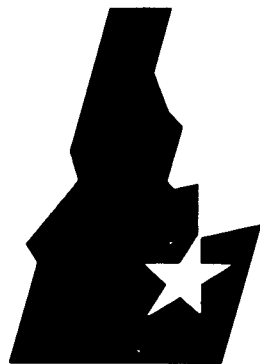


Weld Program Review

*Department of Energy
Weld Evaluation Project
TVA Watts Bar Plant Unit 1*

W. H. Borter



Idaho National Engineering Laboratory

U.S. Department of Energy • Idaho Operations Office



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WELD PROGRAM REVIEW

**DEPARTMENT OF ENERGY
WELD EVALUATION PROJECT
TVA WATTS BAR PLANT UNIT 1**

William H. Borter

December 1986

ABSTRACT

Results are presented of a review of the implementation of programmatic requirements in welding and inspection functions associated with construction of the Tennessee Valley Authority (TVA) Watts Bar Nuclear Plant Unit 1 (WBNP-1). The review was performed for the U.S. Department of Energy (DOE) Weld Evaluation Project (WEP) by EG&G Idaho, Inc., to assess compliance of the TVA weld program (to fabricate safety-related components) with requirements in the WBNP-1 Final Safety Analysis Report (through February 1, 1986). More than 1100 requirements/criteria from twenty-odd regulatory guides, codes, and standards were utilized to evaluate the TVA weld program.

ACKNOWLEDGMENTS

Acknowledgment is extended to the many participants in the weld program review, which is part of the Department of Energy's Weld Evaluation Project at the Tennessee Valley Authority's Watts Bar Nuclear Plant Unit 1. In particular, acknowledgment is made of the contribution to the programmatic review by Douglas D. Hansen, Joseph S. Mitchell, Paul D. O'Leary, Nolan D. Stucki, and R. W. Swayne.

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WELD PROGRAM REVIEW

DEPARTMENT OF ENERGY

WELD EVALUATION PROJECT

TVA WATTS BAR PLANT UNIT 1

1. INTRODUCTION

The scope of the Department of Energy Weld Evaluation Project (WEP) conducted by EG&G Idaho, Inc., was to establish that programmatic requirements from applicable codes and standards had been incorporated in the welding program at the Tennessee Valley Authority (TVA) Watts Bar Nuclear Plant Unit 1 (WBNP-1). Specifically, the objectives were to assess compliance of the TVA safety-related weld program to the requirements in the WBNP Final Safety Analysis Report (FSAR) including amendments through February 1, 1986, and to provide TVA, as applicable, with a report of the deficiencies in the weld program.

The programmatic review performed by WEP can be divided into two areas (quality/regulatory guides and codes/standards). The quality/regulatory guides area includes welding quality assurance requirements from ANSI standards (N45.2 and its daughter standards), ASME Boiler and Pressure Vessel Code Section III NA-4000, and welding quality-related NRC regulatory guides. The codes/standards area of review includes fabrication and inspection activities as established in AWS D1.1, ANSI B31.1, and B31.5, ASME Code Section III, and construction-related NRC regulatory guides. All documents cited herein are listed in Section 9 (References).

The review was confined to welding and inspection activities associated with field fabrication and installation performed by TVA at Watts Bar. These activities were performed by two organizations at WBNP-1. The first organization is the Office of Construction (hereafter referred to as "Construction"), which performed the installation and fabrication of safety-related items. The second organization is the Office of Nuclear Power Operations (hereafter referred to as "Operations") which performed modification and repairs to safety-related items of already installed and fabricated systems that were completed and turned over by Construction.

Based on these two areas of review and the two organizations performing activities at WBNP-1, the review is divided into the following eight categories.

1. Current Construction quality/regulatory guides
2. Past Construction quality/regulatory guides
3. Current Construction codes/standards

4. Past Construction codes/standards
5. Current Operations quality/regulatory guides
6. Past Operations quality/regulatory guides
7. Current Operations codes/standards
8. Past Operations codes/standards.

The *current* category represents the programs of the TVA Construction and Operation organizations that was in effect at WBNP-1 on February 1, 1986. The *past* category represents the programs that had been in effect at WBNP-1 from the date of the first safety-related welds made by the Construction and Operations organizations. The dates of the first safety-related welds are listed below.

First Safety-Related Welds

Construction

AWS D1.1	September 13, 1974
ASME Section III	April 18, 1974
ANSI B31.1	April 18, 1974
ANSI B31.5	April 18, 1974

Operations

All Codes	December 19, 1982
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In the category of past Construction quality/regulatory guides, it was not necessary in all checklists to use the date of the first safety-related weld. This was because some regulatory guides and their corresponding ANSI N45.2 daughter standards had not been issued until after the first safety-related weld.

The date used in the programmatic review was the earliest date the regulatory guide or the corresponding N45.2 daughter standard was issued. If the date was prior to the date the first safety-related weld was made, then the date of the first safety-related weld was used.

The review of the quality/regulatory guides was to verify that quality assurance requirements from regulatory guides, ASME Code Section III, and ANSI standards (N18.7 and N45.2 and its daughter standards) related to inspection and welding activities were incorporated into the TVA Quality Assurance Program. These TVA documents include Quality Assurance Manuals, Quality Assurance Program Policies, and Quality Assurance Procedures.

The review of the codes/standards was to verify that technical requirements from regulatory guides, ASME Code Sections III and XI, ANSI B31.1 and B31.5, and AWS D1.1 related to inspection and welding activities were incorporated into the implementing documents. These TVA documents include Quality Control Instructions, Quality Control Procedures, and Process Specifications.

2. IDENTIFYING TVA'S PROGRAMMATIC COMMITMENTS

The first task performed by WEP was to establish the codes and standards committed to by TVA as indicated by the WBNP Final Safety Analysis Report for activities performed by TVA at WBNP-1 related to the welding and inspection of safety-related items.

Table 1^a lists the regulatory guides and ANSI N45.2

series standards (quality/regulatory guides) and the codes and standards (codes/standards) found applicable to the welding and inspection activities performed by TVA at WBNP-1. The data listed after each document is the issue date of the document which TVA has committed to meet. All of the regulatory guides, codes, and standards are listed (by issuing agency, title, and issue date) in Section 9, References.

a. All tables are located in Section 10, Tables.

3. EVALUATION OF TVA'S COMPLIANCE TO PROGRAMMATIC COMMITMENTS

The evaluation of the welding program at WBNP-1 was limited to welding and inspection activities performed by TVA and associated with construction of safety-related items, which includes the following:

- Qualification of welders
- Assignment and documentation of welders
- Control and issue of filler material
- Qualification of inspectors
- Inspection of welding activities.

The evaluation did not include activities associated with the TVA Office of Engineering, which include the following:

- Design of components and weldments
- Development and control of drawings
- Assignments of jurisdictional boundaries and related codes and standards
- Qualification of welding and nondestructive examination procedures
- Procurement of material.

4. PROGRAMMATIC REQUIREMENTS IDENTIFIED FROM COMMITMENTS

After establishing the list shown in Table 1, the WEP evaluation team reviewed each of the referenced documents to identify the criteria in the document that was applicable to the welding and inspection activities performed by TVA at WBNP-1. The result was the development of the series of checklists (listed in Tables 2 through 5), which identify the applicable criteria for each of the documents listed in Table 1. In addition, checklists were developed to specifically address the five programs related to TVA welding and inspection activities at WBNP-1. The result is that the criteria in the checklists corresponding to the documents listed in Table 1 are also addressed in the checklists developed to cover the five programs. This duplication was to ensure that all criteria related to welding and inspection activities performed by TVA at WBNP-1 had been addressed. The five programs are:

- Qualification of welders
- Assignment and documentation of welders
- Control and issue of filler material
- Qualification of inspectors
- Inspection of welding activities.

It was determined that there have been two TVA welding and inspection programs in effect at WBNP-1. They were the Construction program and the Nuclear Power (Operations) program, both of which have been used to perform welding and inspection activities on safety-related items.

Based on this determination, the evaluation team divided the welding and inspection program into four segments:

1. Quality/regulatory guide requirements (Construction); checklists for these requirements are in Appendix A
2. Code/standard requirements (Construction); checklists for these requirements are in Appendix B
3. Quality/regulatory guide requirements (Operations); checklists for these requirements are in Appendix C
4. Code/standard requirements (Operations); checklists for these requirements are in Appendix D.

The result of incorporating the requirements of the five programs with the quality/regulatory guides and

codes/standards are (a) 13 checklists for Construction (Table 3) and 14 checklists for Operations (Table 5) that address codes/standards requirements, and (b) 11 checklists for Construction (Table 2) and 10 checklists for Operations (Table 4) that address quality/regulatory guide requirements.

Each checklist lists the applicable criteria (requirements) that pertains to TVA's welding and inspection activities performed at WBNP-1, and also gives (a) the subject of the criteria, (b) the location (document) where the criteria can be found in the TVA program, and (c) whether the document is in compliance with the requirements of the criteria.

Two sets of checklists (listed in Tables 2 and 3) were developed to address quality/regulatory guide and codes/standards requirements in the Construction program. Table 2 lists the checklists (contained in Appendix A) developed to address the criteria relating to quality requirements applicable to the Construction activities at WBNP-1. Checklists Q-1 through Q-11 (Appendix A) are for quality requirements as established in quality/regulatory guide related documents; the Q in the checklist identifying number denotes quality requirements for Construction. Table 3 lists the checklists (contained in Appendix B) developed to address the criteria relating to technical requirements applicable to the Construction activities at WBNP-1. Checklists C-1 through C-13 (Appendix B) are for technical requirements as established in codes/standards related documents; the C in the checklist identifying number denotes code requirements for Construction.

Two sets of checklists (listed in Tables 4 and 5) were developed to address quality/regulatory guides and codes/standards requirements in the Operations program. Table 4 lists the checklists (contained in Appendix C) developed to address the criteria relating to quality requirements applicable to the Operations activities at WBNP-1. Checklists QNP-1 through QNP-10 (Appendix C) are for quality requirements as established in quality/regulatory guide related documents; QNP in the checklist identifying number denotes quality requirements for Nuclear Power (Operations). Table 5 lists the checklists (contained in Appendix D) developed to address the criteria relating to technical requirements applicable to the Operations activities at WBNP-1. Checklists CNP-1 through CNP-14 (Appendix D) are for technical requirements as established in codes/standards related documents; the CNP in the checklist identifying number denotes code requirements for Nuclear Power (Operations).

5. COMPARISON OF PROGRAMMATIC REQUIREMENTS TO TVA'S ESTABLISHED PROGRAM

Using the checklists listed in Tables 2 and 3 (and contained in Appendixes A and B), WEP reviewed the Construction program to verify if the quality/regulatory guides and codes/standards criteria had been incorporated into the program. The same type of reviews were performed for Operations using the checklists listed in Tables 4 and 5 (contained in Appendixes C and D). Five important aspects were taken into consideration during this review:

1. Only activities related to TVA welding and inspection actions at WBNP-1 were addressed in this review.
2. The criteria from a code/standard and quality/regulatory guide may show up in more than one checklist. It was intended that these checklists overlap.
3. This review was to establish if the criteria had been incorporated into some aspect of the program at WBNP-1. It was not intended to verify that all TVA procedures/specifications included each of the criteria.
4. This review was to verify that quality assurance requirements related to inspection and welding activities from regulatory guides, ASME Code Section III, and ANSI Standards (N18.7 and N45.2 and its daughter standards) have been incorporated into the Quality Assurance Program. These TVA documents include Quality Assurance Manuals, Quality Assurance Program Policies (QAPP), and Quality Assurance Procedures (QAP).
5. This review was to verify that technical requirements related to inspection and welding activities from regulatory guides, ASME Code Section III, ANSI B31.1 and B31.5, and AWS D1.1 have been incorporated into the implementing documents. These TVA documents include Quality Control Instructions (QCI), Quality Control Procedures (QCP), and Process Specifications (P.S.).

After the review to determine if the criteria had been incorporated into the present day program, a review was made to establish if the criteria had been in the program from the time of the first safety-related weld.

Not all checklists were required to be traced back to the date of the first safety-related weld. For checklists addressing the quality/regulatory guide require-

ments established through the regulatory guides and their corresponding ANSI N45.2 daughter standards, the date established for the review is that listed below.

Regulatory Guide	Issued	ANSI	Issued	Date Used In Review ^a
1.28	1972	N45.2	1971	04/18/74
1.38	1973	N45.2.2	1972	04/18/74
1.94	04/75	N45.2.5	07/08/74	07/08/74
1.58	08/73	N45.2.6	01/25/73	04/18/74
1.116	06/76	N45.2.8	05/20/75	05/20/75
1.88	08/74	N45.2.9	06/06/74	06/06/74

a. The date used in the programmatic review was the earliest date the regulatory guide or the corresponding N45.2 series standard was issued. If this date was prior to the first safety-related weld, then the date of April 18, 1974, was used.

The criteria or requirements that were not incorporated in the program or had not been incorporated from the first-safety related weld are noted in Tables 6 through 12. Tables 6, 7, 8, and 9 list the checklists and the criteria from each of the checklists that had not been incorporated. Tables 10, 11, and 12 list the same criteria but by code/standard and give the response from TVA on why that criteria had not been incorporated. Descriptions of Tables 6 through 12 are given below.

Table 6 lists the criteria, by checklists, that were found not to have been incorporated into the TVA Quality Assurance Program (Construction) on the date of the first safety-related weld or the applicable date of the Regulatory Guide or related ANSI N45.2 and daughter standards. Listed with each criterion is the date that the criterion was first incorporated.

Table 7 lists the criteria, by checklists, that were found not to have been incorporated into the Construction installation and fabrication program on the date of the first safety-related weld. Listed with the criterion is the date that the criterion was first incorporated.

Table 8 lists the criteria, by checklists, that were found not to have been incorporated into the TVA

Quality Assurance Program (Operations) on the date of the first safety-related weld. (It was found that all criteria were in the program from the date of the first safety-related weld.)

Table 9 lists the criteria, by checklists, that were found not to have been incorporated into the Operations repair and modification program.

Table 10 lists the criteria, by code or standard, that were found not to have been incorporated into the TVA Quality Assurance Program (Construction) on the date of the first safety-related weld or the applicable date of the regulatory guide or related ANSI N45.2 and daughter standards. Listed with each criterion is the date that the criterion was first incorporated and a com-

ment why that criterion had not been incorporated prior to the date listed.

Table 11 lists the criteria, by code, that were found not to have been incorporated into the Construction installation and fabrication program on the date of the first safety-related weld. Listed with each criterion is the date that the criterion was first incorporated and a comment why that criterion had not been incorporated prior to the date listed.

Table 12 lists the criteria, by code, that were found not to have been incorporated into the Operations repair and modification program. Listed with each criterion is a comment why that criterion had not been incorporated.

6. RESULTS OF THE EVALUATION OF TVA'S CURRENT PROGRAM

The results of the programmatic review of the current program are presented in the following four categories.

1. Current Construction quality/regulatory guides
2. Current Operations quality/regulatory guides
3. Current Construction codes/standards
4. Current Operations codes/standards.

Each of the categories is presented with its results. WEP found that Category 1 (current Construction quality/regulatory guides), Category 2 (current Operations quality/regulatory guides), and Category 3 (current Construction codes/standards), had incorporated all applicable requirements. Category 4 (current Operations codes/standards) has some criteria that have not been incorporated, which are noted in Table 12 with the reasons given by TVA why the criteria were not incorporated.

1. *Current Construction Quality/Regulatory Guides*

WEP found that all applicable quality assurance requirements from regulatory guides, codes, and standards relating to inspection and welding activities were incorporated into the current TVA Quality Assurance Program applicable to Construction.

2. *Current Operations Quality/Regulatory Guides*

WEP found that all applicable Quality Assurance requirements from regulatory guides, codes, and standards relating to inspection and welding

activities were incorporated into the current TVA Quality Assurance Program applicable to Operation.

3. *Current Construction Codes/Standards*

WEP found that all applicable technical requirements from regulatory guides, codes, and standards relating to inspection and welding activities, were incorporated into the current Construction installation and fabrication program.

4. *Current Operations Codes/Standards*

WEP found that of the applicable technical requirements from regulatory guides, codes, and standards relating to inspection and welding activities, all criteria except eleven criteria from AWS D1.1 were incorporated into the current Operations repair and modification program.

The criteria from AWS D1.1 that had not been incorporated into the current program fell into the following three groups:

- a. Alternate heat treatment temperature
- b. Nondestructive testing (NDE) other than magnetic particle (MT) and dye penetrant (PT)
- c. Magnetic particle and dye penetrant testing.

TVA noted that the criteria addressing these three groups had not been used because they had not been required at Watts Bar, and if any were required they would be incorporated into the program.

7. RESULTS OF THE EVALUATION OF TVA'S PROGRAM PRIOR TO ITS CURRENT PROGRAM

The results of the programmatic review of the past program are presented in the following four categories.

1. Past Construction quality/regulatory guides
2. Past Operations quality/regulatory guides
3. Past Construction codes/standards
4. Past Operations codes/standards.

Each of the categories is presented with its results. Category 2 (past Operations quality/regulatory guides) had incorporated all criteria from the time of the first safety-related weld. For an early period in the Construction program, criteria from Category 1 (past Construction quality/regulatory guides) and Category 3 (past Construction codes/standards) were not incorporated; these criteria are noted in Tables 10 and 11, along with the reasons given by TVA why the criteria were not incorporated. For Category 4 (past Operations codes/standards) some criteria have not been incorporated; these criteria are noted in Table 12, along with the reasons given by TVA as to why the criteria were not incorporated.

1. *Past Construction Quality/Regulatory Guides*

WEP found that all applicable quality assurance requirements from ASME Section III relating to inspection and welding activities had been incorporated into the TVA Quality Assurance Program from the first safety-related weld (April 18, 1974).

In the review of the non-ASME Quality Assurance Program, it was found that all applicable requirements, as established by regulatory guides and corresponding ANSI N45.2 standards (and related daughter standards), except those in five areas, had been incorporated into the Quality Assurance Program from the first safety-related weld (April 18, 1974).

These five areas are listed below, with the date WEP was able to find the requirements first fully addressed in the TVA Quality Assurance Program applicable to construction:

- Quality Assurance Program 05/28/74
- Organization 05/28/74
- Control of Measuring and Test Equipment 12/23/74

- Inspection, Test, and Operating Status 02/20/76

- Quality Assurance Records 06/10/75

TVA issued a quality assurance manual (OEDC) on May 28, 1974, to cover activities performed by the Engineering, Design, and Construction Organizations. This was the earliest TVA quality assurance document WEP was able to locate that addressed the five areas. Review of this manual established that the areas of (a) Quality Assurance Program and (b) Organization met the requirements as established in the applicable quality/regulatory guides. The review also disclosed that the sections of the Quality Assurance Manual that addressed (a) Control of Measuring and Test Equipment, (b) Inspection, Test and Operating Status and (c) Quality Assurance Records, established responsibilities only for the development of procedures. The dates listed above are of the first TVA quality assurance documents found by WEP to fully address these three areas.

As noted above, all applicable requirements, including the five areas, were found addressed in the Quality Assurance Program for ASME Section III.

2. *Past Operations Quality/Regulatory Guides*

WEP found that all applicable quality assurance requirements from regulatory guides, codes, and standards relating to inspection and welding activities were incorporated into the TVA Quality Assurance Program applicable to Operations from the time of the first safety-related weld.

3. *Past Construction Codes/Standards*

WEP found that of the applicable technical requirements from regulatory guides, codes, and standards relating to inspection and welding activities, all but 11 criteria from AWS D1.1 and 13 criteria from ASME Section III had been incorporated into the construction installation and fabrication program at the time of the first safety-related weld.

The criteria from AWS D1.1 that had not been incorporated fall into the following groups:

- a. Alternate heat treatment temperature

- b . Nondestructive testing (NDE) other than magnetic particle (MT) and dye penetrant (PT)
- c . Magnetic particle and dye penetrant testing.

TVA noted that the criteria addressing these three groups had not been used at Watts Bar prior to the date it was incorporated into the program.

The criteria from ASME Section III that had not been incorporated fall into the following groups.

- a . Nondestructive testing (NDE) of weld edge preparation
- b . Elimination and repair of defects in base material
- c . Minimum thickness of fabricated material
- d . Ultrasonic examination.

TVA noted that (a) if NDE of the weld edge preparation had been required prior to the incorpora-

tion of the criteria into the program, the requirement would have been noted on the drawing, and (b) the elimination and repair of defects in base material and the verification of minimum thickness was addressed on a case by case basis with nonconformance reports (NCRs). TVA also noted that ultrasonic examination had not been used at Watts Bar prior to the incorporation of the criteria into the program.

4. *Past Operations Codes/Standards*

WEP found that all applicable technical requirements from regulatory guides, codes, and standards relating to inspection and welding activities, except 11 criteria from AWS D1.1 noted in the results of the current program, had been incorporated into the Operations repair and modification program at the time of the first safety-related weld.

8. CONCLUSIONS

The conclusions of the programmatic review are presented in terms of quality/regulatory guides criteria and codes/standards criteria that have been incorporated in the TVA welding program through the Construction program and the Operations program.

