catawba Unit 1 exceeded 150 ppb sulfate in December, 1993 for approximately 12 hours during a shutdown. Catawba Unit 2 exceeded 150 ppb sulfate in March, 1993 for approximately 23 days during a shutdown.

Chlorides - Catawba Unit 1 exceeded 100 ppb chloride in March, 1990 for 1 day with a peak of 340 ppb.

Fluorides - There were no excursions that exceeded administrative limits

Oxygen - There were no excursions that exceeded administrative limits

Boron - There were no excursions that exceeded administrative limits

Lithium - Small lithium excursions occur on an infrequent basis due to the production of lithium in the core. These excursions are not drastically out of specification.

Catawba Unit 1 was above 2.2 ppm lithium for approximately 2 days with a peak of 5.19 ppm due to a closed cooling ingress that caused a release of lithium from the demineralizers.

Prior to 1985, CNS did not measure conductivity on a set frequency; however, any large excursions would have been investigated and cleaned up.

CONDUCTIVITY EXCURSIONS THAT MAY INDICATE RESIN INTRUSIONS

CNS, Unit 1 and Unit 2 have not had any conductivity excursions from 1985 to present that would indicate an intrusion of resin.

TABLE 3.1

Catawba Unit 1

The following is a listing of inspections and results obtained for answering questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-E	B04.012.001	IRPV-CRDM	VT-2	1	8	03/21/95	Clear
B-E	B04.012.001	IRPV-CRDM	VT-2	2	15	N/A	N/A
B-F	B05.010.009	IRPV-W51-01-SE	UT	1	2	11/03/87	Clear/Limited
B-F	B05.010.009A	IRPV-W51-01-SE	PT	1	2	11/02/87	Clear
B-F	B05.010.010	IRPV-W51-02-SE	UT	1	2	11/03/87	Clear/Limited
B-F	B05.010.010A	IRPV-W51-02-SE	PT	1	2	11/02/87	Clear
B-F	B05.010.011	IRPV-W51-03-SE	UT	1	2	11/03/87	Clear/Limited
B-F	B05.010.011A	IRPV-W51-03-SE	PT	1	2	11/02/87	Clear
B-F	B05.010.012	IRPV-W51-04-SE	UT	1	2	11/03/87	Clear/Limited
B-F	B05.010.012A	IRPV-W51-04-SE	PT	1	2	11/02/87	Clear
B-F	B05.010.009	IRPV-W51-01-SE	UT	2	10	N/A	N/A
B-F	B05.010.009A	IRPV-W51-01-SE	PT	2	10	N/A	N/A
B-F	B05.010.010	IRPV-W51-02-SE	UT	2	10	N/A	N/A
B-F	B05.010.010A	IRPV-W51-02-SE	PT	2	10	N/A	N/A
B-F	B05.010.011	IRPV-W51-03-SE	UT	2	10	N/A	N/A
B-F	B05.010.011A	IRPV-W51-03-SE	PT	2	10	N/A	N/A
B-F	B05.010.012	IRPV-W51-04-SE	UT	2	10	N/A	N/A
B-F	B05.010.012A	IRPV-W51-04-SE	PT	2	10	N/A	N/A
B-F	B05.130.017	IRPV-W52-01	UT	1	6	08/19/92	Clear
B-F	B05.130.017A	IRPV-W52-01	PT	1	6	08/19/92	Clear
B-F	B05.130.017B	IRPV-W52-01	UT	1	6	08/19/92	Clear

