T.V.A.

Welding Project

Watts Bar N.P.

Phase I Review

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VOLUME 6

TVA WELDING PROJECT

WATTS BAR NUCLEAR PLANT

PHASE I REPORT

This report has been prepared, reviewed and approved by the TVA Welding Project.

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ABSTRACT

This report presents the results of a programmatic review of the Tennessee Valley Authority (TVA) welding program for the Watts Bar Nuclear Plant (WBN). The review was performed by the TVA Welding Project (WP) and is referred to as Phase I of the WP effort.

The primary purposes of Phase I of the WP program review were to ensure that the TVA program (design output documents, policies, and procedures) correctly reflects TVA commitments and regulatory requirements and to identify and categorize concerns and potential deficiencies in the welding program to be investigated in Phase II of the WP effort.

An audit-type review of the TVA welding program was performed to determine if:

1. TVA design output documents properly delineate the commitments detailed in the Final Safety Analysis Report (FSAR).

2. Implementing procedures of the user organizations incorporate and correctly convey the commitments made through the FSAR and the welding requirements defined in the TVA general and WBN project construction specifications.

Included in the review of the implementing procedures used by the construction and operations organizations is the assessment conducted by the U.S. Department of Energy Weld Evaluation Project (DOE/WEP).

The quality indicators, including employee concerns, were identified, categorized, and analyzed to evaluate their effect on the welding program.

The results of the review are as follows:

1. The quality/regulatory guidelines and codes/standards criteria applicable to the welding activities performed at WBN were incorporated into the controlling documents of the user organizations.

2. The design output documents adequately reflect the FSAR commitments with the exceptions noted in this report.

3. The quality indicators revealed instances of unclear and indirect references and instructions in design, construction, and operations documents.

The results of the Phase I review support the conclusion that the TVA welding program used at WBN was in compliance with the FSAR commitments. This report provides recommendations for enhancing the existing TVA welding program at WBN.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
AWS	American Welding Society
CAR	Corrective Action Report
DOE	Department of Energy
DPM	Division of Nuclear Power Procedure Manual
DR	Discrepancy Report
FSAR	Final Safety Analysis Report
G-29	General Construction Specification G-29
NC	Nuclear Construction
NCM	Nuclear Components Manual
NCR	Nonconformance Report
NDE	Non-Destructive Examination
NE	Nuclear Engineering
NO	Nuclear Operations
NOI	Notification of Indication
NQA	Nuclear Quality Assurance
NQAM	Nuclear Quality Assurance Manual
NRC	Nuclear Regulatory Commission
QA	Quality Assurance
QAPM	Quality Assurance Program Manual
QTPM	Quality Training Program Manual
RG	Regulatory Guide
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
TVA	Tennessee Valley Authority
WBN	Watts Bar Nuclear Plant
WEP	Weld Evaluation Project
WP	Welding Project

1.0 OVERALL SUMMARY

1.1 Introduction

The scope of the TVA Welding Project (WP) Phase I Report was a programmatic assessment of the TVA welding program for Watts Bar Nuclear Plant (WBN), hereafter referred to as the welding program. The purposes of this programmatic assessment were:

1. to determine the codes, standards, and regulations to which TVA was committed for the design, construction, and operation of the plant,

2. to determine if the welding commitments were reflected in the design output documents, and

3. to determine if the construction and operations programs reflect the design and quality requirements of the codes, standards, and regulations.

Quality indicators (documented problems identified by various features of TVA's Quality Assurance (QA) program and by regulatory agencies), including employee concerns, were also analyzed to evaluate areas to be further investigated. The data for such quality indicators was collected around January 1986 when quality indicator reviews were conducted for all sites.

The WP work was accomplished by personnel experienced and knowledgeable in the organization and functional responsibilities of the three line organizations which shared the responsibility for the welding program. The WP was an independent organization which was not under WBN management. The WP had complete freedom to pursue any and all issues related to the welding program which the WP determined appropriate. Simultaneous reviews were conducted by each of the three line organizations with close coordination and sharing of information. Each line organization review is documented in separate sections of this report.