Construction Program

Quality/Regulatory Guides. Of the 115 criteria associated with the quality/regulatory guide checklists relating to the Construction Program, WEP found that all criteria had been incorporated into the current program. In addition, all criteria had been incorporated in the program from the time of the first safety-related weld or the date that the applicable regulatory guide/ANSI standard became effective, except for 18 criteria that had been incorporated just after the start of welding. As TVA has noted in Table 10, these 18 criteria had been addressed in early documents applicable to Watts Bar but could not be retrieved from the TVA historical file.

Codes/Standards. Of the 480 criteria associated with the codes/standards checklists relating to the Construction program, WEP found all criteria had been incorporated into the current program. In addition, all

criteria had been incorporated into the program from the time of the first safety-related weld, except for 24 criteria that were not addressed in the early part of the program. These criteria were added in the early phase of construction, but as TVA has noted in Table 11 had always been addressed through other means such as nonconformance reports and construction drawings or had not been utilized at Watts Bar prior to the date incorporated.

Operations Program

Quality/Regulatory Guides. Of the 94 criteria associated with the quality/regulatory guide checklists relating to the Operations program, WEP found that all had been incorporated into the program from the first safety-related weld.

Codes/Standards. Of the 484 criteria associated with the codes/standards checklists relating to the Operations program, WEP found that all criteria had been incorporated from the first safety-related weld, except for 11 criteria. As TVA has noted in Table 12, these 11 criteria have not been required in activities performed by Operations.

9. REFERENCES

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10. TABLES

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Table 1. Applicable Quality/Regulatory Guides and Codes/Standards

Regulatory Guides	ANSI Standards
1.28 (06/72)	N18.7 (1976)
1.31 (04/78)	N45.2 (1971)
1.33 (02/78)	N45.2.2 (1972)
1.38 (05/77)	N45.2.5 (1974)
1.44 (05/73)	N45.2.6 (1978)
1.50 (05/73)	N45.2.8 (1975)
1.58 (09/80)	N45.2.9 (1974)
1.71 (12/73)	
1.88 (10/76)	
1.94 (04/76)	
1.116 (06/76)	
<u>Codes and Standards</u>	
ASME Section III	(1971-S73 and 1974 for Heat Treatment)
ANSI B31.1	(1973-S73)
ANSI B31.5	(1966)
AWS D1.1	(1972, Rev. 2, 1974)
ASME Section XI	(1980-W81)
ASNT SNT-TC-1A	(1975 and 1980)

Table 2. Index of Quality/Regulatory Guide Checklists: Construction

Checklist Q-1	ASME Section III, 1971 through Summer 1973, Quality Assurance Program Requirements.
Checklist Q-2	Regulatory Guide 1.28 and ANSI N45.2, Quality Assurance Program Requirements for Nuclear Power Plants.
Checklist Q-3	Regulatory Guide 1.31, Control of Ferrite Content in Stainless Steel Weld Metal.
Checklist Q-4	Regulatory Guide 1.38 and ANSI N45.2.2, Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants.
Checklist Q-5	Regulatory Guide 1.44, Control of the Use of Sensitized Stainless Steel.
Checklist Q-6	Regulatory Guide 1.50, Control of Preheat Temperature for Welding of Low-Alloy Steels.
Checklist Q-7	Regulatory Guide 1.58 and ANSI N45.2.6, Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants.
Checklist Q-8	Regulatory Guide 1.71, Welder Qualification for Areas of Limited Accessibility.
Checklist Q-9	Regulatory Guide 1.94 and ANSI N45.2.5, Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants.
Checklist Q-10	Regulatory Guide 1.116 and ANSI N45.2.8, Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants.
Checklist Q-11	ASME Section III, ANSI N45.2.9 and Regulatory Guide 1.88, Quality Assurance Record Requirements.

Table 3. Index of Code/Standard Checklists: Construction

Checklist C-1	Filler Metal Control
Checklist C-2	Welder Qualification AWS D1.1 Rev. 2-74
Checklist C-3	Welder Qualification ASME Section IX 1971-S 73
Checklist C-4	Inspection of Welding Activities ASME Section III 1971-S 73
Checklist C-5	Inspection of Welding Activities AWS D1.1 Rev. 2-74
Checklist C-6	Inspection of Welding Activities ANSI B31.1 1973-S 73
Checklist C-7	Inspection of Welding Activities ANSI B31.5 1966
Checklist C-8	ASNT SNT-TC-1A 1975 (NDE Personnel Qualification)
Checklist C-9	Assignment and Documentation of Welders
Checklist C-10	ASME Section III 1971 Edition through Summer 1973 Addenda (1974 Edition for Heat Treatment)
Checklist C-11	AWS D1.1 Rev. 2-74
Checklist C-12	ANSI B31.1 1973-S 73
Checklist C-13	ANSI B31.5 1966

Table 4. Index of Quality/Regulatory Guide Checklists: Operations

Checklist QNP-1	Regulatory Guide 1.31, Control of Ferrite Content in Stainless Steel Weld Metal.
Checklist QNP-2	Regulatory Guide 1.33, ANSI N18.7 and N45.2, Quality Program Requirements (Operations).
Checklist QNP-3	Regulatory Guide 1.38 and ANSI N45.2.2, Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants.
Checklist QNP-4	Regulatory Guide 1.44, Control of the Use of Sensitized Stainless Steel.
Checklist QNP-5	Regulatory Guide 1.50, Control of Preheat Temperature for Welding of Low-Alloy Steels.
Checklist QNP-6	Regulatory Guide 1.58 and ANSI N45.2.6, Qualification of Inspection, Examination, Testing Personnel for Nuclear Power Plants.
Checklist QNP-7	Regulatory Guide 1.71, Welder Qualification for Areas of Limited Accessibility.
Checklist QNP-8	Regulatory Guide 1.94 and ANSI N45.2.5, Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants.
Checklist QNP-9	Regulatory Guide 1.116 and ANSI N45.2.8, Supplementary Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for the Construction Phase of Nuclear Power Plants.
Checklist QNP-10	ASME Section III, ANSI N45.2.9 and Regulatory Guide 1.88, Quality Assurance Record Requirements.

Table 5. Index of Code/Standard Checklists: Operations

Checklist CNP-1	Filler Metal Control
Checklist CNP-2	Welder Qualification AWS D1.1 Rev. 2-74
Checklist CNP-3	Welder Qualification ASME Section IX 1971-S 73
Checklist CNP-4	Inspection of Welding Activities ASME Section III 1971-S 73
Checklist CNP-5	Inspection of Welding Activities AWS D1.1 Rev. 2-74
Checklist CNP-6	Inspection of Welding Activities ANSI B31.1 1973-S 73
Checklist CNP-7	Inspection of Welding Activities ANSI B31.5 1966
Checklist CNP-8	ASNT SNT-TC-1A 1980 (NDE Personnel Qualification)
Checklist CNP-9	Assignment and Documentation of Welders
Checklist CNP-10	ASME Section III 1971 Edition through Summer 1973 Addenda (1974 Edition for Heat Treatment)
Checklist CNP-11	AWS D1.1 Rev. 2-74
Checklist CNP-12	ANSI B31.1 1973-S 73
Checklist CNP-13	ANSI B31.5 1966
Checklist CNP-14	ASME Section XI 1980-W 81

Table 6. Quality/Regulatory Guide Checklists Results: Construction

- Q-1 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-2 All criteria except the five listed below from ANSI N45.2 have been traced back to the date of the first safety-related weld made by Construction (April 18, 1974).

ANSI N45.2

Criteria	Subject	Date Traced Back To
1. 2	Quality Assurance Program	05/28/74
2. 3	Organization	05/28/74
3. 13	Control of Measuring and Test Equipment	12/23/74
4. 15	Inspection, Test and Operating Status	02/20/76
5. 18	Quality Assurance Records	06/10/75

- Q-3 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-4 All criteria except the two listed below from ANSI N45.2.2 have been traced back to the date of the first safety-related weld made by Construction (April 18, 1974).

ANSI N45.2.2

Criteria	Subject	Date Traced Back To
1. 2.5	Measuring and Test Equipment	12/23/74
2. 8.0	Records	06/10/75

- Q-5 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-6 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-7 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-8 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- Q-9 All criteria except the two from ANSI N45.2.5 listed below have been traced back to the date of the issue of ANSI N45.2.8 (May 20, 1975).

ANSI N45.2.5

Criteria	Subject	Date Traced Back To
1. 2.5	Measuring and Test Equipment	12/23/74
2. 7	Records	06/10/75

- Q-10 All criteria except the one listed below from ANSI N45.2.8 have been traced back to the date of the issue of ANSI N45.2.8 (May 20, 1975).

ANSI N45.2.8

Criteria	Subject	Date Traced Back To
1. 7.0	Records	06/10/75

Table 6. (Continued)

Q-11 All criteria except the eight listed below from ANSI N45.2.9 have been traced back to the date of the issue of ANSI N45.2.9 (June 6, 1974).

ANSI N45.2.9		
Criteria	Subject	Date Traced Back To
1. 2	General Requirements	06/10/75
2. 2.1	QA Record System	06/10/75
3. 2.2	Categories	06/10/75
4. 3.2	Records Administration	06/10/75
5. 4	Receipt of Records	06/10/75
6. 5	Storage, Preservation, and Safekeeping	06/10/75
7. 6	Retrieval	06/10/75
8. 7	Disposition	06/10/75

Table 7. Code/Standard Checklists Results: Construction

- C-1 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-2 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-3 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-4 All criteria except the three listed below from ASME Section III have been traced back to the date of the first safety-related weld made by Construction (April 18, 1974).

ASME Section III

Criteria	Subject	Date Traced Back To
1. NB-4130	Elimination and Repair of Defects in Base Material	08/04/78
2. NB-5130	Examination of Weld Edge Preparation	03/21/79
3. NB-5330	Ultrasonic Acceptance Standard	01/22/75

- C-5 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-6 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-7 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-8 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-9 All criteria have been traced back to the date of the first safety-related weld made by Construction.
- C-10 All criteria except the twelve listed below from ASME Code Section III have been traced back to the date of the first safety-related weld made by Construction (April 18, 1974).

ASME Section III

Criteria	Subject	Date Traced Back To
1. NB-2545	Magnetic Particle Examination of Base Material	09/22/78
2. NB-2546	Liquid Penetrant Examination of Base Material	09/07/78
3. NB-4131	Elimination and Repair of Defects in Base Material	08/04/78
4. NB-4132	Documentation of Repair Welds in Base Material	08/04/78
5. NB-4214	Minimum Thickness of Fabricated Materials	08/04/78
6. NB-5130	Examination of Weld Edge Preparation	03/21/79
7. NB-5330	Ultrasonic Acceptance Standards	01/22/75
8. NC-4130	Elimination and Repair of Defects in Base Material	08/04/78
9. ND-4130	Elimination and Repair of Defects in Base Material	08/04/78
10. NE-4131	Rules Governing Elimination and Repair	08/04/78
11. NE-4214	Minimum Thickness of Fabricated Materials	08/04/78
12. NE-5330	Ultrasonic Acceptance Standards	01/22/75

Table 7. (Continued)

C-11 All criteria except the eleven listed below from AWS D1.1 have been traced back to the date of the first safety-related AWS D1.1 weld made by Construction (September 13, 1974).

AWS D1.1		
Criteria	Subject	Date Traced Back To
1. 3.9.2	Alternate or Lower Heat Treatment Temperature	03/22/79
2. 6.7.3	Radiographic Testing	07/27/78
3. 6.7.4	Ultrasonic Testing	02/15/80
4. 6.7.5	Magnetic Particle Testing	05/13/77
5. 6.7.6	Dye Penetrant Testing	05/04/76
6. 8.15.2	NDE of Welds Except UT	07/27/78
7. 8.15.3	Ultrasonic Testing of Welds	02/15/80
8. 9.25.2	NDE of Welds Except UT	07/27/78
9. 9.25.3	Ultrasonic Testing of Welds	02/15/80
10. 10.17.2	NDE of Welds Except UT	07/27/78
11. 10.17.3	Ultrasonic Testing of Welds	02/15/80

C-12 All criteria have been traced back to the date of the first safety-related weld made by Construction.

C-13 All criteria have been traced back to the date of the first safety-related weld made by Construction.

Table 8. Quality/Regulatory Guide Checklists Results: Operations

QNP-1	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-2	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-3	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-4	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-5	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-6	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-7	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-8	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-9	All criteria have been traced back to the date of the first safety-related weld made by Operations.
QNP-10	All criteria have been traced back to the date of the first safety-related weld made by Operations.

Table 9. Code/Standard Checklists Results: Operations

- CNP-1 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-2 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-3 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-4 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-5 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-6 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-7 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-8 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-9 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-10 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-11 All criteria except the eleven listed below from AWS D1.1 are in the present program and have been traced back to the date of the first safety-related weld made by Operations. These eleven criteria were found to have never been incorporated into the program.

AWS D1.1

Criteria	Subject
1. 3.9.2	Alternate or Lower Heat Treatment Temperature
2. 6.7.3	Radiographic Testing
3. 6.7.4	Ultrasonic Testing
4. 6.7.5	Magnetic Particle Testing
5. 6.7.6	Dye Penetrant Testing
6. 8.15.2	NDE of Welds Except UT
7. 8.15.3	Ultrasonic Testing
8. 9.25.2	NDE of Welds Except UT
9. 9.25.3	Ultrasonic Testing
10. 10.17.2	NDE of Welds Except UT
11. 10.17.3	Ultrasonic Testing

- CNP-12 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-13 All criteria have been traced back to the date of the first safety-related weld made by Operations.
- CNP-14 All criteria have been traced back to the date of the first safety-related weld made by Operations.

Table 10. Criteria not incorporated at time of first safety-related weld from Quality/Regulatory Guide Checklists: Construction

Criteria	Subject	First Date Found Addressed at WBNP	Comments
<u>ANSI N45.2</u>			
2	Quality Assurance Program	5/28/74	— ^a
3	Organization	5/28/74	— ^b
13	Control of Measuring and Test Equipment	12/23/74	— ^c
15	Inspection, Test and Operating Status	2/20/76	— ^e
18	Quality Assurance Records	6/10/75	— ^d
<u>ANSI N45.2.2</u>			
2.5	Measuring and Test Equipment	12/23/74	— ^c
8.0	Records	6/10/75	— ^d
<u>ANSI N45.2.5</u>			
2.5	Measuring and Test Equipment	12/23/74	— ^c
8.0	Records	6/10/75	— ^d
<u>ANSI N45.2.8</u>			
8.0	Records	6/10/75	— ^d
<u>ANSI N45.2.9</u>			
2	General Requirements	6/10/75	— ^d
2.1	QA Record System	6/10/75	— ^d
2.2	Categories	6/10/75	— ^d
3.2	Records Administration	6/10/75	— ^d
4	Receipt of Record	6/10/75	— ^d
5	Storage, Preservation, and Safekeeping	6/10/75	— ^d
6	Retrieval	6/10/75	— ^d
7	Disposition	6/10/75	— ^d

a. Covered in QAPP-2 (Quality Assurance Program); OEDC-QAP-2.0 (May 28, 1974) also covered this criterion. Prior to May 28, 1974, this criterion was covered in quality assurance and quality control procedures prepared by Watts Bar. This was established by TVA in R. B. Kelly letter No. L16860618802, June 19, 1986. WEP has not been able to locate a copy of these procedures.

b. Covered in QAPP-1 (Organization); OEDC-QAP-1.0 (May 28, 1974) also covered this criterion. Prior to May 28, 1974, this criterion was covered in quality assurance and quality control procedures prepared by Watts Bar. This was established by TVA in R. B. Kelly letter No. L16860618802, June 19, 1986. WEP has not been able to locate a copy of these procedures.

c. Covered in QAPP-12 (Control of Measuring and Test Equipment); DEC-QCP-1.12 (December 23, 1974) also covered these criteria. Prior to December 23, 1974, these criteria were covered in quality assurance and quality control procedures prepared by Watts Bar. This was established by TVA in R. B. Kelly letter No. L16860618802, June 19, 1986. WEP has not been able to locate a copy of these procedures.

d. Covered in QAPP-17 (Quality Assurance Records), June 10, 1975. Prior to June 10, 1975, these criteria were covered in quality assurance and quality control procedures prepared by Watts Bar. This was established by TVA in R. B. Kelly letter No. L16860618802, June 19, 1986. WEP has not been able to locate a copy of these procedures.

e. Covered in QAPP-14 (Inspection, Test, and Operation Status); DEC-QAP-14.01 (February 20, 1976) also covered in this criterion. Prior to February 20, 1976, this criterion was covered in quality assurance and quality control procedures prepared by Watts Bar. This was established by TVA in R. B. Kelly letter No. L16860618802, June 19, 1986. WEP has not been able to locate a copy of these procedures.

Table 11. Criteria not incorporated at time of first safety-related weld from Code/ Standard Checklists: Construction

Criteria	Subject	First Date Addressed at WBNP	Comments
<u>AWS D1.1</u>			
3.9.2	Alternate or lower heat treatment temperature	03/22/79	— ^a
6.7.3	Radiographic testing	07/27/78	— ^b
6.7.4	Ultrasonic testing	02/15/80	— ^b
6.7.5	Magnetic particle testing	05/13/77	— ^c
6.7.6	Dye penetrant testing	05/04/76	— ^c
8.15.2	NDE of welds except UT	07/27/78	— ^b
8.15.3	UT of welds	02/15/80	— ^b
9.25.2	NDE of welds except UT	07/27/78	— ^b
9.25.3	UT of welds	02/15/80	— ^b
10.17.2	NDE of welds except UT	07/27/78	— ^b
10.17.3	UT of welds	02/15/80	— ^b
<u>ASME III</u>			
NB-2545	MT examination of base metal	09/22/78	— ^g
NB-2546	LP examination of base metal	09/07/78	— ^f
NB-4130	Elimination and repair of defects	08/04/78	— ^d
NB-4131	Elimination and repair of defects in base material	08/04/78	— ^d
NB-4132	Documentation of repair welds in base material	08/04/78	— ^d
NB-4214	Minimum thickness of fabricated material	08/04/78	— ^d
NB-5130	Examination of weld edge preparation	03/21/79	— ^e
NB-5330	Ultrasonic acceptance standards	01/22/75	— ^h
NC-4130	Elimination and repair of defects in base material	08/04/78	— ^d
ND-4130	Elimination and repair of defects in base material	08/04/78	— ^d
NE-4131	Rules governing elimination and repair	08/04/78	— ^d
NE-4214	Minimum thickness of fabricated materials	08/04/78	— ^d
NE-5330	Ultrasonic acceptance standards	01/22/75	— ^h

a. Prior to March 29, 1979, this criterion was not addressed in Watts Bar procedures. Per telephone conversation with TVA (John White), it was established that this criterion had not been used at Watts Bar prior to 3-22-79. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

b. TVA letter from John White, dated March 13, 1986, established that prior to July 27, 1978, for RT and February 15, 1980, for UT, Watts Bar did not perform RT or UT on structural welds. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

c. TVA letter from John White, dated May 8, 1986, established that prior to May 13, 1977, for MT and May 4, 1976, for PT, Watts Bar did not perform MT or PT on AWS welds. It also stated that if MT or PT had been required an ASME Section III procedure would have been used. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

d. TVA letter from John White, March 21, 1986, established that prior to August 4, 1978, repair to base material surface defects, when required, was addressed in nonconformance reports (NCRs) on an as-needed basis. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

e. TVA letter from John White, March 21, 1986, established that prior to March 21, 1979, examination of weld edge preparation, when required, was addressed by Engineering on applicable drawings. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

Table 11. (Continued)

- f. TVA letter from John White, March 21, 1986, established that prior to September 7, 1978, LP examination of base metal repairs, when required, was addressed in nonconformance reports (NCRs) on an as-needed basis. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.
- g. TVA letter from John White, March 21, 1986, established that prior to September 22, 1978, MT examination of base metal repairs, when required, was addressed in nonconformance reports (NCRs) on an as-needed basis. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.
- h. TVA response, May 8, 1986, to WEP (Paul O'Leary) request dated April 23, 1986, by John White established that prior to January 22, 1975, UT was not performed at Watts Bar. This position was confirmed by TVA in L. E. Martin letter No. T25860618833, June 18, 1986.

Table 12. Criteria not incorporated at time of first safety-related weld from Code/Standard Checklists: Operations

Criteria	Subject	First Date Found Addressed at WBNP	Comments
<u>AWS D1.1</u>			
3.9.2	Alternate or Lower Heat Treatment Temperature	Not Addressed	— ^a
6.7.3	Radiographic Testing	Not Addressed	— ^a
6.7.4	Ultrasonic Testing	Not Addressed	— ^a
6.7.5	Magnetic Particle Testing	Not Addressed	— ^a
6.7.6	Dye Penetrant Testing	Not Addressed	— ^a
8.15.2	NDE of Welds Except UT	Not Addressed	— ^a
8.15.3	UT of Welds	Not Addressed	— ^a
9.25.2	NDE of Welds Except UT	Not Addressed	— ^a
9.25.3	UT of Welds	Not Addressed	— ^a
10.17.2	NDE of Welds Except UT	Not Addressed	— ^a
10.17.3	UT of Welds	Not Addressed	— ^a

- a. TVA letter from Gary Pitzl, May 2, 1986, established that Nuclear Power (Operations) has not had a need to address any of these criteria for activities performed at Watts Bar. It also established that if a need does arise provisions are in the Operations program to incorporate the required process specification from G-29. This position was confirmed by TVA in a L. E. Martin letter No. T25860618833, June 18, 1986.