TABLE 3.1

Catawba Unit 1

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-F	B05.130.018	1RPV-W52-02	UT	1	6	08/19/92	Clear
B-F	B05.130.018A	1RPV-W52-02	PT	1	6	08/19/92	Clear
B-F	B05.130.018B	1RPV-W52-02	UT	1	6	08/19/92	Clear
B-F	B05.130.019	1RPV-W52-03	UT	1	6	07/27/92	Clear
B-F	B05.130.019A	1RPV-W52-03	PT	1	6	07/26/92	Clear
B-F	B05.130.019B	1RPV-W52-03	UT	1	6	07/27/92	Clear
B-F	B05.130.020	1RPV-W52-04	UT	1	6	08/19/92	Clear
B-F	B05.130.020A	1RPV-W52-04	PT	1	6	08/19/92	Clear
B-F	B05.130.020B	1RPV-W52-04	UT	1	6	08/19/92	Clear
B-F	B05.130.017	1RPV-W52-01	UT	2	10	N/A	N/A
B-F	B05.130.017A	1RPV-W52-01	UT	2	10	N/A	N/A
B-F	B05.130.017B	1RPV-W52-01	PT	2	10	N/A	N/A
B-F	B05.130.018	1RPV-W52-02	UT	2	10	N/A	N/A
B-F	B05.130.018A	1RPV-W52-02	UT	2	10	N/A	N/A
B-F	B05.130.018B	1RPV-W52-02	PT	2	10	N/A	N/A
B-F	B05.130.019	1RPV-W52-03	UT	2	10	N/A	N/A
B-F	B05.130.019A	1RPV-W52-03	UT	2	10	N/A	N/A
B-F	B05.130.019B	1RPV-W52-03	PT	2	10	N/A	N/A
B-F	B05.130.020	1RPV-W52-04	UT	2	10	N/A	N/A
B-F	B05.130.020A	1RPV-W52-04	UT	2	10	N/A	N/A
B-F	B05.130.020B	1RPV-W52-04	PT	2	10	N/A	N/A

TABLE 3.1

Catawba Unit 1

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B14.010.010	IRPV-CRDM64	PT	1	6	07/26/92	Clear
B-O	B14.010.018	IRPV-CRDM72	PT	1	6	07/26/92	Clear
B-O	B14.010.023	IRPV-CRDM77	PT	1	6	07/26/92	Clear
B-O	B14.010.010	IRPV-CRDM64	PT	2	*	N/A	N/A
B-O	B14.010.018	IRPV-CRDM72	PT	2	*	N/A	N/A
B-O	B14.010.023	IRPV-CRDM77	PT	2	*	N/A	N/A
B-P	B15.010.001	IRPV	VT-2	1	**	**	Clear
B-P	B15.011.001	IRPV	VT-2	1	8	03/21/95	Clear
B-P	B15.010.001	IRPV	VT-2	2	**	**	Clear
B-P	B15.011.001	IRPV	VT-2	2	15	N/A	N/A

* These CRDM welds are scheduled for each refueling outage, but examination may be deferred to end of interval.

** These system leakage tests are performed after each refueling outage.

Definitions & Additional Information:

1. VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. When coverage of the examination volume is 90% and less, the examination is shown to be limited and a relief request is submitted to the NRC.
5. The inspections for category B-O are all CRDM Housing Body to Adapter welds.

TABLE 3.2

Catawba Unit 2

The following is a listing of inspections and results obtained for answering questions for Generic Letter 97-01 (Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations).

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-E	B04.012.001	2RPV-CRDM	VT-2	1	6	06/30/94	Clear
B-E	B04.012.001	2RPV-CRDM	VT-2	2	14	N/A	N/A
B-F	B05.010.009	2RPV-W80-101SE	UT	1	1	01/25/88	Clear/Limited
B-F	B05.010.009A	2RPV-W80-101SE	PT	1	1	01/26/88	Clear
B-F	B05.010.010	2RPV-W81-101SE	UT	1	1	01/25/88	Clear/Limited
B-F	B05.010.010A	2RPV-W81-101SE	PT	1	1	01/26/88	Clear
B-F	B05.010.011	2RPV-W82-101SE	UT	1	1	01/25/88	Clear/Limited
B-F	B05.010.011A	2RPV-W82-101SE	PT	1	1	01/26/88	Clear
B-F	B05.010.012	2RPV-W79-101SE	UT	1	1	01/25/88	Clear/Limited
B-F	B05.010.012A	2RPV-W79-101SE	PT	1	1	01/26/88	Clear/Limited
B-F	B05.010.009	2RPV-W80-101SE	UT	2	8	04/02/97	Clear
B-F	B05.010.009A	2RPV-W80-101SE	PT	2	8	04/02/97	Clear
B-F	B05.010.010	2RPV-W81-101SE	UT	2	8	04/02/97	Clear
B-F	B05.010.010A	2RPV-W81-101SE	PT	2	8	04/02/97	Clear
B-F	B05.010.011	2RPV-W82-101SE	UT	2	8	04/02/97	Clear
B-F	B05.010.011A	2RPV-W82-101SE	PT	2	8	04/02/97	Clear
B-F	B05.010.012	2RPV-W79-101SE	UT	2	8	04/02/97	Clear
B-F	B05.010.012A	2RPV-W79-101SE	PT	2	8	04/02/97	Clear
B-F	B05.130.017	2RPV-W80-101	UT	1	5	03/02/93	Clear
B-F	B05.130.017A	2RPV-W80-101	PT	1	5	03/02/93	Clear
B-F	B05.130.017B	2RPV-W80-101	UT	1	5	03/02/93	Clear