From the time that the Phase I review was started until the time that this report was prepared, the names of the line organizations have changed. However, the basic functions and responsibilities of the line organizations have not changed. For purposes of this report, the current names of the line organizations will be used. One line organization was responsible for the operation of the TVA nuclear plants. This organization, currently called Nuclear Operations (NO), was also responsible for implementing the welding program for maintenance and modifications. At that time, technical direction for the NO welding program was provided by a nuclear operations engineering group. Another line organization was responsible for implementing the welding program for plant construction activities. This organization is currently called Nuclear Construction (NC). Technical direction for the construction welding program was provided by the third line organization which was responsible for the engineering activities of TVA's nuclear program. This organization is currently called Nuclear Engineering (NE). Presently, NE provides a single source of technical direction for all welding activities at WBN; NC implements the welding program for plant construction, modifications, and maintenance activities.

A separate and independent programmatic review of welding activities was performed by the United States Department of Energy (DOE) as part of its Weld Evaluation Project (WEP) at Watts Bar Nuclear Plant unit 1. A WP assessment of the results and conclusions presented in the DOE/WEP report is included as section 2.0 of this report.

The WP review of the NE program was based on the following elements:

1. Determination of the welding-related commitments from the FSAR and other licensing documents.

2. Determination if the welding-related commitments are properly reflected in the design output documents.

3. Analysis of quality indicators and employee concerns applicable to NE for indications of programmatic deficiencies.

4. Determination of the adequacy of the NE program to produce documents that correctly reflect the technical requirements required by the welding commitments.

The WP review of the NC program was based on the following elements:

1. A review of the construction site-implementing procedures to determine if they correctly incorporate and convey all of the necessary welding requirements.

2. Evaluation of weld repair and weld cutout rates for safety-related pipe welds.

3. Analysis of quality indicators and employee concerns applicable to NC for indications of programmatic deficiencies.

The WP review of the NO program was based on the following elements:

1. A review of the NO site-implementing procedures to determine whether they correctly incorporate and convey all of the necessary welding requirements.

2. Analysis of quality indicators and employee concerns applicable to NO for indications of programmatic deficiencies.

The results of the WP reviews of the NE, NC, and NO programs are presented in sections 3.0, 4.0, and 5.0 of this report, respectively. Each section presents recommendations which were applicable at the time of the original reviews, i.e., early 1986. Those recommendations which have been fulfilled between that time and the present are discussed in section 1.2 of this report. The remaining programmatic recommendations have been consolidated in section 1.4 of this report.

The TVA WP Phase I activities for WBN were accomplished as planned in the Tennessee Valley Authority Welding Project Program Description which was submitted to NRC in January 1986. The specific review activities were conducted in accordance with approved project procedures issued as part of the Welding Project - Project Manual.

1.2 Results

The following are the results of the WP review of the welding program:

1. The review revealed commitments to a number of national codes and standards, specifications, and regulations.

2. The NE review revealed the need for minor corrections and additional notes on specific design drawings. These changes are for the purpose of enhancing the program to ensure that each drawing clearly and directly references the correct source of information required for implementation. The drawing enhancements need to be made only when the drawings are revised for other purposes. A sampling of drawing revisions issued subsequent to the NE review indicates that the essentials of that recommendation have already been implemented. Therefore, WP considers this item closed, with no further action required.