APPENDIX A
QUALITY/REGULATORY GUIDE
CHECKLISTS: CONSTRUCTION

APPENDIX A

QUALITY/REGULATORY GUIDE CHECKLISTS: CONSTRUCTION

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**QUALITY/REGULATORY GUIDE REQUIREMENTS
ASME SECTION III 1971 THROUGH S73
QUALITY ASSURANCE PROGRAM REQUIREMENTS**

NOTE: Quality assurance manual is OEDC QA Manual for ASME Section III Nuclear Power Plant Components (NCM) Revision 43.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
NA-4111	Establishment of quality assurance program	NCM 1.1 (R14) NCM 5.1 (R23)	X	
NA-4120	Evaluation of the program	NCM 1.7 (R16) NCM 11.1 (R17)	X	
NA-4210	Authority and responsibility of quality assurance personnel	NCM 1.5.0 (R19)	X	
NA-4220	Qualification of personnel	NCM 1.9 (R9)	X	
NA-4221	Personnel records	NCM 9.1 (R19)	X	
NA-4320	Categories of specific responsibilities	NCM 1.5.0 (R19) NCM 11.1 (R17)	X	
NA-4410	Design control	NCM 2.3 (R12) NCM 2.4 (R11)	X	
NA-4420	Quality control procedure	NCM 1.5.0 (R19)	X	
NA-4430	Document control	NCM 2.3 (R12) NCM 2.4 (R11)	X	
NA-4442.1	Establishment and maintenance of identification and control measures	NCM 3.7 (R15) NCM 5.1 (R23)	X	
NA-4451	Establishment of fabrication control measures	NCM 4.1 (R22) NCM 5.1 (R23) NCM 8.1 (R16)	X	
NA-4452	Process control checklist	NCM 4.1 (R22)	X	
NA-4460	Handling, storage, shipping and presentation	NCM 3.6 (R18) NCM 3.7 (R15)	X	
NA-4510	Establishment of examinations and tests	NCM 4.1 (R22) NCM 6.1 (R22)	X	
NA-4520	Hold points	NCM 4.1 (R22)	X	
NA-4530	Checklists of examinations tests and inspections	NCM 4.1 (R22)	X	
NA-4540	Examination or process status	NCM 4.1 (R22)	X	
NA-4550	Nonconforming material parts or components	NCM 10.2 (R23)	X	
NA-4600	Calibration of measurement and test equipment	NCM 7.1 (R18)	X	
NA-4920	Maintenance and access to QA records	NCM 9.1 (R19)	X	
NA-4930	Content of records	NCM 9.1 (R19)	X	

Checklist Q-2

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.28 REV. 0 (SAFETY GUIDE 28/6-7-72) & ANSI N45.2-1971
QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR NUCLEAR POWER PLANTS**

NOTE: Regulatory Guide 1.28 endorses ANSI N45.2-1971 without any additions or exceptions.

The following criteria are from ANSI N45.2-1971 to meet the criteria of 10 CFR 50 Appendix B.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
2	Quality assurance program	QAPP 2 (R8)	X	
3	Organization	QAPP 1 (R5)	X	
6	Instruction, procedure and drawings	QAPP 5 (R5)	X	
7	Document control	QAPP 6 (R4)	X	
9	Identification and control of materials, parts, and components	QAPP 8 (R3)	X	
10	Control of special processes	QAPP 9 (R2)	X	
11	Inspection	QAPP 10 (R3)	X ^a	
13	Control of measuring and test equipment	QAPP 12 (R2)	X	
14	Handling, storage and shipping	QAPP 13 (R2)	X	
15	Inspection, test and operating status	QAPP 14 (R5)	X	
16	Nonconforming items	QAPP 15 (R5)	X	
18	Quality assurance records	QAPP 17 (R3)	X	

a. QAPP 10 (R3) does not address "Hold Points," but the Watts Bar Quality Control Instruction (QCI-4.03) does. Also, QAPP 10 (R2) addresses "Hold Points"; it appears this aspect of the document was removed in the rewrite of Rev. 2 for the incorporation into QAPP 5, but this incorporation was not made.

Checklist Q-3

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.31, REV. 3, APRIL 1978
CONTROL OF FERRITE CONTENT IN STAINLESS STEEL WELD METAL**

NOTE: Regulatory Guide 1.31 supplements the ASME code requirements to ensure control of delta ferrite in welds in austenitic stainless steel core support structures and Class 1 and 2 components.

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
1.0	Verification of delta ferrite of filler materials	PF-1015 (R7) Para 2.0 and 2.2	X	
2.0	Ferrite measurement	PF-1015 (R7) Para 2.2.1 and 2.2.3	X	
3.0	Instrumentation	PF-1015 (R7) Para 2.2.3	X	
4.0	Acceptability of test results	PF-1015 (R7) Para 4.0	X	
5.0	Quality assurance	PF-1015 (R7) Para 5.0	X	

a. PF-1015 is the Purchase Specification for stainless steel filler material.

Checklist Q-4

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.38 REV. 2 MAY 1977-ANSI N45.2.2-1972
PACKAGING, SHIPPING, RECEIVING, STORAGE AND HANDLING OF ITEMS
FOR NUCLEAR POWER PLANTS**

NOTE: Reg. Guide 1.38 supplements or modifies the requirements of ANSI N45.2.2 as identified in the following.

- Standards referenced by N45.2.2 are subject to independent acceptance by the NRC.
- Bags containing desiccants shall not be produced from materials containing fluorides, chlorides, sulfur, lead, zinc, copper or mercury.
- The standard applies to the operational phase of the plant.
- In shipping, carriers are exempt from NRC regulations for transport.
- Changes *should* to *shall* in (1) (a)
- Use of tapes produced from elements containing halogens, sulphur, mercury, etc., is restricted.
- Tapes are allowed to be colored to contrast with the material.

The following criteria are from ANSI N45.2.2-1972.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	QAPP 13 (R2)	X	
2.3	Results	QAPP 13 (R2)	X	
2.4	Personnel qualification	QAPP 10 (R3) QAP 2.2 (R5)	X	
2.5	Measuring and test equipment	QAPP 12 (R2)	X	
3.4	Methods of preservation	QAPP 13 (R2)	X	
3.5	Caps, plugs, tapes and adhesives	QCP 1.36 (R9) P.S.4.M.1.1 (R9)	X	
3.9	Marking	QAPP 8 (R2)	X	
4.4	Identification and marking	QAPP 8 (R2)	X	
6.4	Control of items in storage	QAPP 8 (R2)	X	
6.5	Removal of items from storage	QAPP 8 (R2)	X	
8.0	Records	QAPP 17 (R3)	X	

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.44, REV. 0, MAY 1973
CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL

Unstabilized, austenitic stainless steel of the AISI Type 3XX series used for components that are part of (1) the reactor coolant pressure boundary, (2) systems required for reactor shutdown, (3) systems required for emergency core coolant, and (4) reactor vessel internals that are relied upon to permit adequate core cooling for any mode of normal operation or under credible postulated accident conditions should meet the following criteria:

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
Cleaning	(1) Material should be suitably cleaned and protected against contaminants capable of causing stress corrosion cracking	P.S.4.M.1.1 (R9) Para 3.1.1 (see footnote a)	X	
Solution heat treat	(2) Material from which components and systems are fabricated should be solution heat treated to produce a nonsensitized condition	FSAR Para 5.2.5.2 (see footnote b)	X	
Verification	(3) Non-sensitization of material should be verified using ASTM A262-70 "Recommended Practices for Detecting Susceptibility to Intergranular Attack in Stainless Steel" practice A or E or another method to show nonsensitization	FSAR Para 5.2.5.3 ^b	X	
Material subjected to 800°-1500°F subsequent to solution HT	(4) Material subjected to sensitizing temperature, subsequent to solution heat treating per subparagraph C.2 and in accordance with subparagraph C.3, L grade material should not have carbon content greater than 0.03%	FSAR Para 5.2.5.5 ^b	X	
Exceptions	(a) Material exposed to reactor coolant with controlled concentration of less than 0.01 ppm dissolved O ₂ at temperatures above 200°F during normal operations	FSAR Para 5.7.5.5 ^b	X	
	(b) Material in form of casting or weld metal with ferrite content of at least 5%	FSAR Para 5.2.5.7 ^b	X	

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.44, REV. 0, MAY 1973
CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
Exceptions (continued)	(c) Piping is solution annealed, exposed to temperature in range of 800-1500°F and has been limited to welding operation, sufficiently small diameter in event of postulated failure the reactor can be shut down and cooled in orderly manner provided makeup is provided by reactor coolant makeup system only	FSAR Para 5.2.5.5 ^b	X	
Material subjected to 800°-1500°F during HT or processing other than welding	(5) Retest is not required for:			
	(a) Cast of weld metal with ferrite content of 5% or more or,	FSAR Para 5.2.5.7 ^b	X	
	(b) Carbon content of 0.03% or less	FSAR Para 5.2.5.6 ^b	X	
	(c) Material exposed to special processing provided the processing is properly controlled to develop uniform product and adequate documentation exists	FSAR Para 5.2.5.7 ^b	X	
Welding	(6) Welding practices and, if necessary, material composition should be controlled to avoid excessive sensitization of base metal HAZ.	P.S.1.M.1.2 (R4) Para.8.0 ^a	X	

a. Noted from WBNP Safety Evaluation Report, Paragraph 5.2.3:

The controls imposed upon austenitic stainless steel are either in accordance with Regulatory Guides 1.31, and 1.44, or, if they are not in accordance with these Regulatory Guides, the positions and actions taken have previously been accepted by the NRC.

The material selection, fabrication practices, examination procedures, and protection procedures performed provide reasonable assurance that the austenitic stainless steel in the reactor coolant pressure boundary will be in a metallurgical condition which precludes susceptibility to stress corrosion cracking during service.

b. Items (2), (3), (4), and (5) are engineering functions that are performed at locations other than the fabrication site at Watts Bar Unit 1. Therefore, these criteria have been included in this checklist for information only.

Checklist Q-6

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.50, REV. 0, MAY 1973
CONTROL OF PREHEAT TEMPERATURE FOR WELDING OF LOW-ALLOY STEELS

Regulatory Guide 1.50—Regulatory position is that weld fabrication for low alloy steel components should comply with the fabrication requirements specified in Section III and Section IX of ASME code supplemented by the following criteria.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
(1) WPS	(a) Specify minimum preheat and maximum interpass temperature	P.S.1.M.1.2 (R4) Para 3.0	X	
	(b) WPS be qualified at minimum preheat temperature	(see footnote a)		b
(2) Production Welds	Preheat temperature maintained until PWHT has been performed			b
(3) Production Welds	Should be monitored to verify limits on preheat and interpass temperature are maintained	P.S.1.M.1.2 (R4) Para 9.0 ^a	X	
(4) Requirement of 1, 2, and 3 not met	If 1, 2, and 3 not met, weld subject to rejection. Soundness of weld may be verified by acceptable examination procedure			b

a. Noted from WBNP Safety Evaluation Report SER Para 5.2.3: The controls imposed on welding preheat temperatures are not in total conformance with the recommendations of Regulatory Guide 1.50, "Control of Preheat Temperature for Welding Low Alloy Steels." However, the acceptance of WCAP-8577 by the NRC allows an alternative to regulatory position 2, which was followed. The applicant also did not meet regulatory position 1.b, which requires that weld procedure qualifications be performed at the minimum preheat temperature. The NRC agrees that qualification within the range of preheat temperature allowed by ASME Code is acceptable because it is not possible to control the temperature of a welding qualification plate to a given temperature with no tolerances. Accordingly, it is the NRC position that the controls imposed provide reasonable assurance that cracking of components made from low alloy steels will not occur during fabrication and minimize the possibility of subsequent cracking as a result of hydrogen being retained in the weldment.

b. TVA has noted an exception to this item in their commitments to the NRC.

Checklist Q-7

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.58 REV. 1 SEPTEMBER 1980 AND ANSI N45.2.6-1978
QUALIFICATION OF INSPECTION, EXAMINATION, AND TESTING PERSONNEL
FOR NUCLEAR POWER PLANTS**

For requirements for welding and nondestructive examination personnel, see Checklist C-8 ASNT SNT-TC-1A 1975, NDE Personnel Qualification. QTPM = Quality Training Program Manual.

NOTE: Reg. Guide 1.58 supplements or modifies the requirements of ANSI N45.2.6-1978 as identified in the following:

- Personnel who perform inspection, examination, or testing in accordance with SNT-TC-1A are not intended to be covered by N45.2.6.
- Other documents referenced by N45.2.6 are subject to independent acceptance by the NRC.
- Personnel performing preoperational testing, or survey party chiefs, are not within the scope of RG 1.58 Rev 1.

The following criteria are from ANSI N45.2.6-1978.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	QTPM III (R4) Section 1	X	
2.1.1	Indoctrination	QTPM III-1 (R3) Para.2.1	X	
2.1.2	Training	QTPM III-1 (R3) Para.2.1	X	
2.2	Determination of initial capability	QTPM III-1 (R3) Para.2.2	X	
2.3	Evaluation of performance	QTPM III-1 (R3) Para.2.4	X	
2.4	Written certification of qualification	QTPM III-1 (R3) Para.2.2	X ^a	
2.5	Physical	QTPM III-1 (R3) Para 2.2	X	
3.1	Qualifications General	QTPM III-1 (R3) Para 2.2	X ^a	
3.5	Education & Experience	QTPM III-1 (R3) Para 2.2	X	
4.0	Performance	QTPM III-1 (R3) Para 2.1	X	
5	Records	QTPM III-1 (R3) Para 6.0	X	

a. TVA has noted an exception to this item in their commitments to the NRC.

Checklist Q-8

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.71 REV. 0 DECEMBER 1973
WELDER QUALIFICATION FOR AREAS OF LIMITED ACCESSIBILITY**

The scope of the Regulatory Guide is applicable when fabricating or repair welding on wrought low-alloy and high alloy steels, nickel base alloys, static and centrifugal castings and bimetallic joints.

NOTE: Reg. Guide 1.71 supplements ASME Section IX-71 Para. Q-3(c) Special Positions.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
C-1	When physical conditions restrict welders access to a production weld to less than 12 to 14 in. in any direction from weld joint, special performance qualification is required using simulated access conditions	FSAR/Westinghouse response to Reg. 1.71 FSAR (Q&A) 122.5		^a
C-2.a	Requalification is required when significantly different restricted accessibility conditions occur			^a
C-2.b	Requalification is required when any of the essential welding variables listed in Section IX are changed	P.S.1.M.1.2 (R4) Para 4.0 and 8.0	X	
C-3	Production welding should be monitored and adherence to welding qualification requirements should be certified	QCI-4.03 (R6) Para. 6.2	X	

a. TVA has noted an exception to this item in their commitments to the NRC.

Checklist Q-9

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.94 REV. 1, APRIL 1976 & ANSI N45.2.5-1974
SUPPLEMENTARY QUALITY ASSURANCE REQUIREMENTS FOR INSTALLATION,
INSPECTION AND TESTING OF STRUCTURAL CONCRETE AND STRUCTURAL STEEL
DURING THE CONSTRUCTION PHASE OF NUCLEAR POWER PLANTS**

NOTE: Reg. Guide 1.94 supplements or modifies the requirements of ANSI N45.2.5-1974 as identified in the following:

- Standards referenced by N45.2.5 are subject to independent acceptance by the NRC.
- Other regulatory positions on this standard relate to the placement of concrete and do not affect the TVA WB welding program.

The following criteria are from ANSI N45.2.5-1974.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	QAPP 10 (R3)	X	
2.3	Results	QAPP 10 (R3)	X	
2.4	Personnel qualifications	QAP 2.2 (R5) QAP 2.3 (R6)	X	
2.5	Measuring & test equipment	QAPP 12 (R2)	X	
3.1	Verification of material	QAPP 8 (R2)	X	
3.3	Construction processes	QAPP 9 (R2)	X	
5.5	Welding	QAPP 9 (R2)	X	
6.1	Data analysis and evaluation general	QAPP 10 (R3)	X	
6.3	Steel construction test data evaluation and analysis	QAPP 10 (R3)	X	
7	Records	QAPP 17 (R3)	X	

Checklist Q-10

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.116 REV. O JUNE 1976 & ANSI N45.2.8-1975
SUPPLEMENTARY QUALITY ASSURANCE REQUIREMENTS FOR INSTALLATION,
INSPECTION, AND TESTING OF MECHANICAL EQUIPMENT AND SYSTEMS
FOR THE CONSTRUCTION PHASE OF NUCLEAR POWER PLANTS

NOTE: Reg. Guide 1.116 (R0) endorses ANSI N45.2.8-1975 with provision that the ANSI documents referenced in Section 8 are subject to independent acceptance by the NRC and that N45.2.8 is applicable to the "Preoperational and initial start up" and the "Operational" phases of the plant.

The following criteria are from ANSI N45.2.8-1975.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	QAPP 2 (R8)	X	
2.1	Planning	QAPP 9 (R2) QAPP 10 (R3)	X	
2.3	Results	QAPP 10 (R3)	X	
2.5	Receiving, storage	QAPP 13 (R2)	X	
2.7	Personnel qualifications	QAPP 10 (R3)	X	
2.8	Measuring and test	QAPP 12 (R2)	X	
2.9	Prerequisites	QAPP 10 (R3)	X	
<u>Pre-installation Verification</u>				
3.2	Identification	QAPP 8 (R2)	X	
3.3	Processes and procedures	QAPP 9 (R2)	X	
3.4	Physical condition	QAPP 13 (R2) QAPP 15 (R5)	X	
3.5	Site conditions	WBNP-QCP-1.36 (R9)	X	
<u>Control During Installation Process</u>				
4.1	General	QAPP 9 (R2)	X	
4.2	Process and procedure control	QAPP 9 (R2)	X	
4.3	Examination	QAPP 10 (R3)	X	
4.4	Inspection	QAPP 10 (R3)	X	
7.0	Records	QAPP 17 (R3)	X	

Checklist Q-11

**QUALITY/REGULATORY GUIDE REQUIREMENTS
ASME SECTION III 1971 Edition w/Summer 1973 Addenda and
N45.2.9-1974 and Regulatory Guide 1.88, Rev. 2, October 1976
QUALITY ASSURANCE RECORD REQUIREMENTS**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
<u>ASME</u>				
NA-4920	Maintenance and access	QAPP 17 (R3) All	X	
NA-4930	Retention of records	QAPP 17 (R3) Para 5.0	X	
<u>N45.2.9</u>				
2	General requirements	QAPP 17 (R3) All	X	
2.1	QA record system	QAPP 17 (R3) Para 1.0	X	
2.2	Categories	QAPP 17 (R3) Para 5.1 and 5.2	X	
3.2	Records administration	QAPP 17 (R3) Para 6 and 7	X	
4	Receipt of records	QAP 17.1 (R11) Para 7.3	X	
5	Storage, preservation, and safekeeping	QAP 17.1 (R11) Para 7.5	X ^a	
6	Retrieval	QAP 17.1 (R11) Para 7.5	X	
7	Disposition	QAP 17.1 (R11) Para 7.7	X	

a. TVA has noted an exception to this item in their commitments to the NRC.

APPENDIX B
CODE/STANDARD
CHECKLISTS: CONSTRUCTION

APPENDIX B

CODE/STANDARD CHECKLISTS: CONSTRUCTION

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Checklist C-1

**CODE/STANDARD REQUIREMENTS
FILLER METAL CONTROL**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
<u>ANSI N45.2</u>				
14	Measures established to control storage	QCI-1.36 (R12) Para 1.1	X	
<u>ANSI N45.2.2</u>				
6.1.1	Storage conditions	QCI-1.36 (R12) Para 6.1	X	
6.1.2	Level of storage welding Level B	QCI-1.36 (R12) Para 6.1 and 6.2	X	
6.2.1	Access to storage shall be controlled	QCI-1.36 (R12) Para 6.1.1	X	
6.3	Storage methods	QCI-1.36 (R12) Para 6.1	X	
6.4	Control of items	QCI-1.36 (R12) Para 6.1	X	
6.5	Removal of items	QCI-1.36 (R12) Para 6.4.1	X	
<u>ASME Section III</u>				
NB-2440 NB-4411	Minimize absorption of moisture by flux cored, and coated electrodes	QCI-1.36 (R12) Para 6.4.2	X	
NB-2152	Maintain identification	QCI-1.36 (R12) Para 6.3.2	X	
NB-4122	Material identification	QCI-4.01 (R5) Para 6.2 and 6.5	X	
<u>AWS D1.1</u>				
4.1.3	Protected or stored so characteristics are not affected	QCI-4.01 (R5) Para 6.2	X	
4.9.2	Electrodes for manual shielded metal-arc welding	QCI-4.01 (R5) Para 6.3	X	
4.18.1.1	Electrodes shall be dry and in suitable condition—GMAW, FCAW	QCI-4.01 (R5) Para 6.2	X	
<u>B31.1</u>	Issue and storage not addressed in code.			
<u>B31.5</u>	Issue and storage not addressed in code.			

CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION AWS D1.1-Rev. 2-74

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
5.15	General	P.S.1.C.2.2 (R1) Para 1.2	X	
5.16.1	Groove weld plate	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.1.3	Fillet weld plate	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.2	Pipe groove	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.2.3	Pipe groove	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.3	Thickness range qualified plate	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.16.4	Thickness range qualified pipe	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17	Limitation of variables	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.17.1	Limitation of variables	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.17.1.1	Qualification to steel listed in code qualified for all listed	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.2	Qualification to each process	P.S.1.C.2.2 (R1) Para 2.4	X	
5.17.1.3	Identification of electrodes welder qualified for	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.4	Electrode and shielding combination	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.5	Position qualified	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.6	Change in diameter wall pipe grouping	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.7	Change in progression	P.S.1.C.2.2 (R1) Para 2.2	X	
5.18	Groove weld plate qualification test plate unlimited thickness	P.S.1.C.2.2 (R1) Para 2.2	X	
5.19	Groove weld plate qualification test plate limited thickness	P.S.1.C.2.2 (R1) Para 2.2	X	
5.20	Groove weld qualification test for butt joints on pipe	P.S.1.C.2.2 (R1) Para 2.2	X	
5.22	Fillet welds	P.S.1.C.2.2 (R1) Para 2.5	X	
5.23	Position of test welds	P.S.1.C.2.2 (R1) Para 2.5	X	
5.24	Base metal	P.S.1.C.2.2 (R1) Para 2.4	X	
5.25	Welding procedure	P.S.1.C.2.2 (R1) Para 5.1	X	
5.26	Test specimens, number, type, and preparation	P.S.1.C.2.2 (R1) Para 2.2	X	
5.26.1	Type and number shown in Table 5.26.1	P.S.1.C.2.2 (R1) Para 2.2	X	

Checklist C-2

CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION AWS D1.1-Rev. 2-74 (continued)

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
5.26.2	Guided bend figure	P.S.1.C.2.2 (R1) Para 5.2	X	
5.26.4	Fillet weld break and macroetch test	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27	Method of testing	P.S.1.C.2.2 (R1) Para 6.1.1 and 6.1.2	X	
5.27.1	Root-face-side-bend	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.2	Fillet weld break test	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.3	Macro etch	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.4	Radiography test	P.S.1.C.2.2 (R1) Para 6.2	X	
5.28	Test results required	P.S.1.C.2.2 (R1) Para 6.1.2	X	
5.28.3	Macroetch test	P.S.1.C.2.2 (R1) Para 6.1.2	X	
5.28.4	Radiography test	P.S.1.C.2.2 (R1) Para 6.2	X	
5.28.5	Visual examination	P.S.1.C.2.2 (R1) Para 5.2	X	
5.28.5.5	Root surface	P.S.1.C.2.2 (R1) Para 5.2	X	
5.29	Retest	P.S.1.C.2.2 (R1) Para 3.0 and 3.1(a), (b)	X	
5.30	Period of effectiveness	P.S.1.C.2.2 (R1) Para 4.0	X	
5.31	Records	P.S.1.C.2.2 (R1) Para 2.3	X	

a. TVA at Watts Bar is using QCI-4.02 R7 for welder performance qualification. This instruction references G29C Process Specifications, which would be P.S.1.C.2.2.

Checklist C-3

**CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION
ASME SECTION IX 1971 S 73 ADDENDA**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
Q-20	General			
(a)	Determination ability of welder	P.S.1.M.2.2 (R3) Para 1.2	X	
(b)	Test may be terminated	P.S.1.M.2.2 (R3) Para 2.4	X	
(c)	Maintain records of WPS by contractor used for qualification	P.S.1.M.2.2 (R3) Para 2.5	X	
(d)	Welder shall be assigned identifying letter or symbol	P.S.1.M.2.2 (R3) Para 2.6	X	
Q-21	Qualification of welders and welding operators			
(a)	Welders			
	(1) Mechanical tests	P.S.1.M.2.2 (R3) Para 6.2	X	
	(2) Radiograph	P.S.1.M.2.2 (R3) Para 6.2	X	
	(3) Grooves qualify for fillets	P.S.1.M.2.2 (R3) Para 2.7	X	
Q-22	Essential variables			
	W-1 change in filler Metal F. No.	P.S.1.M.2.2 (R3) Para 2.2	X	
	W-2 change in position	P.S.1.M.2.2 (R3) Para 2.2	X	
	W-3 Progression	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-4 Omission of backing strip	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-5 Addition of backing in gas welding	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-6 Change one process to another	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-7 Omission or addition of consumable insert	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-8 Omission of gas backing	P.S.1.M.2.2 (R3) Para 6.0	X	
Q-23	Test joint			
	(a) WPS available dimensions of test material	P.S.1.M.2.2 (R3) Para 6.0	X	
	(b) Plate or pipe	P.S.1.M.2.2 (R3) Para 6.0	X	
	(c) Can substitute carbon steel for other material	P.S.1.M.2.2 (R3) Para 6.0	X	

Checklist C-3

**CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION
ASME SECTION IX 1971 S 73 ADDENDA (continued)**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
Q-24	Type and No. of Test specimens			
	(a) Table Q.24.1, 2 or 3	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(1) Qualification on plate with backing also qualifies for pipe, 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(2) Qualification on plate without backing also qualifies pipe, 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(3) Qualification double welded plate also double welded pipe 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(4) All other positions pipe qualifies for plate but not vice versa	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(b) Type & No. Test per Q-24.1 and Figures Q-13 a,b,c	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(c) 5G and 6G requires 4 bend coupons	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(d) Manual shielded arc may be qualified by x-ray	P.S. 1.M.2.2 (R3) Para 6.0 and 7.0	X	
Q-25	Retest	P.S.1.M.2.2 (R3) Para 3.0	X	
Q-26	Renewal of qualification	P.S.1.M.2.2 (R3) Para 4.0	X	

a. TVA at Watts Bar is using QCI-4.02 R7 for welder performance qualification. This instruction references the G29M Process Specification, which would be P.S.1.M.2.2.

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
ASME III 1971-S73**

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-2545	Magnetic Particle (base metal)	QCP-4.13 MTM (R1) Att. A, Para 10.3	X	
NB-2546	Liquid Penetrant (base metal)	QCP-4.13 PTM (R4) Att. A, Para 9.3	X	
NB-4122	Material identification	QCI-4.01 (R5) Para 6.2.1.4 and 6.2.1.5	X	
NB-4130	Elimination and repair of defects	QCP-4.13 FU&VM (R7) Att. A, Para 5.0	X	
NB-4231.1	Tack welds	QCP-4.13 FU&VM (R7) Att. A, Para A.9	X	
NB-4231.2	Temporary attachments and their removal	QCI-1.07 (R11) Att. A, Para 6.4.1.1	X	
NB-4232.1	Fairing of offsets	QCP-4.13 FU&VM (R7) Att. A, Para B.2.3	X	
NB-4233	Alignment requirements when component surfaces are inaccessible	QCP-4.13 FU&VM (R7) Att. A, Para A.4.1	X	
NB-4322	Maintenance and certification of records	QCI-4.02 (R7) Para 6.4	X	
NB-4322.1	Identification of joints by welder	QCP-4.13 FU&VM (R7) Att. A, Para 7.0	X	
NB-4421	Backing rings	QCP-4.13 FU&VM (R7) Att. A, Para A.3	X	
NB-4424	Surfaces of weld	QCP-4.13 FU&VM (R7) Att. A, Para B.2	X	
NB-4426.2	Thickness of weld reinforcement for piping	QCP-4.13 FU&VM (R7) Att. A, Para B.6	X	b
NB-4427	Shape and size of fillets and socket welds	QCP-4.13 FU&VM (R7) Att. A, Para B.7	X	b
NB-4435	Welding of temporary or minor permanent attachments	QCI-1.07 (R11) Para 6.4.1.1	X	
NB-4452	Elimination of surface defects	QCP-4.13 FU&VM (R7) Att. A, Para 6.0	X	
NB-4453	Requirements for making repair of welds	QCP-4.13 FU&VM (R7) Att. A, Para 6.3	X	
NB-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NB-5130	Examination of weld edge preparation surfaces	QCP-4.13 FU&VM (R7) Att. A, Para A.2	X	

Checklist C-4

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
ASME III 1971-S73 (continued)**

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-5320	Radiographic acceptance standards	QCP-4.13 RTM (R1) Att. A, Para 13.0	X	
NB-5330	Ultrasonic acceptance standards	QCP-4.13 UTM (R2) Att. A, Para 10.0	X	
NB-5340	Magnetic particle acceptance standards	QCP-4.13 MTM (R1) Att. A, Para 10.0	X	^b
NB-5350	Liquid penetrant acceptance standards	QCP-4.13 PTM (R4) Att. A, Para 9.0	X	

a. NC and ND makes reference to NB for requirements. In addition, NE inspection activities are identical to those of NB and, therefore, have not been listed.

b. TVA has taken provisions of later code editions.

Checklist C-5

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
AWS D1.1-Rev 2-74**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
3.2.3	Visual inspection and repair of plate cut edges	P.S.1.C.1.2 (R3) Para 6.5	X	
3.3.1	Assembly, fit-up requirements	P.S.1.C.1.2 (R3) Para 7.1	X	
3.3.2	Partial joint penetration groove weld fit-up	P.S.1.C.1.2 (R3) Para 7.3	X	
3.3.3	Butt weld alignment	P.S.1.C.1.2 (R3) Para 7.4	X	
3.3.4	Groove weld joint tolerance	P.S.1.C.1.2 (R3) Para 7.7	X	
3.3.5	Groove produced by gouging	P.S.1.C.1.2 (R3) Para 11.1.7	X	
3.3.7.2	Tack weld requirements	P.S.1.C.1.2 (R3) Para 8.1-8.8	X	
3.6	Weld profile	QCP-4.13 VTC (R2) Att. A, Para 6.0	X	
3.10	Cleaning and protective coatings	QCP-4.13 VTC (R2) Att. A, Para 5.0	X	
4.2	Preheat and interpass temperature requirements	P.S.1.C.1.2 (R3) Para 10.0-10.5	X	
4.4	Arc strikes	QCP-4.13 VTC (R2) Att. A, Para 5.0	X	
6.1-6.4	General inspection requirements	QCI-4.03 (R6) all	X	
6.5	Inspection of work and records	QCP-4.13 VTC (R2) Att. A, Para 7.0	X	

a. QCI-4.03 R6 Paragraph 5.1.1 states that the welding engineering unit shall assign the detailed welding procedure (DWP). The DWPs reference P.S.1.C.1.2.

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
B31.1-1973-S73**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
111.3.1	Socket weld requirement	QCP-4.13 FU&VM (R7) Att. A, Para A.8	X	
111.4	Fillet welds	QCP-4.13 FU&VM (R7) Att. A, Para A.8, and B.7	X	a
127.3.1	Butt welds			
A.1	End preparation	QCP-4.13 FU&VM (R7) Att. A, Para A.1	X	
A.2	Dimensions	QCP-4.13 FU&VM (R7) Att. A, Para A.2	X	
A.3	Boring end of pipe	QCP-4.13 FU&VM (R7) Att. A, Para A.2	X	
A.4	Upset of end of pipe	QCP-4.13 FU&VM (R7) Att. A, Para A.2	X	
B.	Cleaning	QCP-4.13 FU&VM (R7) Att. A, Para A.1	X	
C.	Alignment	QCP-4.13 FU&VM (R7) Att. A, Para A.4	X	
D.	Spacing	QCP-4.13 FU&VM (R7) Att. A, Para A.4	X	
127.4.1B	Environment	P.S.1.M.1.2 (R4) Para 14.1	X	
127.4.2B	Tack welds	QCP-4.13 FU&VM (R7) Att. A, Para A.9	X	
127.4.2C	Gradual transition of weld	QCP-4.13 FU&VM (R7) Att. A, Para B.2.3	X	
127.4.2D	As-welded surfaces	QCP-4.13 FU&VM (R7) Att. A, Para B.2	X	
D.2	Reinforcement	QCP-4.13 FU&VM (R7) Att. A, Para B.6	X	
D.3	Undercut	QCP-4.13 FU&VM (R7) Att. A, Para B.5	X	
127.4.4	Fillet welds	QCP-4.13 FU&VM (R7) Att. A, Para B.7	X	a
127.4.5	Seal welds	QCP-4.13 FU&VM (R7) Att. A, Para B.8.1	X	
127.5.1	Qualification general	P.S.1.M.1.2 (R4) Para 3.1	X	
131.2.3	Minimum preheat	P.S.1.M.1.2 (R4) Para 9.4 and 9.5	X	
136.4	Mandatory examinations Table 136.4	QCP-4.13 FU&VM (R7) all QCP-4.13 UTM (R2) all QCP-4.13 MTM (R1) all QCP-4.13 PTM (R4) all	X	

a. TVA has taken provisions of later code editions.

Checklist C-7

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
ANSI B31.5-1966**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
527.3.1 (a)	Butt joint end prep	QCP-4.13 FU&VM (R7) Att. A, Para A.2.	X	
527.3.1 (b)	Cleaning	QCP-4.13 FU&VM (R7) Att. A, Para A.1	X	
527.3.1 (c)	Alignment	QCP-4.13 FU&VM (R7) Att. A, Para A.4	X	
527.3.1 (d)	Spacing	QCP-4.13 FU&VM (R7) Att. A, Para A.4	X	
527.4.2 (b)	Tack welds	QCP-4.13 FU&VM (R7) Att. A, Para A.9	X	
527.4.2 (d)(1)	External surface undercut	QCP-4.13 FU&VM (R7) Att. A, Para B.5	X	
527.4.2 (d)(2)	Reinforcement	QCP-4.13 FU&VM (R7) Att. A, Para B.6	X	
527.4.4	Socket and fillet welds	QCP-4.13 FU&VM (R7) Att. A, Para B.7	X	
527.4.5	Seal welds	QCP-4.13 FU&VM (R7) Att. A, Para B.8.1	X	
527.4.6 (C-E)	Weld branch connections	QCP-4.13 FU&VM (R7) Att. A, Para B.2, B.4, and B.7	X	
527.6	Records-procedures and welder qualifications	P.S.1.M.1.2 (R4) Para 3.1 and 4.1	X	
527.7	Defect repairs	QCP-4.13 FU&VM (R7) Att. A, Para 6.0	X	
531.2.3	Verification of preheat temperature	P.S.1.M.1.2 (R4) Para 9.4	X	
531.3.3	Postheat treatment	P.S.1.M.1.2 (R4) Para 10.1	X	
536	Inspection	QCP-4.13 FU&VM (R7) all	X	

CODE/STANDARD REQUIREMENTS
ASNT SNT-TC-1A 1975
NDE PERSONNEL QUALIFICATION

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
4.1	Levels of qualification	QTP III-2 (R2) Para 2.1	X	
4.3	Three levels of qualification	QTP III-2 (R2) Para 2.1	X	
5.1	Written practice established	QTP III-2 (R2) all	X	
5.2	Guidelines	QTP III-2 (R2) Sections 3, 4, and 5	X	
5.3	Describe responsibilities of each level	QTP III-2 (R2) Para 2.1		
6.1 and 6.2	Personnel shall have sufficient education, etc.	QTP III-2 (R2) Para 2.2.A, 2.2B, and 3	X	
6.3	Level III candidate shall satisfy 6.3.1 criteria	QTP III-2 (R2) Para 2.1.A		
7.1	Sufficient organized training	QTP III-2 (R2) sec 3	X	
7.3	Sufficient examinations	QTP III-2 (R2) sec 4	X	
8.2	Administer examination	QTP III-2 (R2) Para 4.A.2, 4.A.3, and 4.A.4	X	
8.2.a	Physical examination	QTP III-2 (R2) Para 2.2.C	X	
8.2.b	General examination	QTP III-2 (R2) Para 4.B.1	X	
8.2.c	Specific examination	QTP III-2 (R2) Para 4.B.2	X	
8.2.d	Practical examination	QTP III-2 (R2) Para 4.B.3	X	
8.4	Level III examination	QTP III-2 (R2) Para 2.1.A.3	X	
8.6.1	Examination grading	QTP III-2 (R2) Para 4.A	X	
8.6.2	Composite grade	QTP III-2 (R2) Para 4.A.1	X	
8.6.3	Weight factors	QTP III-2 (R2) Para 4.A.1	X	
8.6.4	Passing grade	QTP III-2 (R2) Para 4.A.1	X	
8.7	Re-examination	QTP III-2 (R2) Para 4.D	X	
9.2	Certification practices	QTP III-2 (R2) all	X	
9.3	Certification based on demonstration	QTP III-2 (R2) Para 5.A	X	
9.6	Copies shall be maintained	QTP III-2 (R2) Para 9.0	X	
9.6.1	Qualification records shall be maintained	QTP III-2 (R2) Para 9.0	X	
9.7.1	Recertification criteria	QTP III-2 (R2) Para 7.0	X	
9.7.3	Interruption of service	QTP III-2 (R2) Para 6.A.2	X	
10.1	Termination of employee certification	QTP III-2 (R2) Para 5.D	X	