TABLE 3.2

Catawba Unit 2

Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-F	B05.130.018	2RPV-W81-101	UT	1	6	05/20/94	Clear
B-F	B05.130.018A	2RPV-W81-101	PT	1	6	05/20/94	Clear
B-F	B05.130.018B	2RPV-W81-101	UT	1	6	05/20/94	Clear
B-F	B05.130.019	2RPV-W82-101	UT	1	6	05/20/94	Clear
B-F	B05.130.019A	2RPV-W82-101	PT	1	6	05/20/94	Clear
B-F	B05.130.019B	2RPV-W82-101	UT	1	6	05/20/94	Clear
B-F	B05.130.020	2RPV-W79-101	UT	1	6	05/20/94	Clear
B-F	B05.130.020A	2RPV-W79-101	PT	1	6	05/20/94	Clear
B-F	B05.130.020B	2RPV-W79-101	UT	1	6	05/20/94	Clear
B-F	B05.130.017	2RPV-W80-101	UT	2	8	04/02/97	Clear
B-F	B05.130.017A	2RPV-W80-101	PT	2	8	04/02/97	Clear
B-F	B05.130.017B	2RPV-W80-101	UT	2	8	04/02/97	Clear
B-F	B05.130.018	2RPV-W81-101	UT	2	8	04/02/97	Clear
B-F	B05.130.018A	2RPV-W81-101	PT	2	8	04/02/97	Clear
B-F	B05.130.018B	2RPV-W81-101	UT	2	8	04/02/97	Clear
B-F	B05.130.019	2RPV-W82-101	UT	2	8	04/02/97	Clear
B-F	B05.130.019A	2RPV-W82-101	PT	2	8	04/02/97	Clear
B-F	B05.130.019B	2RPV-W82-101	UT	2	8	04/02/97	Clear
B-F	B05.130.020	2RPV-W79-101	UT	2	8	04/02/97	Clear
B-F	B05.130.020A	2RPV-W79-101	PT	2	8	04/02/97	Clear
B-F	B05.130.020B	2RPV-W79-101	UT	2	8	04/02/97	Clear

TABLE 3.2

Catawba Unit 2

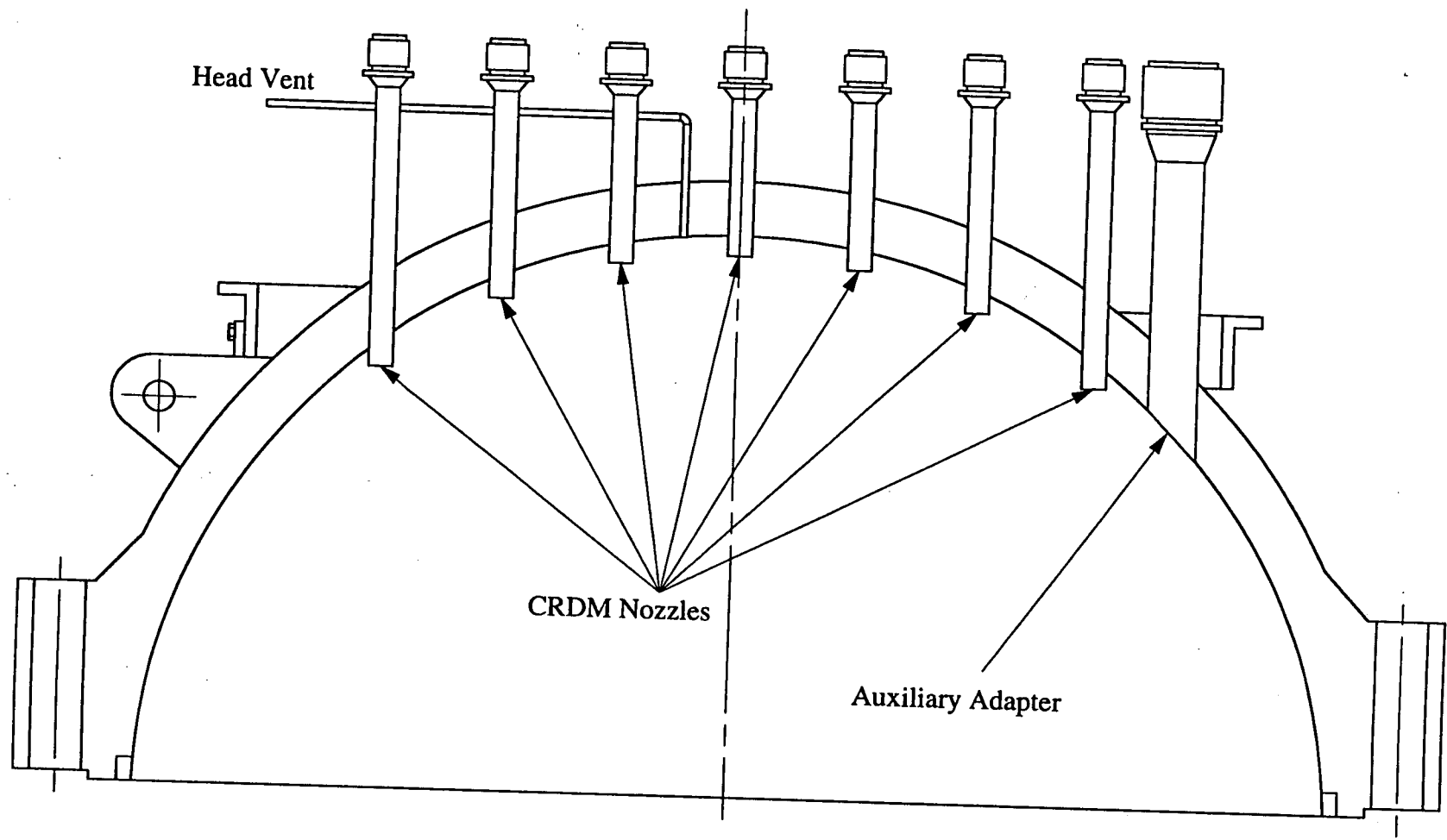
Sect. XI Examination Category	Item Number	ID Number	Type of Insp.	Insp. Interval	Refueling Outage	Date Inspected	Results
B-O	B14.010.006	2RPV-CRDM58	PT	1	6	05/20/94	Clear
B-O	B14.010.008	2RPV-CRDM62	PT	1	1	01/26/88	Clear
B-O	B14.010.016	2RPV-CRDM70	PT	1	6	05/20/94	Clear
B-O	B14.010.006	2RPV-CRDM58	PT	2	*	N/A	N/A
B-O	B14.010.008	2RPV-CRDM62	PT	2	*	N/A	N/A
B-O	B14.010.016	2RPV-CRDM70	PT	2	*	N/A	N/A
B-P	B15.010.001	2RPV	VT-2	1	**	**	Clear
B-P	B15.011.001	2RPV	VT-2	1	7	11/26/95	Clear
B-P	B15.010.001	2RPV	VT-2	2	**	**	Clear
B-P	B15.011.001	2RPV	VT-2	2	14	N/A	N/A

* These CRDM welds are scheduled for each refueling outage, but examination may be deferred to end of interval.