Checklist C-9

**CODE/STANDARD REQUIREMENTS
ASSIGNMENT AND DOCUMENTATION OF WELDERS**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
ASME Section III NB 4321	Performance qualification in accordance with ASME Section IX	P.S.1.M.1.2 (R4) Para 4.0	X	
ASME Section III NB 4322.1	Identification to joint by welder or welder operator	P.S.3.M.5.1 (R6) Para 7.0	X	
ANSI B31.1 127.5.1	Performance qualification in accordance with ASME Section IX	P.S.1.M.1.2 (R4) Para 4.0	X	
ANSI B31.1 127.6	Welding performed identified by welder symbol	P.S.3.M.5.1 (R6) Para 7.0	X	
AWS D1.1-74 5.3	Performance qualification in accordance with Part III of this code	P.S.1.C.1.2 (R3) Para 5.15	X	
USASI (ANSI) B31.5-66 527.5.1	Performance qualification with ASME Section IX	P.S.1.M.1.2 (R4) Para 4.0	X	
USASI (ANSI) B31.5-66 527.6	Welding performed identified by welder symbol	P.S.3.M.5.1 (R6) Para 7.0	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-2545	Magnetic Particle (base metal)	QCP-4.13 MTM (R1) Att. A, Para 10.3	X	
NB-2546	Liquid Penetrant (base metal)	QCP-4.13 PTM (R4) Att. A, Para. 9.3	X	
NB-4122	Materials identification	P.S.1.M.3.1 (R7) Para 3.0	X	
NB-4125	Testing of welding and brazing materials	P.S.1.M.1.2 (R4) Para 6.0	X	
NB-4131	Rules governing elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
NB-4132	Documentation of repair welds of base materials	P.S.4.M.5.1 (R3) Para 6.0	X	
NB-4211.1	Preheating before thermal cutting	P.S.1.M.1.2 (R4) Para 5.3	X	
NB-4214	Minimum thickness of fabricated materials	P.S.4.M.5.1 (R3) Para 2.2	X	
NB-4231.1	Tack welds	P.S.1.M.1.2 (R4) Para 14.2 and 14.3	X	
NB-4231.2	Temporary attachments and their removal	P.S.1.M.1.2 (R4) Para 14.17 and 14.4	X	b
NB-4232.1	Fairing of offsets	P.S.1.M.1.2 (R4) Para 11.1	X	
NB-4233	Alignment requirements when component surfaces are inaccessible	P.S.3.M.5.1 (R6) Para A.4.1	X	
NB-4311	Types of welding processes permitted	P.S.1.M.1.2 (R4) Para 3.1	X	
NB-4321	Required qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NB-4322	Maintenance and certification of records	P.S.1.M.2.2 (R3) Para 2.0	X	
NB-4322.1	Identification of joints by welder	P.S.3.M.5.1 (R6) Para 7.0	X	
NB-4323	Welding prior to qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NB-4411	Identification, storage and handling of welding materials	P.S.1.M.1.2 (R4) Para 6.3	X	
NB-4412	Cleanliness and protection of welding surfaces	P.S.1.M.1.2 (R4) Para 5.4	X	
NB-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-4422	Peening	P.S.1.M.1.2 (R4) Para 14.18	X	
NB-4423	Double-welded joints	P.S.1.M.1.2 (R4) Para 14.5, 14.6 and 15.4.3.2	X	
NB-4424	Surfaces of weld	P.S.3.M.5.1 (R6) Para B.2 and B.5	X	
NB-4425	Welding components of different diameters	P.S.1.M.1.2 (R4) Para 11.1	X	
NB-4426.2	Thickness of weld reinforcement for piping	P.S.3.M.5.1 (R6) Para B.6	X	b
NB-4427	Shape and size of fillets and socket welds	P.S.3.M.5.1 (R6) Figures 3 and 4	X	b
NB-4428	Seal welds of threaded joints	P.S.3.M.5.1 (R6) Para B.8	X	
NB-4435	Welding of temporary or minor permanent attachment	P.S.1.M.1.2 (R4) Para 10.0, 14.4, and 14.17	X	
NB-4452	Elimination of surface defects	P.S.1.M.1.2 (R4) Para 15.6 and 15.7	X	
NB-4453	Requirements for making repair of welds	P.S.1.M.1.2 (R4) Para 15.0	X	b
NB-4610	Welding preheat requirements	P.S.1.M.1.2 (R4) Para 9.0	X	
NB-4612	Preheating methods	P.S.1.M.1.2 (R4) Para 9.0	X	
NB-4621	Heating and cooling method (PWHT)	P.S.2.M.1.1 (R4) Para 3.0	X	
NB-4622.1	Requirements for PWHT	P.S.2.M.1.1 (R4) Table 1	X	
NB-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NB-4622.4	Minimum holding temperature and time	P.S.2.M.1.1 (R4) Para 4.0	X	
NB-4622.7	Exemptions to mandatory requirements	P.S.4.M.5.1 (R3) Table 2	X	b
NB-4623	Cooling rate above 800°F	P.S.2.M.1.1 (R4) Para 3.0	X	
NB-4624.3	Local heating	P.S.3.M.1.1 (R4) Para 2.3	X	
NB-5113	Post examination and cleaning	QCP-4.13 PTM (R4) Att. A, Para 11.0	X	
NB-5130	Examination of weld edge preparation surfaces	QCP-4.13 FU&VM (R7) Att. A, Para A.2.1.1	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-5320	Radiographic acceptance standards	QCP-4.13 RTM (R1) Att. A, Para 13.0	X	
NB-5330	Ultrasonic acceptance standards	QCP-4.13 UTM (R1) Att. A, Para 10.0	X	
NB-5340	Magnetic particle acceptance standards	QCP-4.13 MTM (R1) Att. A, Para 10.0	X	^b
NB-5350	Liquid penetrant acceptance standards	QCP-4.13 PTM (R3) Att. A, Para 9.0	X	
NB-5500	Qualification of nondestructive examination personnel	QCP-4.13 PTM (R3) Att. A, Para 3.0 QCP-4.13 MTM (R1) Att. A, Para 4.0 QCP-4.13 FU&VM(R7) Att. A, Para 3.0 QCP-4.13 UTM (R2) Att. A, Para 12.6 QCP-4.13 RTM (R1) Att. A, Para 15.0	X	
NC-4130	Elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
NC-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
ND-4130	Elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
ND-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NE-4122	Materials identification	P.S.1.M.3.1 (R7) Para 3.0	X	
NE-4125	Testing of welding and brazing materials	P.S.1.M.1.2 (R4) Para 6.0	X	
NE-4131	Rules governing the elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
NE-4211.1	Preheating before thermal cutting	P.S.1.M.1.2 (R4) Para 5.3	X	
NE-4214	Minimum thickness of fabricated materials	P.S.4.M.5.1 (R3) Para 2.2	X	
NE-4231.1	Tack welds	P.S.1.M.1.2 (R4) Para 14.2 and 14.3	X	
NE-4232.1	Fairing of offsets	P.S.1.M.1.2 (R4) Para 11.1	X	
NE-4311	Types of welding processes permitted	P.S.1.M.1.2 (R4) Para 3.1	X	
NE-4321	Required qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NE-4322	Maintenance and certification of records	P.S.1.M.2.2 (R3) Para 2.0	X	
NE-4322.1	ID of joints by welder	P.S.3.M.5.1 (R6) Para 7.0	X	
NE-4323	Welding prior to qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NE-4411	ID, storage and handling of welding materials	P.S.1.M.3.1 (R7) Para all	X	
NE-4412	Cleanliness and protection of welding surfaces	P.S.1.M.1.2 (R4) Para 5.4	X	
NE-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NE-4422	Peening	P.S.1.M.1.2 (R4) Para 14.18	X	
NE-4423	Single and double welded joints	P.S.1.M.1.2 (R4) Para 14.5, 14.6, 15.4.3.2, 11.3 and 11.4	X	
NE-4424	Surfaces of weld	P.S.3.M.5.1 (R6) Para B.2 and B.5	X	
NE-4425	Welding components of different diameters	P.S.1.M.1.2 (R4) Para 11.1	X	
NE-4426.1	Weld reinforcement for vessels	P.S.3.M.5.1 (R6) Table 3	X	
NE-4427	Shape and size of fillets	P.S.3.M.5.1 (R6) Para B7	X	
NE-4428	Seal welds of threaded joints	P.S.3.M.5.1 (R6) Para B.8	X	
NE-4435	Welding of temporary or minor permanent attachments	P.S.1.M.1.2 (R4) Para 14.4 and 14.7	X	
NE-4452	Elimination of surface defects	P.S.1.M.1.2 (R4) Para 15.6 and 15.7	X	
NE-4453	Requirements for making repair welds	P.S.1.M.1.2 (R4) Para 15.0	X	
NE-4610	Welding preheat requirements	P.S.1.M.1.2 (R4) Para 9.0	X	
NE-4612	Preheating methods	P.S.1.M.1.2 (R4) Para 9.0	X	
NE-4621	Vessels required to be PWHT	P.S.2.M.1.1 (R4) Para 3.0	X	
NE-4622.1	Requirements for PWHT	P.S.2.M.1.1 (R4) Table 1	X	
NE-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NE-4622.4	Minimum holding temperature and time	P.S.2.M.1.1 (R4) Para 4.0	X	

Checklist C-10

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NE-4622.7	Exemptions to mandatory requirements	P.S.4.M.5.1 (R3) Table 2	X	b
NE-4623	Cooling rate above 800°F	P.S.2.M.1.1 (R4) Para 3.0	X	
NE-4624.3	Local heating	P.S.2.M.1.1 (R4) Para 2.3	X	
NE-5113	Post examination cleaning	QCP-4.13 PTM (R4) Att. A, Para 11.0	X	
NE-5320	Radiographic acceptance standards	QCP-4.13 RTM (R1) Att. A, Para 13.0	X	
NE-5330	Ultrasonic acceptance standards	QCP-4.13 UTM (R2) Att. A, Para 10.0	X	
NE-5340	Magnetic particle acceptance standards	QCP-4.13 MTM (R1) Att. A, Para 10.0	X	b
NE-5350	Liquid penetrant acceptance standards	QCP-4.13 PTM (R4) Att. A, Para 9.0	X	
NE-5800	Qualification of NDE personnel	QCP-4.13 PTM (R4) Att. A, Para 3.0 QCP-4.13 MTM (R1) Att. A, Para 4.0 QCP-4.13 FU&VM (R7) Att. A, Para 3.0 QCP-4.13 UTM (R2) Att. A, Para 12.0 QCP-4.13 RTM (R1) Att. A, Para 15.0	X	

a. NC and ND make reference to NB for requirements. Only paragraphs of NC and ND which establish different requirements have been listed.

b. TVA has taken provisions from later codes.

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
3.1.3	Weld restrictions during inclement conditions and temperature	P.S.1.C.1.2 (R3) Para 11.1.4	X	
3.1.4	Adherence to size and length of weld as specified by design requirements	P.S.1.C.1.2 (R3) Para 11.1.5	X	
3.2.1	Condition of base metal	P.S.1.C.1.2 (R3) Para 6.1, 6.3 and 6.2	X	
3.2.2	Oxygen cutting requirements	P.S.1.C.1.2 (R3) Para 6.5	X	
3.2.3	Visual inspection and repair of plate cut edges	P.S.0.C.1.1 (R1) Para 3.2.2	X	
3.3.1	Assembly, fit-up requirements	P.S.1.C.1.2 (R3) Para 7.1	X	
3.3.2	Partial Joint penetration groove weld fit-up	P.S.1.C.1.2 (R3) Para 7.3	X	
3.3.3	Butt weld alignment	P.S.1.C.1.2 (R3) Para 7.4	X	
3.3.4	Groove weld joint tolerance	P.S.1.C.1.2 (R3) Para 7.7	X	
3.3.5	Groove produced by gouging	P.S.1.C.1.2 (R3) Para 11.1.7	X	
3.3.6	Usage of alignment clamps	P.S.1.C.1.2 (R3) Para 7.8	X	
3.3.7	Tack weld requirement	P.S.1.C.1.2 (R3) Para 8.1-8.8	X	
3.4	Control of distortion and shrinkage stresses	P.S.1.C.1.2 (R3) Para 12.1-12.8	X	
3.5	Dimensional tolerances	P.S.1.C.1.2 (R3) Para 7.1-7.8 P.S.0.C.1.1 (R1) Para 3.5	X	
3.6	Weld profile	P.S.3.C.5.4 (R2) Para 6.1-6.1.16	X	
3.6.3	Base metal thinning and surface finishing	P.S.3.C.5.4 (R2) Para 6.1.16	X	
3.6.4	Undercut for buildings	P.S.3.C.5.4 (R2) Para 6.1.5, 6.2.4, 6.2.1 and 6.2.3	X	
3.7.1- 3.7.2	Repair of weld and base metal	P.S.1.C.1.2 (R3) Para 13.0-13.5	X	
3.7.3	Straightening distorted areas by heating	P.S.1.C.1.2 (R3) Para 13.5	X	
3.7.4	Repair approval	P.S.1.C.1.2 (R3) Para 13.1	X	
3.7.5	Engr. notification prior to cutting completed welds	P.S.1.C.1.2 (R3) Para 13.1 and 13.5	X	

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
3.7.6	Scope requirement for rework of inaccessible welds	P.S.1.C.1.2 (R3) Para 13.4	X	
3.8	Peening	P.S.1.C.1.2 (R3) Para 11.1.10	X	
3.9	Stress relief heat treatment	P.S.1.C.1.2 (R3) Para 14.0-14.2 P.S.2.C.1.1 (R0) Para 3.0	X	
3.9.2	Alternate or lower heat treatment temperature	P.S.2.C.1.1 (R0) Para 3.2	X	
3.10.1	Cleaning and protective coatings	P.S.1.C.1.2 (R3) Para 15.1	X	
4.1.3	Filler metal storage	P.S.1.C.1.2 (R3) Para 9.4.2, 9.1.2, 9.1.3	X	
4.2	Preheat and interpass temperature requirements	P.S.1.C.1.2 (R3) Para 10.0-10.5	X	
4.4	Arc strikes	P.S.1.C.1.2 (R3) Para 8.9	X	
4.5	Interpass cleaning	P.S.1.C.1.2 (R3) Para 11.1.6	X	
4.6	Groove weld termination	P.S.1.C.1.2 (R3) Para 11.1.7, 11.1.8, 11.1.9	X	
4.7	Groove weld backing	P.S.1.C.1.2 (R3) Para 11.1.7, 11.1.8	X	
4.8	Caulking of welds	P.S.1.C.1.2 (R3) Para 11.1.11	X	
4.9.1	SMAW electrodes per latest edition of code	P.S.1.C.1.2 (R3) Para 9.1.1	X	
4.9.2	Requirements of low-hydrogen covered electrodes	P.S.1.C.1.2 (R3) Para 9.1.2, 9.1.3	X	
5.3	Welder qualification per parts III, IV, V of AWS D1.1	P.S.1.C.1.2 (R3) Para 5.1	X	
5.15-5.31	Welder qualification test	P.S.1.C.1.2 (R3) Para 5.1	X	
5.32-5.42	Welding operator qualification	P.S.1.C.1.2 (R3) Para 5.1	X	
5.43-5.52	Qualification of tackers	P.S.1.C.1.2 (R3) Para 5.1	X	
6.1-6.4	General inspection requirements	P.S.1.C.1.2 (R3) all	X	
6.5	Inspection of work and records	QCP 4.13 VTC (R2) Att. A, all	X	
6.7.3	Radiographic testing per code	QCP-4.13 RTC (R1) Att. A, all	X	

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
6.7.4	Ultrasonic testing per code	QCP-4.13 UTC (R1) Att. A, all	X	
6.7.5	Magnetic particle testing per ASTM spec. E109 and AWS D1.1	QCP-4.13 MTC (R1) Att. A, all	X	
6.7.6	Dye penetrant inspection per ASTM Spec. E165 and D1.1	QCP-4.13 PTC (R3) Att. A, all	X	
8.14	Temporary welds	P.S.1.C.1.2 (R3) Para 8	X	
8.15.1	Visual inspection of welds	QCP-4.13 VTC (R2) Att. A, Para 6.0	X	
8.15.2	NDE of welds except UT	QCP-4.13 MTC (R1) Att. A, Para 8.0 QCP-4.13 RTC (R1) Att. A, Para 5.0 QCP-4.13 PTC (R3) Att. A, Para 7.0	X	
8.15.3	UT of welds	QCP-4.13 UTC (R1) Att. A, Para 1.1	X	
9.22.1	Edge preparation	P.S.1.C.1.2 (R3) Para 19.3	X	
9.22.2	Oxygen cut surfaces	P.S.1.C.1.2 (R3) Para 6.5	X	
9.24	Temporary welds	P.S.1.C.1.2 (R3) Para 8.8	X	
9.25.1	Visual inspection of welds	QCP-4.13 VTC (R2) Att. A, Para 6.0	X	
9.25.2	NDE of welds except UT	QCP-4.13 MTC (R1) Att. A, Para 8.0 QCP-4.13 RTC (R1) Att. A, Para 5.0 QCP-4.13 PTC (R3) Att. A, Para 7.0	X	
9.25.3	UT of welds	QCP-4.13 UTC (R1) Att. A, Para 1.1	X	
10.14.1	Fit-up of fillet welds	P.S.1.C.1.2 (R3) Para 7.1	X	
10.14.2	Girth weld	P.S.1.C.1.2 (R3) Para 7.5	X	
10.14.3	Groove weld configuration	P.S.1.C.1.2 (R3) Para 7.7	X	
10.15	Temporary welds	P.S.1.C.1.2 (R3) Para 8.0	X	
10.17.1	Visual inspection of welds	QCP-4.13 VTC (R2) Att. A, Para 6.0	X	
10.17.2	NDE of welds except UT	QCP-4.13 MTC (R1) Att. A, Para 8.0 QCP-4.13 RTC (R1) Att. A, Para 5.0 QCP-4.13 PTC (R3) Att. A, Para 7.0	X	
10.17.3	UT of welds	QCP-4.13 UTC (R1) Att. A, Para 1.1	X	

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
111.1	General (welded joints)	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
111.2	Butt welds	P.S.1.M.1.2 (R4) Para 7.0 and 13.0	X	
111.3	Socket welds	P.S.1.M.1.2 (R4) Para 7.1 Drawing M.1.2-11 R6	X	
111.3.1	Requirements	P.S.1.M.1.2 (R4) Para 7.2 Drawing M.1.2-11 R6	X	
111.4	Fillet welds	P.S.1.M.1.2 (R4) Para 7.0	X	a
111.5	Seal welds	P.S.1.M.1.2 (R4) Para 7.0	X	
111.6 A-F	Circumferential joints	P.S.1.M.1.2 (R4) Para 7.0	X	
111.6.1 G7	Welded socket type or sleeve type joints	P.S.1.M.1.2 (R4) Para 7.0	X	
127.1.1	Welding processes	P.S.1.M.1.2 (R4) Para 3.1	X	
127.2.1	Filler metal	P.S.1.M.1.2 (R4) Para 6.1	X	
127.2.2	Backing rings	P.S.1.M.1.2 (R4) Para 6.1	X	
127.3.1	Butt welds (see A.1 through A.4 below)			
A.1	End preparation	P.S.1.M.1.2 (R4) Para 5.0	X	
A.2	Dimensions	P.S.1.M.1.2 (R4) Para 7.0	X	
A.3	Boring end of pipe	P.S.1.M.1.2 (R4) Para 5.0	X	
A.4	Upset of end of pipe	P.S.1.M.1.2 (R4) Para 5.0	X	
B	Cleaning	P.S.1.M.1.2 (R4) Para 5.4 P.S.3.M.5.1 (R6) Para A.1	X	
C	Alignment	P.S.1.M.1.2 (R4) Para 11.0 P.S.3.M.5.1 (R6) Para A.4	X	
D	Spacing	P.S.1.M.1.2 (R4) Para 11.2 and 11.3	X	
127.3.2	Fillet welds	P.S.1.M.1.2 (R4) Para 7.0	X	
127.4	Procedure (see A and B below)			
127.4.1	General (see A and B below)			
A.	Qualification of WPS	P.S.1.M.1.2 (R4) Para 3.1	X	
B.	Environment	P.S.1.M.1.2 (R4) Para 14.1	X	

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
127.4.2	Girth butt welds (see A through D below)			
A.	Girth butt welds	P.S.1.M.1.2 (R4) Para 7.0	X	
B.	Tack welds	P.S.1.M.1.2 (R4) Para 14.3	X	
C.	Dimensional	P.S.1.M.1.2 (R4) Para 11.1	X	
D.	As-welded surfaces	P.S.1.M.1.2 (R4) Para 12.1	X	
D.1	Surface condition	P.S.1.M.1.2 (R4) Para 12.1	X	
D.2	Reinforcements	P.S.1.M.1.2 (R4) Para 12.1	X	
D.3	Undercut	P.S.3.M.5.1 (R6) Para B.5	X	
D.4	Surface conditioning	P.S.1.M.1.2 (R4) Para 15.7	X	
127.4.3	Longitudinal butt welds	P.S.1.M.1.2 (R4) Para 7.0	X	
127.4.4	Fillet welds	P.S.3.M.5.1 (R6) Para B.7.1, B.7.2	X	a
127.4.5	Seal welds	P.S.3.M.5.1 (R6) Para B.8.1	X	
127.4.9	Attachment welds	P.S.1.M.1.2 (R4) Para 7.1	X	
127.4.10	Heat Treatment	P.S.1.M.1.2 (R4) Para 10.1	X	
127.4.11	Weld defect repairs	P.S.1.M.1.2 (R4) Para 15.0	X	
127.5	Qualification (see 127.5.1 through 127.5.3 below)			
127.5.1	General	P.S.1.M.1.2 (R4) Para 3.1	X	
127.5.2	Welding responsibility	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
127.5.3	Qualification responsibility			
A.	Procedures	P.S.1.M.1.2 (R4) Para 3.1	X	
B.	Welders and welding operators	P.S.1.M.1.2 (R4) Para 4.1	X	
127.6	Qualification records	P.S.1.M.2.2 (R3) Para 2.5 and 2.6 P.S.3.M.5.1 (R6) Para 7.0	X	
131.2.1	Preheating	P.S.1.M.1.2 (R4) Para 9.0	X	
131.2.2	Preheat dissimilar materials	P.S.1.M.1.2 (R4) Para 9.0	X	
131.2.3	Check preheating	P.S.1.M.1.2 (R4) Para 9.4-9.5	X	

Checklist C-12

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
131.3	Postheat treatment (see 131.3.1 through 131.3.5 below)			
131.3.1	Postheat treatment different thickness	P.S.2.M.1.1 (R4) Para 4.0 P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.2	Heating methods	P.S.2.M.1.1 (R4) Para 2.0	X	
131.3.3	Dissimilar metals	P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.4	P-1 material	P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.5	Local	P.S.1.M.1.2 (R4) Para 10.0 P.S.2.M.1.1 (R4) Para 2.3.1	X	
132.1 to 132.7	Preheating	P.S.1.M.1.2 (R4) Para 9.0	X	
133.3 to 133.6	Postheat treatment	P.S.2.M.1.1 (R4) Para all	X	
136.4.2	Visual examination	QCP-4.13 FU&VM (R7) Att. A, Part B	X	
136.4.3	Magnetic particle examination	QCP-4.13 MTM (R1) Att. A, Para 10.0	X	
136.4.4	Liquid penetrant examination	QCP-4.13 PTM (R4) Att. A, Para 9.0	X	
136.4.5	Radiography	QCP-4.13 RTM (R0) Att. A, Para 13.0	X	

a. TVA has taken provisions of later code editions.

CODE/STANDARD REQUIREMENTS
ANSI B31.5-1966

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
527.2.1	Filler material	P.S.1.M.3.1 (R7) Para 2.1	X	
527.2.2	Backing rings	P.S.1.M.3.1 (R7) Para 2.1	X	
527.3.1	Butt Welds	P.S.1.M.1.2 (R4) Para 5.1	X	
	A. End prep	P.S.1.M.1.2 (R4) Para 5.1	X	
	B. Cleaning	P.S.1.M.1.2 (R4) Para 5.4	X	
	C. Alignment	P.S.1.M.1.2 (R4) Para 11.1	X	
	D. Spacing	P.S.1.M.1.2 (R4) Para 11.2, 11.3, and 11.4	X	
527.3.2	Fillet welds	P.S.1.M.1.2 (R4) Para 7.1	X	
527.4	Procedures			
527.4.1	General	P.S.1.M.1.2 (R4) Para 14.1	X	
527.4.2	Butt welds	P.S.1.M.1.2 (R4) Para 7.1	X	
527.4.4	Socket & fillet weld	P.S.3.M.5.1 (R6) Para B.7	X	
527.4.5	Seal welds	P.S.3.M.5.1 (R6) Para B.8	X	
527.5	Qualifications			
527.5.1	General	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
527.6	Records	P.S.3.M.5.1 (R6) Para 7.0 P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
527.7	Defect repair	P.S.1.M.1.2 (R4) Para 15.0	X	
531.2	Preheat			
531.2.1	Preheat	P.S.1.M.1.2 (R4) Para 9.0	X	
531.2.2	Preheat dissimilar material	P.S.1.M.1.2 (R4) Para 9.3	X	
531.2.3	Checking preheat	P.S.1.M.1.2 (R4) Para 9.4	X	
531.3.1	Postheat treatment	P.S.1.M.1.2 (R4) Para 10.0	X	
531.3.2				
531.3.3	Heating method	P.S.2.M.1.1 (R4) Para 2.0	X	
531.3.4	Dissimilar metals	P.S.1.M.1.2 (R4) Para 10.1	X	
531.3.5	Temperature measurement	P.S.2.M.1.1 (R4) Para 5.0	X	
531.3.6	Interruption of welding prior to PWHT	P.S.1.M.1.2 (R4) Para 14.20 and 14.21	X	
531.3.7	PWHT compatibility with base metal	P.S.1.M.1.2 (R4) Para 10.1	X	

Checklist C-13

CODE/STANDARD REQUIREMENTS
ANSI B31.5-1966 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
531.3.8	Holding temp	P.S.2.M.1.1 (R4) Para 4.0	X	
531.3.9	Local PWHT	P.S.2.M.1.1 (R4) Para 2.3	X	
536	Inspection			
536.1	Final inspection	QCP-4.13 FU&VM (R7) Att. A, Part B	X	
536.1.2	Circumferential welds	QCP-4.13 FU&VM (R7) Att. A, Part B	X	

APPENDIX C
QUALITY/REGULATORY GUIDE
CHECKLISTS: OPERATIONS

APPENDIX C

QUALITY/REGULATORY GUIDE CHECKLISTS: OPERATIONS

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**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.31, REV. 3, APRIL 1978
CONTROL OF FERRITE CONTENT IN STAINLESS STEEL WELD METAL**

NOTE: Regulatory Guide 1.31 supplements the ASME code requirements to ensure control of delta ferrite in welds in austenitic stainless steel core support structures and Class 1 and 2 components.