** These system leakage tests are performed after each refueling outage.

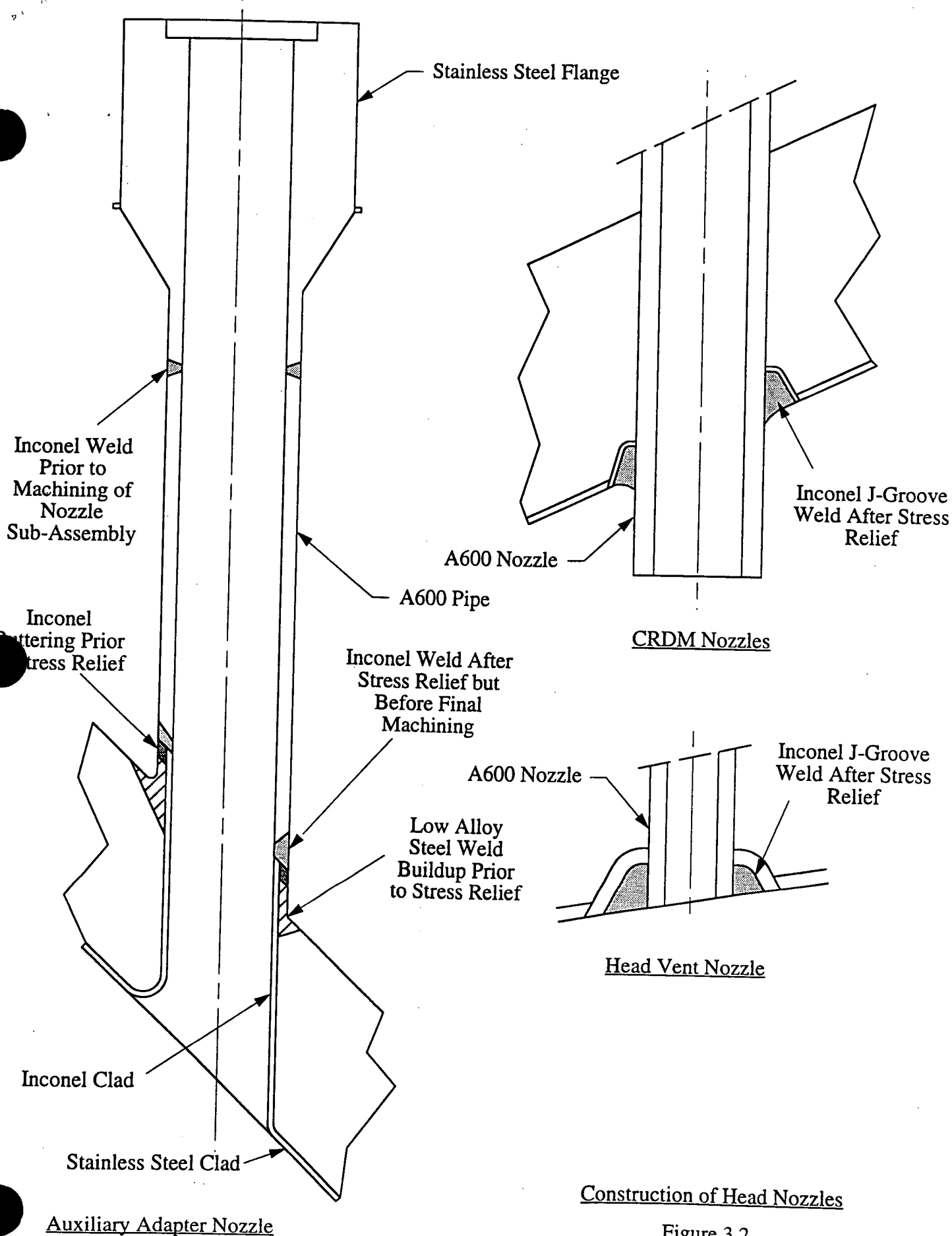
Definitions & Additional Information:

1. VT-2 inspections are visual examinations that were performed during a System Leakage test at operating temperature & pressure.
2. PT inspections are Liquid Penetrant examinations.
3. UT inspections are Ultrasonic examinations.
4. When coverage of the examination volume is 90% and less, the examination is shown to be limited and a relief request is submitted to the NRC.
5. The inspections for category B-O are all CRDM Housing Body to Adapter welds.



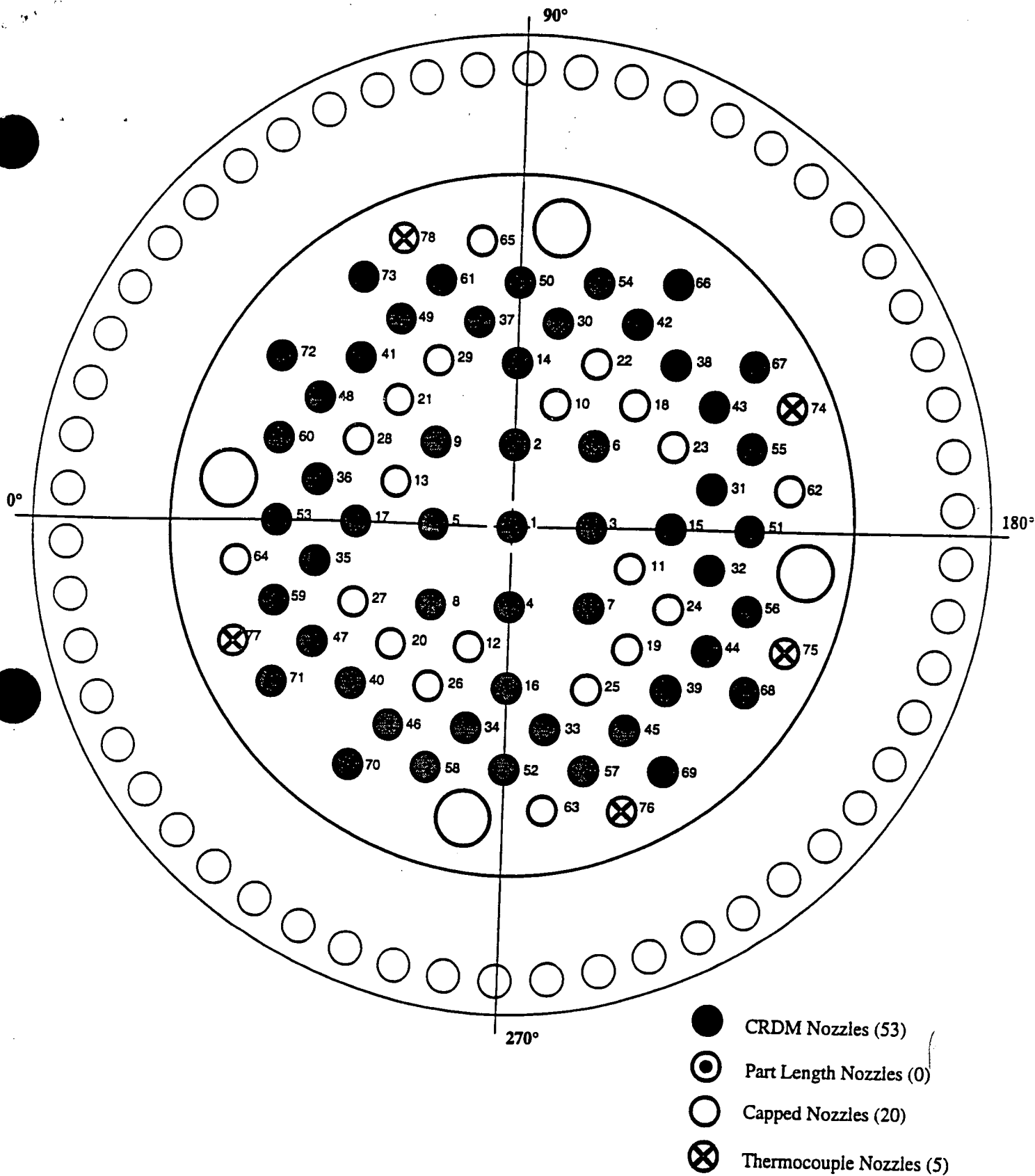
Side View of Reactor Vessel Head, CRDM Nozzles, Auxiliary Adapter and Head Vent

Figure 3.1



Construction of Head Nozzles

Figure 3.2



Location of Nozzle Types on Catawba Vessel Heads

Figure 3.3

TABLE 3.3
CATAWBA UNIT 1
INPUT VALUES FOR PROBABILISTIC ANALYSIS

Case	Pen. No.	Temp.	Set-up Angle (°)	Y.S. (ksi)	GBC (%)
1	76 thru 78	560°F	47.0	40.7	53.4
2	74 & 75		47.0	42.2	81.5
3	68 thru 70, 72		43.8	40.7	53.4
4	66, 67, 71, 73		43.8	42.2	81.5
5	65		42.8	40.7	53.4
6	62 thru 64		42.8	42.2	81.5
7	55 & 59		37.4	42.7	68.1
8	54, 56 thru 58, 60, 61		37.4	42.2	81.5
9	50 & 52		35.2	42.7	68.1
10*	51		35.2	40.7	53.4

*This case is also used to bound penetrations 1 through 50 and 53.

TABLE 3.4
CATAWBA UNIT 2
INPUT VALUES FOR PROBABILISTIC ANALYSIS

Case	Pen. No.	Temp.	Set-up Angle (°)	Y.S. (ksi)	GBC (%)
1	78	560°F	48.8	40.0	47.0
2	74 thru 77		48.8	37.5	58.0
3	66 thru 73		45.4	37.5	58.0
4	62 thru 65		44.3	40.0	47.0
5	54 thru 61		38.6	40.0	47.0
6*	50 thru 53		36.3	38.5	49.1

*This case is also used to bound penetrations 1 through 49.