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
1.0	Verification of delta ferrite of filler materials	PF-1015 (R7) Para 2.0 and 2.2	X	
2.0	Ferrite measurement	PF-1015 (R7) Para 2.2.1 and 2.2.3	X	
3.0	Instrumentation	PF-1015 (R7) Para 2.2.3	X	
4.0	Acceptability of test results	PF-1015 (R7) Para 4.0	X	
5.0	Quality assurance	PF-1015 (R7) Para 5.0	X	

a. PF-1015 is the Purchase Specification for stainless steel filler material.

Checklist QNP-2

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.33, REV. 2, FEBRUARY 1978, INCLUDING
ANSI N18.7-1976 AND N45.2-1971
QUALITY ASSURANCE PROGRAM REQUIREMENTS (OPERATION)**

NOTE: Regulatory Guide 1.33 endorses ANSI N18.7-1976 and ANSI N45.2-1971 (see footnote a).

The following criteria are from ANSI N45.2-1971.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
2	Quality assurance Program	OP-QAP-2.1 (R3)	X	
3	Organization	OP-QAP-1.1 (R3)	X	
6	Installation, procedures, and drawings	OP-QAP-5.1 (R2)	X	
7	Document control	OP-QAP-6.1 (R2)	X	
9	Identification and control of materials parts, and components	OP-QAP-8.1 (R2)	X	
10	Control of special processes	OP-QAP-9.1 (R2)	X	
11	Inspection	OP-QAP-10.1 (R2)	X	
13	Control of measuring and test equipment	QP-QAP-12.1 (R3)	X	
14	Handling, storage, and operating status	OP-QAP-13.1 (R2)	X	
15	Inspection, test, and operating status	OP-QAP-14.1 (R2)	X	
16	Nonconforming items	OP-QAP-15.1 (R2)	X	
18	Quality assurance records	OP-QAP-17.1 (R2)	X	

a. The comparison chart in ANSI N18.7 shows the relationship between N18.7-1976 requirements and N45.2-1971 requirements. Based on review of these documents, within the scope of this project, repair and modification activities meeting N45.2-1971 also meet Regulatory Guide 1.33, with the following additional requirement:

R.G. 1.33, Paragraph 9 and N18.7, Paragraphs 5.2.7 and 5.3.5 also require preparation of maintenance procedures, including weld repair activity procedures. This requirement is addressed in OQAM Part II, Section 2.3, Paragraph 3.0, and in AI-9.15.

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.38 REV. 2 MAY, 1977-ANSI N45.2.2-1972
PACKAGING, SHIPPING, RECEIVING, STORAGE AND HANDLING OF ITEMS
FOR NUCLEAR POWER PLANTS

NOTE: Reg. Guide 1.38 supplements or modifies the requirements of ANSI N45.2.2 as identified in the following:

- Standards referenced by N45.2.2 are subject to independent acceptance by the NRC.
- Bags containing desiccants shall not be produced from materials containing fluorides, chlorides, sulfur, lead, zinc, copper or mercury.
- The standard applies to the operational phase of the plant.
- In shipping, carriers are exempt from NRC regulations for transport.
- Changes *should* to *shall* in (1) (a)
- Use of tapes produced from elements containing halogens, sulphur, mercury, etc., is restricted.
- Tapes are allowed to be colored to contrast with the material.

The following criteria are from ANSI N45.2.2-1972.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	OP-QAP-13.1 (R2) Para 5.1	X	
2.3	Results	OP-QAP-10.1 (R2) Para 6.1.3.2.A,B	X	
2.4	Personnel Qualification	OP-QAP-10.1 (R2) Para 6.1.3.1.A	X	
2.5	Measuring and test equipment	OP-QAP-12.1 (R3) Para 6.2	X	
3.4	Methods of preservation	OP-QAP-13.1 (R2) Para 5.1.1	X	
3.5	Caps, plugs, tapes and adhesives	AI-5.6 (R7) Para 4.5	X	
3.9	Marking	OP-QAP-8.1 (R2) Para 6.1.3	X	
4.4	Identification and marking	OP-QAP-8.1 (R2) Para 6.1.1	X	
6.4	Control of items in storage	OP-QAP-8.1 (R2) Para 6.3.1	X	
6.5	Removal of items from storage	OP-QAP-8.1 (R2) Para 6.3.2	X	
8.0	Records	OP-QAP-8.1 (R2) Para 6.3.1	X	

Checklist QNP-4

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.44, REV. 0, MAY 1973
CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL

Unstabilized, austenitic stainless steel of the AISI Type 3XX series used for components that are part of (1) the reactor coolant pressure boundary, (2) systems required for reactor shutdown, (3) systems required for emergency core coolant, and (4) reactor vessel internals that are relied upon to permit adequate core cooling for any mode of normal operation or under credible postulated accident conditions should meet the following criteria:

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
Cleaning	(1) Material should be suitably cleaned and protected against contaminants capable of causing stress corrosion cracking	AI-5.6 (R7) Attachment 1 Para 3.4.4 (see footnote a)	X	
Solution heat treat	(2) Material from which components and systems are fabricated should be solution heat treated to produce a nonsensitized condition	FSAR Para 5.2.5.2 (see footnote b)	X	
Verification	(3) Non-sensitization of material should be verified using ASTM A262-70 "Recommended Practices for Detecting Susceptibility to Intergranular Attack in Stainless Steel" practice A or E or another method to show nonsensitization	FSAR Para 5.2.5.3 ^b	X	
Material subjected to 800°-1500°F subsequent to solution HT	(4) Material subjected to sensitizing temperature, subsequent to solution heat treating per subparagraph C.2 and in accordance with subparagraph C.3, L grade material should not have carbon content greater than 0.03%	FSAR Para 5.2.5.5 ^b	X	
Exceptions	(a) Material exposed to reactor coolant with controlled concentration of less than 0.01 ppm dissolved O ₂ at temperatures above 200°F during normal operations	FSAR Para 5.7.5.5 ^b	X	
	(b) Material in form of casting or weld metal with ferrite content of at least 5%	FSAR Para 5.2.5.7 ^b	X	

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.44, REV. 0, MAY 1973
CONTROL OF THE USE OF SENSITIZED STAINLESS STEEL (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
Exceptions (continued)	(c) Piping is solution annealed, exposed to temperature in range of 800-1500°F and has been limited to welding operation, sufficiently small diameter in event of postulated failure the reactor can be shut down and cooled in orderly manner provided makeup is provided by reactor coolant makeup system only	FSAR Para 5.2.5.5 ^b	X	
Material subjected to 800°-1500°F during HT or processing other than welding	(5) Retest is not required for:			
	(a) Cast of weld metal with ferrite content of 5% or more or,	FSAR Para 5.2.5.7 ^b	X	
	(b) Carbon content of 0.03% or less	FSAR Para 5.2.5.6 ^b	X	
	(c) Material exposed to special processing provided the processing is properly controlled to develop uniform product and adequate documentation exists	FSAR Para 5.2.5.7 ^b	X	
Welding	(6) Welding practices and, if necessary, material composition should be controlled to avoid excessive sensitization of base metal HAZ.	P.S.1.M.1.2 (R4) Para 8.0 ^a	X	

a. Noted from WBNP Safety Evaluation Report, Paragraph 5.2.3:

The controls imposed upon austenitic stainless steel are either in accordance with Regulatory Guides 1.31 and 1.44, or, if they are not in accordance with these Regulatory Guides, the positions and actions taken have previously been accepted by the NRC.

The material selection, fabrication practices, examination procedures, and protection procedures performed provide reasonable assurance that the austenitic stainless steel in the reactor coolant pressure boundary will be in a metallurgical condition, which precludes susceptibility to stress corrosion cracking during service.

b. Items (2), (3), (4), and (5) are engineering functions that are performed at locations other than the fabrication site at Watts Bar Unit 1. Therefore, these criteria have been included in this checklist for information only.

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.50, REV. 0, MAY 1973
CONTROL OF PREHEAT TEMPERATURE FOR WELDING OF LOW-ALLOY STEELS

Regulatory Guide 1.50—Regulatory position is that weld fabrication for low alloy steel components should comply with the fabrication requirements specified in Section III and Section IX of ASME code supplemented by the following.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
(1) WPS	(a) Specify minimum preheat and maximum interpass temperature	P.S.1.M.1.2 (R4) Para 3.0 (see footnote a)	X	
	(b) WPS be qualified at minimum preheat temperature			b
(2) Production Welds	Preheat temperature maintained until PWHT has been performed			b
(3) Production Welds	Should be monitored to verify limits on preheat and interpass temperature are maintained	P.S.1.M.1.2 (R4) Para 9.0 (see footnote a)	X	
(4) Requirement of 1, 2, and 3 not met	If 1, 2, and 3 not met weld subject to rejection. Soundness of weld may be verified by acceptable examination procedure	Not applicable		b

a. *Noted from WBNP Safety Evaluation Report Para 5.2.3:*

The controls imposed on welding preheat temperatures are not in total conformance with the recommendations of Regulatory Guide 1.50, "Control of Preheat Temperature for Welding Low Alloy Steels." However, the acceptance of WCAP-8577 by the NRC allows an alternative to regulatory position 2, which was followed. The applicant also did not meet regulatory position 1.b, which requires that weld procedure qualifications be performed at the minimum preheat temperature. The NRC agrees that qualification within the range of preheat temperature allowed by ASME Code is acceptable because it is not possible to control the temperature of a welding qualification plate to a given temperature with no tolerances. Accordingly, it is the NRC's position that the controls imposed provide reasonable assurance that cracking of components made from low alloy steels will not occur during fabrication and minimize the possibility of subsequent cracking as a result of hydrogen being retained in the weldment.

b. TVA has noted an exception to these items in their commitments to the NRC.

QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.58 REV. 1 SEPTEMBER 1980 AND ANSI N45.2.6-1978
QUALIFICATION OF INSPECTION, EXAMINATION, AND TESTING PERSONNEL
FOR NUCLEAR POWER PLANTS

AI-10.4 (R3) March 16, 1985 established that NQAM, Part II, Section 5.3A October 12, 1984 is to be used. For requirements for welding and nondestructive examination personnel see checklist CNP-8 ASNT SNT-TC-1A 1980 NDE Personnel Qualification.

NOTE: Reg. Guide 1.58 supplements or modifies the requirements of ANSI N45.2.6-1978 as identified in the following.

- Personnel who perform inspection, examination or test in accordance with SNT-TC-1A are not intended to be covered by N45.2.6.
- Other documents referenced by N45.2.6 are subject to independent acceptance by the NRC.
- Personnel performing preoperational testing or survey party chiefs are not within the scope of RG 1.58 Rev. 1.

The following criteria are from ANSI N45.2.6-1978.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	NQAM, Section 5.3 A Responsibility	X	
2.1.1	Indoctrination	NQAM, Section 5.3 A Para 2.2.3	X	
2.1.2	Training	NQAM, Section 5.3.A Para 2.0	X	
2.2	Determination of initial capability	NQAM, Section 5.3 A Para 5.0	X	
2.3	Evaluation of performance	NQAM, Section 5.3 A Para 5.0	X	
2.4	Written certification of qualification	NQAM, Section 5.3 A Para 6.0	X	
2.5	Physical	NQAM, Section 5.3 A Para 1.2	X	
3.1	Qualifications General	NQAM, Section 5.3 A Para 4.0	X ^a	
3.5	Education & Experience	NQAM, Section 5.3 A Para 3.0	X	
4.0	Performance	NQAM, Section 5.3 A Para 4.0	X	
5	Records	NQAM, Section 5.3 A Para 6.0	X	

a. TVA has noted an exception to this item in their commitments to the NRC.

Checklist QNP-7

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.71 REV. 0 DECEMBER 1973
WELDER QUALIFICATION FOR AREAS OF LIMITED ACCESSIBILITY**

The scope of the Regulatory Guide is applicable when fabricating or repair welding on wrought low-alloy and high alloy steels, nickel base alloys, static and centrifugal castings and bimetallic joints.

NOTE: Reg. Guide 1.71 supplements ASME Section IX-71 Para. Q-3(c) Special Positions.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
C-1	When physical conditions restrict welders access to a production weld to less than 12 to 14 in. in any direction from weld joint, special performance qualification is required using simulated access conditions	FSAR/Westinghouse response to Reg. 1.71 FSAR (Q&A) 122.5		a
C-2.a	Requalification is required when significantly different restricted accessibility condition occurs			a
C-2.b	Requalification is required when any of the essential welding variables listed in Section IX are changed	P.S.1.M.1.2 (R4) Para 4.0 and 8.0	X	
C-3	Production welding shall be monitored and adherence to welding qualification requirements should be certified.	AI-9.4.2 (R6) Para 6.6	X	

a. TVA has noted an exception to this item in their commitments to the NRC.

Checklist QNP-8

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.94 REV. 1, APRIL 1976 & ANSI N45.2.5-1974
SUPPLEMENTARY Q.A. REQUIREMENTS FOR INSTALLATION, INSPECTION AND
TESTING OF STRUCTURAL CONCRETE AND STRUCTURAL STEEL DURING
THE CONSTRUCTION PHASE OF NUCLEAR POWER PLANTS.**

NOTE: Reg. Guide 1.94 supplements or modifies the requirements of ANSI N45.2.5-1974 as identified in the following:

- Standards referenced by N45.2.5 are subject to independent acceptance by the NRC.
- Other regulatory positions on this standard relate to the placement of concrete and do not affect the TVA WB welding program.

The following criteria are from ANSI N45.2.5-1974.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	OP-QAP-1.1 (R3) Para 5.0	X	
2.3	Results	OP-QAP-1.1 (R3) Para 5.2.1.7	X	
2.4	Personnel qualifications	OP-QAP-2.6 (R1) Para 6.3	X	
2.5	Measuring & test equipment	OP-QAP-12.1 (R3) Para 1.0 and 2.0	X	
3.1	Verification of material	OP-QAP-14.1 (R2) Para 6.0	X	
3.3	Construction processes	OP-QAP-9.1 (R2) Para 6.0	X	
5.5	Welding	OP-QAP-9.1 (R2) Para 6.0	X	
6.1	Data analysis and evaluation general	OP-QAP-15.1 (R2) Para 5.1.1	X	
6.3	Steel construction test data evaluation and analysis	OP-QAP-15.1 (R2) Para 5.1.1	X	
7	Records	OP-QAP-17.1 (R2) Para 6.0	X	

Checklist QNP-9

**QUALITY/REGULATORY GUIDE REQUIREMENTS
REGULATORY GUIDE 1.116 REV. 0, JUNE 1976 & ANSI N45.2.8-1975
SUPPLEMENTARY Q.A. REQUIREMENTS FOR INSTALLATION, INSPECTION, AND
TESTING OF MECHANICAL EQUIPMENT AND SYSTEMS FOR THE CONSTRUCTION PHASE
OF NUCLEAR POWER PLANTS**

NOTE: Reg. Guide 1.116 Rev. 0 endorses ANSI N45.2.8-1975 with provision that the ANSI documents referenced in Section 8 are subject to independent acceptance by the NRC and that N45.2.8 is applicable to the "Preoperational and initial start up" and the "Operational" phases of the plant.

The following criteria are from ANSI N45.2.8-1975.

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
1.3	Responsibility	OP-QAP-14.1 (R2) Para 5.1	X	
2.1	Planning	OP-QAP-14.1 (R2) Para 6	X	
2.3	Results	OP-QAP-14.1 (R2) Para 6.2	X	
2.5	Receiving, storage	OP-QAP-13.1 (R2) Para 5	X	
		OP-QAP-7.1 (R2) Para 5.1.1	X	
2.7	Personnel qualifications	OP-QAP-2.6 (R3) Para 6	X	
2.8	Measuring and test	OP-QAP-12.1 (R3) Para 5.1.1	X	
2.9	Prerequisites	OP-QAP-5.1 (R2) Para 6	X	
<u>Pre-installation Verification</u>				
3.2	Identification	OP-QAP-8.1 (R2) Para 6	X	
3.3	Processes and procedures	OP-QAP-9.1 (R2) Para 5.1.1	X	
3.4	Physical condition	OP-QAP-10.1 (R2) Para 6	X	
3.5	Site conditions	OP-QAP-13.1 (R2) Para 6	X	
<u>Control During Installation Process</u>				
4.1	General	OP-QAP-9.1 (R2) Para 6	X	
4.2	Process and procedure control	OP-QAP-9.1 (R2) Para 6.3.1	X	
4.3	Examination	OP-QAP-14.1 (R2) Para 6	X	
4.4	Inspection	OP-QAP-10.1 (R2) Para 6	X	
7.0	Records	OP-QAP-17.1 (R2) Para 6	X	

Checklist QNP-10

QUALITY/REGULATORY GUIDE REQUIREMENTS
ASME SECTION III 1971 Edition w/Summer 1973 Addenda,
N45.2.9-1974 and Regulatory Guide 1.88, Rev. 2, October 1976
QUALITY ASSURANCE RECORD REQUIREMENTS

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
<u>ASME</u>				
NA-4920	Maintenance and access	OP-QAP-17.1 (R2) Para 6.1.2	X	
NA-4930	Retention of records	OP-QAP-17.1 (R2) Para 6.1.3.1 and 6.1.3.2	X	
<u>N45.2.9</u>				
2	General requirements	OP-QAP-17.1 (R2) Para 6	X	
2.1	QA Record System	OP-QAP-17.1 (R2) Para 6	X	
2.2	Categories	OP-QAP-17.1 (R2) Para 6.1.3.1. and 6.1.3.2	X	
3.2	Records administration	OP-QAP-17.1 (R2) Para 6	X	
4	Receipt of records	OP-QAP-17.1 (R2) Para 5.1.3	X	
5	Storage, preservation, and safekeeping	OP-QAP-17.1 (R2) Para 6.1.2.1	X	
6	Retrieval	OP-QAP-17.1 (R2) Para 6.1.2.2	X	
7	Disposition	OP-QAP-17.1 (R2) Para 6.1.4	X	

APPENDIX D
CODE/STANDARD
CHECKLISTS: OPERATIONS

APPENDIX D

CODE/STANDARD CHECKLISTS: OPERATIONS

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**CODE/STANDARD REQUIREMENTS
FILLER METAL CONTROL**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
<u>ANSI N45.2</u>				
14	Measures established to control storage	AI-9.4.1 (R0) Para 5.1	X	
<u>ANSI N45.2.2</u>				
6.1.1	Storage conditions	AI-9.4.1 (R0) Para 5.1	X	
6.1.2	Level of storage welding Level B	AI-9.4.1 (R0) Para 5.1.3, and 5.1.4	X	
6.2.1	Access to storage shall be controlled	AI-9.4.1 (R0) Para 5.2.2	X	
6.3	Storage methods	AI-9.4.1 (R0) Para 5.1	X	
6.4	Control of items	AI-9.4.1 (R0) Para 5.1	X	
6.5	Removal of items	AI-9.4.1 (R0) Para 5.1 and 5.2	X	
<u>ASME Section III</u>				
NB-2440 NB-4411	Minimize absorption of moisture by flux cored, and coated electrodes	AI-9.4.1 (R0) Para 5.1	X	
NB-2152	Maintain identification	AI-9.4.1 (R0) Para 5.1.5	X	
NB-4122	Materials Identification	AI-9.4.1 (R0) Para 5.1.5	X	
<u>AWS D1.1</u>				
4.1.3	Protected or stored so characteristics are not affected	AI-9.4.1 (R0) Para 5.1	X	
4.9.2	Electrodes for manual shielded metal-arc welding	AI-9.4.1 (R0) Para 5.2	X	
4.18.1.1	Electrodes shall be dry and in suitable condition—GMAW, FCAW	AI-9.4.1 (R0) Para 5.1.3	X	
<u>B31.1</u>	Issue and storage not addressed in code.			
<u>B31.5</u>	Issue and storage not addressed in code.			

**CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION AWS D1.1-Rev. 2-74**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
5.15	General	P.S.1.C.2.2 (R1) Para 1.2	X	
5.16.1	Groove weld plate	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.1.3	Fillet weld plate	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.2	Pipe groove	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.2.3	Pipe groove	P.S.1.C.2.2 (R1) Para 2.2	X	
5.16.3	Thickness range qualified plate	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.16.4	Thickness range qualified pipe	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17	Limitation of variables	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.17.1	Limitation of variables	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.17.1.1	Qualification to steel listed in code qualified for all listed	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.2	Qualification to each process	P.S.1.C.2.2 (R1) Para 2.2 and 5.1	X	
5.17.1.3	Identification of electrodes welder qualified for	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.4	Electrode and shielding combination	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.5	Position qualified	P.S.1.C.2.2 (R1) Para 2.2 and 2.4	X	
5.17.1.6	Change in diameter wall pipe grouping	P.S.1.C.2.2 (R1) Para 2.2	X	
5.17.1.7	Change in progression	P.S.1.C.2.2 (R1) Para 2.2	X	
5.18	Groove weld plate qualification test plate unlimited thickness	P.S.1.C.2.2 (R1) Para 2.2	X	
5.19	Groove weld plate qualification test plate limited thickness	P.S.1.C.2.2 (R1) Para 2.2	X	
5.20	Groove weld qualification test for butt joints on pipe	P.S.1.C.2.2 (R1) Para 2.2	X	
5.22	Fillet welds	P.S.1.C.2.2 (R1) Para 2.5	X	
5.23	Position of test welds	P.S.1.C.2.2 (R1) Para 2.2	X	
5.24	Base metal	P.S.1.C.2.2 (R1) Para 2.2	X	
5.25	Welding procedure	P.S.1.C.2.2 (R1) Para 5.1	X	

CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION AWS D1.1-Rev. 2-74 (continued)

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
5.26	Test specimens, number, type, and preparation	P.S.1.C.2.2 (R1) Para 2.2	X	
5.26.1	Type and number shown in Table 5.26.1	P.S.1.C.2.2 (R1) Para 2.2	X	
5.26.2	Guided bend figure	P.S.1.C.2.2 (R1) Para 5.2	X	
5.26.4	Fillet weld break and macroetch test	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27	Method of testing	P.S.1.C.2.2 (R1) Para 6.1.1 and 6.1.2	X	
5.27.1	Root-face-side-bend	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.2	Fillet weld break test	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.3	Macro etch	P.S.1.C.2.2 (R1) Para 6.1.1	X	
5.27.4	Radiography test	P.S.1.C.2.2 (R1) Para 6.2	X	
5.28	Test results required	P.S.1.C.2.2 (R1) Para 6.1.2	X	
5.28.3	Macroetch test	P.S.1.C.2.2 (R1) Para 6.1.2	X	
5.28.4	Radiography test	P.S.1.C.2.2 (R1) Para 6.2	X	
5.28.5	Visual examination	P.S.1.C.2.2 (R1) Para 5.2	X	
5.28.5.5	Root surface	P.S.1.C.2.2 (R1) Para 5.2	X	
5.29	Retest	P.S.1.C.2.2 (R1) Para 3.0 and 3.1(a), (b)	X	
5.30	Period of effectiveness	P.S.1.C.2.2 (R1) Para 4.0	X	
5.31	Records	P.S.1.C.2.2 (R1) Para 2.3	X	

a. Supplement A to DPM N73M2 requires the use of P.S.1.C.2.2 for Welder Qualification Testing.

**CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION
ASME SECTION IX 1971 S 73 ADDENDA**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
Q-20	General			
(a)	Determination ability of welder	P.S.1.M.2.2 (R3) Para 1.2	X	
(b)	Test may be terminated	P.S.1.M.2.2 (R3) Para 2.4	X	
(c)	Maintain records of WPS by contractor used for qualification	P.S.1.M.2.2 (R3) Para 2.5	X	
(d)	Welder shall be assigned identifying letter or symbol	P.S.1.M.2.2 (R3) Para 2.6	X	
Q-21	Qualification of welders and welding operators			
(a)	Welders			
	(1) Mechanical tests	P.S.1.M.2.2 (R3) Para 6.2	X	
	(2) Radiograph	P.S.1.M.2.2 (R3) Para 6.2	X	
	(3) Grooves qualify for fillets	P.S.1.M.2.2 (R3) Para 2.7	X	
Q-22	Essential variables			
	W-1 change in filler Metal F. No.	P.S.1.M.2.2 (R3) Para 2.2	X	
	W-2 change in position	P.S.1.M.2.2 (R3) Para 2.2	X	
	W-3 Progression	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-4 Omission of backing strip	P.S.1.M.2.2 (R3) Para 6.0	X	
Q-22	W-5 Addition of backing in gas welding	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-6 Change one process to another	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-7 Omission or addition of consumable insert	P.S.1.M.2.2 (R3) Para 6.0	X	
	W-8 Omission of gas backing	P.S.1.M.2.2 (R3) Para 6.0	X	
Q-23	Test joint			
	(a) WPS available dimensions of test material	P.S.1.M.2.2 (R3) Para 6.0	X	
	(b) Plate or pipe	P.S.1.M.2.2 (R3) Para 6.0	X	
	(c) Can substitute carbon steel for other material	P.S.1.M.2.2 (R3) Para 6.0	X	
Q-24	Type and No. of Test specimens			
	(a) Table Q.24.1, 2 or 3	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(1) Qualification on plate with backing also qualifies pipe 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	

Checklist CNP-3

**CODE/STANDARD REQUIREMENTS
WELDER QUALIFICATION
ASME SECTION IX 1971 S 73 ADDENDA (continued)**

Criteria	Title/Subject	TVA Document ^a	Compliance	
			Yes	No
Q-24	(2) Qualification on plate without backing also qualifies pipe 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(3) Qualification double welded plate also qualifies double welded pipe 1G and 2G	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(4) All other positions pipe qualifies for plate but not vice versa	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(b) Type & No. Test per Q-24.1 and Figures Q-13 a,b,c	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(c) 5G and 6G requires 4 bend coupons	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
	(d) Manual shielded arc may be qualified by x-ray	P.S.1.M.2.2 (R3) Para 6.0 and 7.0	X	
Q-25	Retest	P.S.1.M.2.2 (R3) Para 3.0	X	
Q-26	Renewal of qualification	P.S.1.M.2.2 (R3) Para 4.0	X	

a. Supplement A to DPM N73M2 requires the use of P.S.1.M.2.2 for Welder Qualification Testing.

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
ASME III 1971-S73**

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-2545	Magnetic Particle (base metal)	N-MT-2 (R1) Para 7.0	X	
NB-2546	Liquid Penetrant (base metal)	N-PT-4 (R2) Para 5.0	X	
NB-4122	Material identification	AI-9.4.2 (R6) Para 6.4, and 6.5	X	
NB-4130	Elimination and repair of defects	AI-9.15 (R6) Para 7.1	X	
NB-4231.1	Tack welds	N-VT-3 (R4) Para 5.2.9	X	
NB-4231.2	Temporary attachments and their removal	P.S.1.M.1.2 (R4) Para 14.4 and 14.17	X	
NB-4232.1	Fairing of offsets	N-VT-3 (R4) Para 6.2	X	
NB-4233	Alignment requirements when component surfaces are inaccessible	N-VT-3 (R4) Para 6.2	X	
NB-4322	Maintenance and certification of records	AI-9.4.2 (R6) Para 6.7	X	
NB-4322.1	Identification of joints by welder	AI-9.4.2 (R6) Para 6.2	X	
NB-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NB-4424	Surfaces of weld	N-VT-3 (R4) Para 6.2	X	
NB-4426.2	Thickness of weld reinforcement for piping	N-VT-3 (R4) Para 6.2.6	X	
NB-4427	Shape and size of fillets and socket welds	N-VT-3 (R4) Para 6.2.7.1	X	b
NB-4435	Welding of temporary or minor permanent attachments	P.S.1.M.1.2 (R4) Para 14.2, and 14.4	X	b
NB-4452	Elimination of surface defects	N-VT-3 (R4) Para 6.2.2	X	
NB-4453	Requirements for making repair of welds	P.S.1.M.1.2 (R4) Para 15.0	X	
NB-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NB-5130	Examination of weld edge preparation surfaces	N-VT-3 (R4) Para 5.2	X	
NB-5320	Radiographic acceptance standards	N-RT-1 (R4) Para 8.0	X	
NB-5330	Ultrasonic acceptance standards	N-UT-8 (R5) Para all	X	
NB-5340	Magnetic particle acceptance standards	N-MT-2 (R2) Para 7.0	X	b
NB-5350	Liquid penetrant acceptance standards	N-PT-1 (R6) Para 5.0	X	

a. NC and ND make reference to NB for requirements. In addition, NE inspection activities are identical to those of NB and, therefore, have not been listed.

b. TVA has taken provisions of later code editions.

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
AWS D1.1-Rev 2-74**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
3.2.3	Visual inspection and repair of plate cut edges	N-VT-2 (R2) Para 4.1	X	
3.3.1	Assembly, fit-up requirements	N-VT-2 (R2) Para 4.2	X	
3.3.2	Partial joint penetration groove weld fit-up	N-VT-2 (R2) Para 4.2	X	
3.3.3	Butt weld alignment	N-VT-2 (R2) Para 4.3	X	
3.3.4	Groove weld joint tolerance	N-VT-2 (R2) Para 4.2	X	
3.3.5	Groove produced by gouging	N-VT-2 (R2) Para 4.2	X	
3.3.7.2	Tack weld requirements	N-VT-2 (R2) Para 4.4	X	
3.6	Weld profile	N-VT-2 (R2) Para 5.7.3, 5.7.8, and 5.7.9	X	
3.10	Cleaning and protective coatings	N-VT-2 (R2) Para 5.4	X	
4.2	Preheat and interpass temperature requirements	N-VT-2 (R2) Para 4.5	X	
4.4	Arc strikes	N-VT-2 (R2) Para 5.3	X	
6.1-6.4	General inspection requirements	N-VT-2 (R2) Para 5.0 AI-9.4.2 (R6) Para 6.0	X	
6.5	Inspection of work and records	N-VT-2 (R2) Para 6.0	X	

**CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
B31.1-1973-S73**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
111.3.1	Socket weld requirement	N-VT-3 (R4) Para 5.2.8	X	
111.4	Fillet welds	N-VT-3 (R4) Para 6.2.7	X	
127.3.1	Butt welds			
A.1	End preparation	N-VT-3 (R4) Para 5.2.1	X	
A.2	Dimensions	N-VT-3 (R4) Para 5.2.2	X	
A.3	Boring end of pipe	N-VT-3 (R4) Para 5.2.2	X	
A.4	Upset of end of pipe	N-VT-3 (R4) Para 5.2	X	
B.	Cleaning	N-VT-3 (R4) Para 5.2.1	X	
C.	Alignment	N-VT-3 (R4) Para 5.2.4	X	
D.	Spacing	N-VT-3 (R4) Para 5.1	X	
127.4.1B	Environment	P.S.1.M.1.2 (R4) Para 14.1	X	
127.4.2B	Tack welds	N-VT-3 (R4) Para 5.2.9	X	
127.4.2C	Gradual transition of weld	N-VT-3 (R4) Para 6.2.2.3	X	
127.4.2D	As-welded surfaces	N-VT-3 (R4) Para 6.2.2	X	
D.2	Reinforcement	N-VT-3 (R4) Para 6.2.6	X	
D.3	Undercut	N-VT-3 (R4) Para 6.2.5	X	
127.4.4	Fillet welds	M-VT-3 (R4) Para 6.2.7	X	a
127.4.5	Seal welds	N-VT-3 (R4) Para 6.2.8	X	
127.5.1	Qualification general	P.S.1.M.1.2 (R4) Para 3.1	X	
131.2.3	Minimum preheat	P.S.1.M.1.2 (R4) Para 9.4 and 9.5	X	
136.4	Mandatory examinations Table 136.4	N-MT-1 (R5) all N-PT-1 (R6) all N-RT-1 (R4) all N-VT-3 (R4) all	X	

a. TVA has taken provisions of later code editions.

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CODE/STANDARD REQUIREMENTS
INSPECTION OF WELDING ACTIVITIES
ANSI B31.5-1966

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
527.3.1 (a)	Butt joint end prep	N-VT-3 (R4) Para 5.0	X	
527.3.1 (b)	Cleaning	N-VT-3 (R4) Para 5.0	X	
527.3.1 (c)	Alignment	N-VT-3 (R4) Para 5.2.4	X	
527.3.1 (d)	Spacing	N-VT-3 (R4) Para 5.1	X	
527.4.2 (b)	Tack welds	N-VT-3 (R4) Para 5.2.9	X	
527.4.2 (d)(1)	External surface undercut	N-VT-3 (R4) Para 6.2.5	X	
527.4.2 (d)(2)	Reinforcement	N-VT-3 (R4) Para 6.2.6	X	
527.4.4	Socket and fillet welds	N-VT-3 (R4) Para 6.2.7	X	
527.4.5	Seal welds	N-VT-3 (R4) Para 6.2.8	X	
527.4.6 (C-E)	Weld branch connections	N-VT-3 (R4) Para 5.1	X	
527.6	Records-procedures and welder qualifications	P.S.1.M.1.2 (R4) Para 3.1 and 4.1	X	
527.7	Defect repairs	P.S.1.M.1.2 (R4) Para 15.0	X	
531.2.3	Verification of preheat temperature	P.S.1.M.1.2 (R4) Para 9.4	X	
531.3.3	Postheat treatment	P.S.1.M.1.2 (R4) Para 10.1	X	
536	Inspection	N-VT-3 (R4) Para 5.0	X	

CODE/STANDARD REQUIREMENTS
ASNT SNT-TC-1A 1980
NDE Personnel Qualification

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
4.1	Levels of qualification	0202.14 (R0) Para 4.2.2	X	
4.3	Three levels of qualification	0202.14 (R0) Para 4.2.2	X	
5.1	Written practice established	0202.14 (R0) Para all	X	
5.2	Describe responsibilities of each level	0202.14 (R0) Para 4.1.2	X	
6.1 and 6.2	Personnel shall have sufficient education, etc.	0202.14 (R0) Para 4.1.5	X	
6.3	Level III requirements	0202.14 (R0) Table 1	X	
7.1	Sufficient organized training	0202.14 (R0) Para 4.1.5, Table 1	X	
8.1	Administer examination	0202.14 (R0) Para 4.1.6	X	
8.1.1	Physical examination	0202.14 (R0) Para 4.2.4	X	
8.1.2	General examination	0202.14 (R0) Para 4.2.4	X	
8.1.3	Specific examination	0202.14 (R0) Para 4.2.4	X	
8.1.4	Practical examination	0202.14 (R0) Para 4.2.4	X	
8.3.3	Level III examination	0202.14 (R0) Para 4.2.4	X	
8.4.1	Examination grading	0202.14 (R0) Para 4.2.5	X	
8.4.2	Composite grade	0202.14 (R0) Para 4.2.5	X	
8.4.3	Weight factors	0202.14 (R0) Para 4.2.5, Table 2	X	
8.4.4	Passing grade	0202.14 (R0) Table 2	X	
8.5	Re-examination	0202.14 (R0) Para 4.1.6	X	
9.2	Certification practices	0202.14 (R0) Para 4.1.7, and 4.1.8	X	
9.3	Certification based on demonstration	0202.14 (R0) Table 2	X	
9.6	Copies shall be maintained	0202.14 (R0) Para 4.1.7	X	
9.6.1	Qualification records shall be maintained	0202.14 (R0) Para 4.1.7	X	
9.7.1	Recertification criteria	0202.14 (R0) Para 4.1.8	X	
9.7.3	Interruption of service	0202.14 (R0) Para 4.1.8	X	
10.1	Termination of employee certification	0202.14 (R0) Para 4.1.9	X	

Checklist CNP-9

**CODE/STANDARD REQUIREMENTS
ASSIGNMENT AND DOCUMENTATION OF WELDERS**

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
ASME Section III NB 4321	Performance qualification in accordance with ASME Section IX	P.S.1.M.1.2 (R4) Para 4.0	X	
ASME Section III NB 4322.1	Identification to joint by welder or welder operator	P.S.3.M.5.1 (R6) Para 7.0	X	
ANSI B31.1 127.5.1	Performance qualification in accordance with ASME Sec- tion IX	P.S.1.M.1.2 (R4) Para 4.0	X	
ANSI B31.1 127.6	Welding performed identified by welder symbol	P.S.3.M.5.1 (R6) Para 7.0	X	
AWS D1.1-74 5.2	Performance qualification in accordance with Part III of this code	P.S.1.C.1.2 (R3) Para 5.1	X	
USASI (ANSI) B31.5-66 527.5.1	Performance qualification with ASME Section IX	P.S.1.M.1.2 (R4) Para 4.0	X	
USASI (ANSI) B31.5-66 527.6	Welding performed identified by welder symbol	P.S.3.M.5.1 (R6) Para 7.0	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-2545	Magnetic Particle (base metal)	N-MT-2 (R1) Para 7.0	X	
NB-2546	Liquid Penetrant (base metal)	N-PT-4 (R2) Para 5.0	X	
NB-4122	Materials identification	P.S.1.M.3.1 (R7) Para 3.0	X	
NB-4125	Testing of welding and brazing materials	P.S.1.M.1.2 (R4) Para 6.0	X	
NB-4131	Rules governing elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
NB-4132	Documentation of repair welds of base materials	P.S.4.M.5.1 (R3) Para 6.0	X	
NB-4211.1	Preheating before thermal cutting	P.S.1.M.1.2 (R4) Para 5.3	X	
NB-4214	Minimum thickness of fabricated materials	P.S.4.M.5.1 (R3) Para 2.2	X	
NB-4231.1	Tack welds	P.S.1.M.1.2 (R4) Para 14.2 and 14.3	X	
NB-4231.2	Temporary attachments and their removal	P.S.1.M.1.2 (R4) Para 14.17 and 14.4	X	^b
NB-4232.1	Fairing of offsets	P.S.1.M.1.2 (R4) Para 11.1	X	
NB-4233	Alignment requirements when component surfaces are inaccessible	P.S.3.M.5.1 (R6) Para A.4.1	X	
NB-4311	Types of welding processes permitted	P.S.1.M.1.2 (R4) Para 3.1	X	
NB-4231	Required qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NB-4322	Maintenance and certification of records	P.S.1.M.2.2 (R3) Para 2.0	X	
NB-4322.1	Identification of joints by welder	P.S.3.M.5.1 (R6) Para 7.0	X	
NB-4323	Welding prior to qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NB-4411	Identification, storage and handling of welding materials	P.S.1.M.1.2 (R4) Para 6.3	X	
NB-4412	Cleanliness and protection of welding surfaces	P.S.1.M.1.2 (R4) Para 5.4	X	
NB-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NB-4422	Peening	P.S.1.M.1.2 (R4) Para 14.18	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-4423	Double-welded joints	P.S.1.M.1.2 (R4) Para 14.5, 14.6 and 15.4.3.2	X	
NB-4424	Surfaces of weld	P.S.3.M.5.1 (R6) Para B.2 and B.5	X	
NB-4425	Welding components of different diameters	P.S.1.M.1.2 (R4) Para 11.1	X	
NB-4426.2	Thickness of weld reininforcement for piping	P.S.3.M.5.1 (R6) Para B.6	X	b
NB-4427	Shape and size of fillets and socket welds	P.S.3.M.5.1 (R6) Figures 3 and 4	X	b
NB-4428	Seal welds of threaded joints	P.S.3.M.5.1 (R6) Para B.8	X	
NB-4435	Welding of temporary or minor permanent attachments	P.S.1.M.1.2 (R4) Para 10.0, 14.4, and 14.17	X	
NB-4452	Elimination of surface defects	P.S.1.M.1.2 (R4) Para 15.6 and 15.7	X	
NB-4453	Requirements for making repair of welds	P.S.1.M.1.2 (R4) Para 15.0	X	b
NB-4610	Welding preheat requirements	P.S.1.M.1.2 (R4) Para 9.0	X	
NB-4612	Preheating methods	P.S.1.M.1.2 (R4) Para 9.0	X	
NB-4621	Heating and cooling method (PWHT)	P.S.2.M.1.1 (R4) Para 3.0	X	
NB-4622.1	Requirements for PWHT	P.S.2.M.1.1 (R4) Table 1	X	
NB-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NB-4622.4	Minimum holding temperature and time	P.S.2.M.1.1 (R4) Para 4.0	X	
NB-4622.7	Exemptions to mandatory requirements	P.S.4.M.5.1 (R3) Table 2	X	b
NB-4623	Cooling rate above 800°F	P.S.2.M.1.1 (R4) Para 3.0	X	
NB-4624.3	Local heating	P.S.2.M.1.1 (R4) Para 2.3	X	
NB-5113	Post examination cleaning	N-PT-4 (R2) Para 4.8	X	
NB-5130	Examination of weld edge preparation surfaces	N-VT-3 (R4) Para 5.2.2	X	
NB-5320	Radiographic acceptance standards	N-RT-1 (R4) Para 8.0	X	
NB-5330	Ultrasonic acceptance standards	N-UT-8 (R5) Para All	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NB-5340	Magnetic particle acceptance standards	N-MT-2 (R1) Para 7.0	X	^b
NB-5350	Liquid penetrant acceptance standards	N-PT-4 (R2) Para 5.0	X	
NB-5500	Qualification of nondestructive examination personnel	N-PT-4 (R2) Para 3.2 N-MT-2 (R1) Para 3.0 P.S.3.M.5.1 (R3) Para 3.0 N-RT-1 (R4) Para 3.0	X	
NC-4130	Elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
NC-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
ND-4130	Elimination and repair of defects	P.S.4.M.5.1 (R3) Para all	X	
ND-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NE-4122	Materials identification	P.S.1.M.3.1 (R7) Para 3.0	X	
NE-4125	Testing of welding and brazing materials	P.S.1.M.1.2 (R4) Para 6.0	X	
NE-4131	Rules governing the elimination and repair defects	P.S.4.M.5.1 (R3) Para all	X	
NE-4211.1	Preheating before thermal cutting	P.S.1.M.1.2 (R4) Para 5.3	X	
NE-4214	Minimum thickness of fabricated materials	P.S.4.M.5.1 (R3) Para 2.2	X	
NE-4231.1	Tack welds	P.S.1.M.1.2 (R4) Para 14.2 and 14.3	X	
NE-4232.1	Fairing of offsets	P.S.1.M.1.2 (R4) Para 11.1	X	
NE-4311	Types of welding processes permitted	P.S.1.M.1.2 (R4) Para 3.1	X	
NE-4321	Required qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NE-4322	Maintenance and certification of records	P.S.1.M.2.2 (R3) Para 2.0	X	
NE-4322.1	ID of joints by welder	P.S.3.M.5.1 (R6) Para 7.0	X	
NE-4323	Welding prior to qualification	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
NE-4411	ID, storage and handling of welding materials	P.S.1.M.3.1 (R7) Para all	X	

CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NE-4412	Cleanliness and protection of welding surfaces	P.S.1.M.1.2 (R4) Para 5.4	X	
NE-4421	Backing rings	P.S.1.M.1.2 (R4) Para 13.0	X	
NE-4422	Peening	P.S.1.M.1.2 (R4) Para 14.18	X	
NE-4423	Single and double welded joints	P.S.1.M.1.2 (R4) Para 14.5, 14.6 and 15.4	X	
NE-4424	Surfaces of weld	P.S.3.M.5.1 (R6) Para B.2 and B.5	X	
NE-4425	Welding components of different diameters	P.S.1.M.1.2 (R4) Para 11.1	X	
NE-4426.1	Weld reinforcement for vessels	P.S.3.M.5.1 (R6) Table 3	X	
NE-4427	Shape and size of fillets	P.S.3.M.5.1 (R6) Para B.7	X	
NE-4428	Seal welds of threaded joints	P.S.3.M.5.1 (R6) Para B.8	X	
NE-4435	Welding of temporary or minor permanent attachments	P.S.1.M.1.2 (R4) Para 14.4 and 14.17	X	
NE-4452	Elimination of surface defects	P.S.1.M.1.2 (R4) Para 15.6 and 15.7	X	
NE-4453	Requirements for making repair welds	P.S.1.M.1.2 (R4) Para 15.0	X	
NE-4610	Welding preheat requirements	P.S.1.M.1.2 (R4) Para 9.0	X	
NE-4612	Preheating methods	P.S.1.M.1.2 (R4) Para 9.0	X	
NE-4621	Vessels required to be PWHT	P.S.2.M.1.1 (R4) Para 3.0	X	
NE-4622.1	Requirements for PWHT	P.S.2.M.1.1 (R4) Table 1	X	
NE-4622.2	Time-temperature recordings	P.S.2.M.1.1 (R4) Para 6.0	X	
NE-4622.4	Minimum holding temperature and time	P.S.2.M.1.1 (R4) Para 4.0	X	
NE-4622.7	Exemptions to mandatory requirements	P.S.4.M.5.1 (R3) Table 2	X	b
NE-4623	Cooling rate above 800°F	P.S.2.M.1.1 (R4) Para 3.0	X	
NE-4624.3	Local heating	P.S.2.M.1.1 (R4) Para 2.3	X	
NE-5113	Post examination cleaning	N-PT-4 (R2) Para 4.8	X	
NE-5320	Radiographic acceptance standards	N-RT-1 (R4) Para 8.0	X	
NE-5330	Ultrasonic acceptance standards	N-UT-23 (R2) Para All	X	

Checklist CNP-10

**CODE/STANDARD REQUIREMENTS
ASME SECTION III 1971 EDITION THROUGH SUMMER 1973 ADDENDA
(1974 EDITION FOR HEAT TREATMENT) (continued)**

Criteria ^a	Title/Subject	TVA Document	Compliance	
			Yes	No
NE-5340	Magnetic particle acceptance standards	N-MT-2 (R1) Para 7.0	X	^b
NE-5350	Liquid penetrant acceptance standards	N-PT-4 (R2) Para 5.0	X	
NE-5500	Qualification of NDE personnel	N-PT-4 (R2) Para 3.2 N-MT-4 (R2) Para 3.0 N-UT-22 (R0) Para 3.0 N-RT-1 (R4) Para 3.0	X	

a. NC and ND make reference to NB for requirements. Only paragraphs of NC and ND which address different requirements have been listed.

b. TVA has taken provisions of later code editions.

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
3.1.3	Weld restrictions during inclement conditions and temperature	P.S.1.C.1.2 (R3) Para 11.1.4	X	
3.1.4	Adherence to size and length of weld as specified by design requirements	P.S.1.C.1.2 (R3) Para 11.1.5	X	
3.2.1	Condition of base metal	P.S.1.C.1.2 (R3) Para 6.1, 6.3 and 6.2	X	
3.2.2	Oxygen cutting requirements	P.S.1.C.1.2 (R3) Para 6.5	X	
3.2.3	Visual inspection and repair of plate cut edges	P.S.0.C.1.1 (R1) Para 3.2.2	X	
3.3.1	Assembly, fit-up requirements	P.S.1.C.1.2 (R3) Para 7.1	X	
3.3.2	Partial Joint penetration groove weld fit-up	P.S.1.C.1.2 (R3) Para 7.3	X	
3.3.3	Butt weld alignment	P.S.1.C.1.2 (R3) Para 7.4	X	
3.3.4	Groove weld joint tolerance	P.S.1.C.1.2 (R3) Para 7.7	X	
3.3.5	Groove produced by gouging	P.S.1.C.1.2 (R3) Para 11.1.7	X	
3.3.6	Usage of alignment clamps	P.S.1.C.1.2 (R3) Para 7.8	X	
3.3.7	Tack weld requirement	P.S.1.C.1.2 (R3) Para 8.1-8.8	X	
3.4	Control of distortion and shrinkage stresses	P.S.1.C.1.2 (R3) Para 12.1-12.8	X	
3.5	Dimensional tolerances	P.S.1.C.1.2 (R3) Para 7.1-7.8 P.S.0.C.1.1 (R1) Para 3.5	X	
3.6	Weld profile	N-VT-2 (R2) Para 5.7.8	X	
3.6.3	Base metal thinning and surface finishing	N-VT-2 (R2) Para 5.7.3 Para 6.1.16	X	
3.6.4	Undercut for buildings	N-VT-2 (R2) Para 5.7.2	X	
3.7.1- 3.7.2	Repair of weld and base metal	P.S.1.C.1.2 (R3) Para 13.0-13.5	X	
3.7.3	Straightening distorted areas by heating	P.S.1.C.1.2 (R3) Para 13.5	X	
3.7.4	Repair approval	P.S.1.C.1.2 (R3) Para 13.1	X	
3.7.5	Engr. notification prior to cutting completed welds	P.S.1.C.1.2 (R3) Para 13.1 and 13.5	X	

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
3.7.6	Scope requirement for rework of inaccessible welds	P.S.1.C.1.2 (R3) Para 13.4	X	
3.8	Peening	P.S.1.C.1.2 (R3) Para 11.1.10	X	
3.9	Stress relief heat treatment	P.S.1.C.1.2 (R3) Para 14.0-14.2	X	
3.9.2	Alternate or lower heat treatment			X
3.10.1	Cleaning and protective coatings	P.S.1.C.1.2 (R3) Para 15.1	X	
4.1.3	Filler metal storage	P.S.1.C.1.2 (R3) Para 9.4.2, 9.1.2, 9.1.3	X	
4.2	Preheat and interpass temperature requirements	P.S.1.C.1.2 (R3) Para 10.0-10.5	X	
4.4	Arc strikes	P.S.1.C.1.2 (R3) Para 8.9	X	
4.5	Interpass cleaning	P.S.1.C.1.2 (R3) Para 11.1.6	X	
4.6	Groove weld termination	P.S.1.C.1.2 (R3) Para 11.1.7, 11.1.8, 11.1.9	X	
4.7	Groove weld backing	P.S.1.C.1.2 (R3) Para 11.1.7, 11.1.8	X	
4.8	Caulking of welds	P.S.1.C.1.2 (R3) Para 11.1.11	X	
4.9.1	SMAW electrodes per latest edition of code	P.S.1.C.1.2 (R3) Para 9.1.1	X	
4.9.2	Requirements of low-hydrogen	P.S.1.C.1.2 (R3)	X	
4.9.3	covered electrodes	Para 9.1.2, 9.1.3		
5.3	Welder qualification per parts III, IV, V of AWS D1.1	P.S.1.C.1.2 (R3) Para 5.1	X	
5.15-5.31	Welder qualification test	P.S.1.C.1.2 (R3) Para 5.1	X	
5.32-5.42	Welding operator qualification	P.S.1.C.1.2 (R3) Para 5.1	X	
5.43-5.52	Qualification of tackers	P.S.1.C.1.2 (R3) Para 5.1	X	
6.1-6.4	General inspection requirements	N-VT-2 (R2) all P.S.1.C.1.2 (R3) all	X	
6.5	Inspection of work and records	N-VT-2 (R2) all P.S.1.C.1.2 (R3) all	X	
6.7.3	Radiographic testing per code			X

Checklist CNP-11

CODE/STANDARD REQUIREMENTS
AWS D1.1—Rev 2-74 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
6.7.4	Ultrasonic testing per code			X
6.7.5	Magnetic particle testing per ASTM spec. E109 and AWS D1.1			X
6.7.6	Dye penetrant inspection per ASTM Spec. E165 and D1.1			X
8.14	Temporary welds	P.S.1.C.1.2 (R3) Para 8	X	
8.15.1	Visual inspection of welds	N-VT-2 Para 5.0	X	
8.15.2	NDE of welds except UT			X
8.15.3	UT of welds			X
9.22.1	Edge preparation	P.S.1.C.1.2 (R3) Para 19.3	X	
9.22.2	Oxygen cut surfaces	P.S.1.C.1.2 (R3) Para 6.5	X	
9.24	Temporary welds	P.S.1.C.1.2 (R3) Para 8.8	X	
9.25.1	Visual inspection of welds	N-VT-2 (R2) all	X	
9.25.2	NDE of welds except UT			X
9.25.3	UT of welds			X
10.14.1	Fit-up of fillet welds	P.S.1.C.1.2 (R3) Para 7.1	X	
10.14.2	Girth weld	P.S.1.C.1.2 (R3) Para 7.5	X	
10.14.3	Groove weld configuration	P.S.1.C.1.2 (R3) Para 7.7	X	
10.15	Temporary welds	P.S.1.C.1.2 (R3) Para 8.0	X	
10.17.1	Visual inspection of welds	N-VT-2 (R2) Para 5.0	X	
10.17.2	NDE of welds except UT			X
10.17.3	UT of welds			X

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
111.1	General (welded joints)	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
111.2	Butt welds	P.S.1.M.1.2 (R4) Para 7.0 and 13.0	X	
111.3	Socket welds	P.S.1.M.1.2 (R4) Para 7.1 Drawing M.1.2-11 R6	X	
111.3.1	Requirements	P.S.1.M.1.2 (R4) Para 7.2 Drawing M.1.2-11 R6	X	
111.4	Fillet welds	P.S.1.M.1.2 (R4) Para 7.0	X	a
111.5	Seal welds	P.S.1.M.1.2 (R4) Para 7.0	X	
111.6 A-F	Circumferential joints	P.S.1.M.1.2 (R4) Para 7.0	X	
111.6.1 G7	Welded socket type or sleeve type joints	P.S.1.M.1.2 (R4) Para 7.0	X	
127.1.1	Welding processes (see A.1 through A.4 below)	P.S.1.M.1.2 (R4) Para 3.1	X	
127.2.1	Filler metal	P.S.1.M.1.2 (R4) Para 6.1	X	
127.2.2	Backing rings	P.S.1.M.1.2 (R4) Para 6.1	X	
127.3.1	Butt welds (see A.1 through A.4 below)			
A.1	End preparation	P.S.1.M.1.2 (R4) Para 5.0	X	
A.2	Dimensions	P.S.1.M.1.2 (R4) Para 7.0	X	
A.3	Boring end of pipe	P.S.1.M.1.2 (R4) Para 5.0	X	
A.4	Upset of end of pipe	P.S.1.M.1.2 (R4) Para 5.0	X	
B	Cleaning	P.S.1.M.1.2 (R4) Para 5.4 P.S.3.M.5.1 (R6) Para A.1	X	
C	Alignment	P.S.1.M.1.2 (R4) Para 11.0 P.S.3.M.5.1 (R6) Para A.4	X	
D	Spacing	P.S.1.M.1.2 (R4) Para 11.2 and 11.3	X	
127.3.2	Fillet welds	P.S.1.M.1.2 (R4) Para 7.0	X	
127.4	Procedure (see A and B below)			
127.4.1	General (see A and B below)			
A.	Qualification of WPS	P.S.1.M.1.2 (R4) Para 3.1	X	
B.	Environment	P.S.1.M.1.2 (R4) Para 14.1	X	

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
127.4.2	Girth butt welds (see A through D below)			
A.	Girth butt welds	P.S.1.M.1.2 (R4) Para 7.0	X	
B.	Tack welds	P.S.1.M.1.2 (R4) Para 14.3	X	
C.	Dimensional	P.S.1.M.1.2 (R4) Para 11.1	X	
D.	As-welded surfaces	P.S.1.M.1.2 (R4) Para 12.1	X	
D.1	Surface condition	P.S.1.M.1.2 (R4) Para 12.1	X	
D.2	Reinforcements	P.S.1.M.1.2 (R4) Para 12.1	X	
D.3	Undercut	P.S.3.M.5.1 (R6) Para B.5	X	
D.4	Surface conditioning	P.S.1.M.1.2 (R4) Para 15.7	X	
127.4.3	Longitudinal butt welds	P.S.1.M.1.2 (R4) Para 7.0	X	
127.4.4	Fillet welds	P.S.3.M.5.1 (R6) Para B.7.1, B.7.2	X	a
127.4.5	Seal welds	P.S.3.M.5.1 (R6) Para B.8.1	X	
127.4.9	Attachment welds	P.S.1.M.1.2 (R4) Para 7.1	X	
127.4.10	Heat Treatment	P.S.1.M.1.2 (R4) Para 10.1	X	
127.4.11	Weld defect repairs	P.S.1.M.1.2 (R4) Para 15.0	X	
127.5	Qualification (see 127.5.1 through 127.5.3 below)			
127.5.1	General	P.S.1.M.1.2 (R4) Para 3.1	X	
127.5.2	Welding responsibility	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
127.5.3	Qualification responsibility			
A.	Procedures	P.S.1.M.1.2 (R4) Para 3.1	X	
B.	Welders and welding operators	P.S.1.M.1.2 (R4) Para 4.1	X	
127.6	Qualification records	P.S.1.M.2.2 (R3) Para 2.5 and 2.6 P.S.3.M.5.1 (R6) Para 7.0	X	
131.2.1	Preheating	P.S.1.M.1.2 (R4) Para 9.0	X	
131.2.2	Preheat dissimilar materials	P.S.1.M.1.2 (R4) Para 9.0	X	
131.2.3	Check preheating	P.S.1.M.1.2 (R4) Para 9.4-9.5	X	

Checklist CNP-12

CODE/STANDARD REQUIREMENTS
ANSI B31.1-1973-S73 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
131.3	Postheat treatment (see 131.3.1 through 131.3.5 below)			
131.3.1	Postheat treatment different thickness	P.S.2.M.1.1 (R4) Para 4.0 P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.2	Heating methods	P.S.2.M.1.1 (R4) Para 2.0	X	
131.3.3	Dissimilar metals	P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.4	P-1 material	P.S.1.M.1.2 (R4) Para 10.0	X	
131.3.5	Local	P.S.1.M.1.2 (R4) Para 10.0 P.S.2.M.1.1 (R4) Para 2.3.1	X	
132.1 to 132.7	Preheating	P.S.1.M.1.2 (R4) Para 9.0	X	
133.3 to 133.6	Postheat treatment	P.S.2.M.1.1 (R4) Para all	X	
136.4.2	Visual examination	N-VT-3 (R4)	X	
136.4.3	Magnetic particle examination	N-MT-1 (R5)	X	
136.4.4	Liquid penetrant examination	N-PT-1 (R6)	X	
136.4.5	Radiography	N-RT-1 (R4)	X	

a. TVA has taken provisions of later code editions.

CODE/STANDARD REQUIREMENTS
ANSI B31.5-1966

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
527.2.1	Filler material	P.S.1.M.3.1 (R7) Para 2.1	X	
527.2.2	Backing rings	P.S.1.M.3.1 (R7) Para 2.1	X	
527.3.1	Butt Welds	P.S.1.M.1.2 (R4) Para 5.1	X	
	A. End prep	P.S.1.M.1.2 (R4) Para 5.1	X	
	B. Cleaning	P.S.1.M.1.2 (R4) Para 5.4	X	
	C. Alignment	P.S.1.M.1.2 (R4) Para 11.1	X	
	D. Spacing	P.S.1.M.1.2 (R4) Para 11.2, 11.3, and 11.4	X	
527.3.2	Fillet welds	P.S.1.M.1.2 (R4) Para 7.1	X	
527.4	Procedures			
527.4.1	General	P.S.1.M.1.2 (R4) Para 14.1	X	
527.4.2	Butt welds	P.S.1.M.1.2 (R4) Para 7.1	X	
527.4.4	Socket & fillet weld	P.S.3.M.5.1 (R6) Para B.7	X	
527.4.5	Seal welds	P.S.3.M.5.1 (R6) Para B.8	X	
527.5	Qualifications			
527.5.1	General	P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
527.6	Records	P.S.3.M.5.1 (R6) Para 7.0 P.S.1.M.1.2 (R4) Para 3.0 and 4.0	X	
527.7	Defect repair	P.S.1.M.1.2 (R4) Para 15.0	X	
531.2	Preheat			
531.2.1	Preheat	P.S.1.M.1.2 (R4) Para 9.0	X	
531.2.2	Preheat dissimilar material	P.S.1.M.1.2 (R4) Para 9.3	X	
531.2.3	Checking preheat	P.S.1.M.1.2 (R4) Para 9.4	X	
531.3.1	Postheat treatment	P.S.1.M.1.2 (R4) Para 10.0	X	
531.3.2				
531.3.3	Heating method	P.S.2.M.1.1 (R4) Para 2.0	X	
531.3.4	Dissimilar metals	P.S.1.M.1.2 (R4) Para 10.1	X	
531.3.5	Temperature measurement	P.S.2.M.1.1 (R4) Para 5.0	X	
531.3.6	Interruption of welding prior to PWHT	P.S.1.M.1.2 (R4) Para 14.20 and 14.21	X	
531.3.7	PWHT compatibility with base metal	P.S.1.M.1.2 (R4) Para 10.1	X	

Checklist CNP-13

CODE/STANDARD REQUIREMENTS
ANSI B31.5-1966 (continued)

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
531.3.8	Holding temp	P.S.2.M.1.1 (R4) Para 4.0	X	
531.3.9	Local PWHT	P.S.2.M.1.1 (R4) Para 2.3	X	
536	Inspection			
536.1	Final inspection	N-VT-3 (R4)	X	
536.1.2	Circumferential welds	N-VT-3 (R4)	X	

Checklist CNP-14

CODE/STANDARD REQUIREMENTS
ASME SECTION XI (REPAIR RULES)
1980 THROUGH WINTER 1981

Criteria	Title/Subject	TVA Document	Compliance	
			Yes	No
IWA-1400 (j) and (k)	Repair records	Part II, Section 2.3, Para 3.3 Procedure 1402.02	X	
IWA-4120	Additional rules and requirements	NQAM, Part II, Section 2.3, Para 3.1.3 Procedure 1402.02	X	
IWA-4130	Repair program	NQAM, Part II, Section 2.3, Para 3.0 and 3.1.2 Procedure 1402.02	X	
IWA-4140	Inspection	NQAM, Part II, Section 2.3 Procedure 1402.02	X ^a	
IWA-4200	Material	NQAM, Part II, Section 2.3, Para 3.0 and 3.1.2 Procedure 1402.02	X	
IWA-4300	Welding and welder qualifications	NQAM, Part II, Section 2.3, Para 3.0 and 3.1.2 Procedure 1402.02	X	

a. The TVA program exempts involvement of the ANII for tack and seal welds to valve seats. This exemption was accepted by the ANIA (Hartford Steam Boiler) on May 6, 1983.

Enclosure 1

ENCLOSURE 1
Page 1 of 1

SUBCATEGORY REPORT

Operation 30700 R1

ISSUE

Nuclear Power Site
Program/Procedures

6586T

Enclosure 2