3. The NO review revealed 15 specific areas for procedure improvement. All of these have been subsequently resolved.

4. The review of commitment documents against site construction implementing procedures revealed that, except as discussed in item 5 below, the commitments were identified and incorporated in the site-implementing procedures. There are, however, several areas which are ambiguous, lack sufficient implementing details, and do not identify the source of the commitment. The site-implementing procedure system is generally cumbersome and difficult to follow. Specific discrepancies found in the WBN-implementing procedures and WP recommendations for corrective action have been forwarded to the appropriate site personnel. Actions planned, underway, or completed to correct the procedural discrepancies are discussed in section 4.9 of this report. Attachment 7.9 lists the procedural discrepancies and summarizes the actions discussed in section 4.9. Recommendation 1 of section 1.4 will assure tracking of this effort to completion.

5. The review revealed some instances where the requirements of WBN Construction Specification N3C-884 were not incorporated into the NC-implementing procedures. Because of a change to the engineering criteria for visual inspection which occurred in February 1981, the visual inspection performed on pipe rupture mitigative devices fabricated after February 1981 may not have been to the same criteria specified in the construction specification. The differences in the criteria were not significant enough to warrant a sample selection for reinspection during Phase II. Nevertheless, those pipe rupture mitigative devices that were reinspected during the Phase II effort

were shown by engineering calculations to be acceptable as is. This discrepancy and other minor discrepancies are detailed in attachment 7.9. Actions planned, underway, or completed are also given in attachment 7.9.

6. At WBN, NC uses a computerized weld monitoring program to status and assimilate data on critical piping welds made in the primary fluid systems of the plant. The program was initiated in 1975 with prior weld histories incorporated into the data base. The weld monitoring program contains pertinent summary information on each weld and a complete history of all weld repair activities. Data extracted from the weld monitoring program may be used as one indicator of the effectiveness of the welding program at WBN. Data extracted from the weld monitoring system for the welds statused up to January 10, 1986, was reviewed. This review revealed that the piping welds requiring cut out or repair for workmanship (improper implementation of the welding program) represent one and one-half percent of the total installed as of January 10, 1986.

7. The quality indicator analysis data base was comprised of 2,235 quality indicators for the three line organizations involved. These included employee concerns which comprise 21 percent of the total. The analysis revealed the following breakdown:

   a. Procedural Violation - 57 percent (1273)
   b. Program Concerns - 19 percent (432)
   c. Hardware - 8 percent (172)
   d. Welding Materials - 6 percent (141)
   e. Personnel Qualification - 6 percent (136)
   f. Design Deficiencies - 4 percent (81)

8. The NO procedures which provided the technical requirements for welding were derived from the specifications controlled by NE but were not reviewed or approved by NE. This situation was resolved by incorporating the welding technical requirements of Division of Nuclear Power Procedure Manual (DPM) N73M2, "Process Specification for Welding, Heat Treatment and Allied Field Operations," into General Construction Specification G-29, "Process Specifications for Welding, Heat Treatment, Nondestructive Examination, and Allied Field Fabrication Operations," thus establishing one source corporate document controlled by NE; hereafter, General Construction Specification G-29 will be referred to as G-29. No follow up or additional action is required in this matter.

9. The review of design output consistency for the FSAR commitment to the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) code identified the need for NE to specifically delineate the technical requirements for welding fabrication of seismically designed ductwork. The SMACNA code allows welding and other fabrication techniques based on the constructor's skill and technology. The current TVA specification improvement program will resolve any problem of ambiguity by including a specific section on welding of ductwork in the Master Specification MS-NEB-007, "General Welding, Brazing and Soldering Requirements for Installation, Modification, and Maintenance."

1.3 Conclusions

The following are the conclusion from the WP Phase I review of the welding program:

1. The design process is producing design output documents that properly reflect the welding and welding-related commitments.

2. The technical requirements from the codes, standards, and regulations relating to welding were incorporated into the welding programs of both construction and operations.

3. There were instances of unclear and indirect references and instructions in design, construction, and operations documents.

4. There is a need for specific changes to numerous implementing procedures and drawings. Many of the recommended changes are for the purpose of enhancing the program to ensure that each procedure and drawing clearly and directly reference the sources of information required for implementation. These changes will result in a system that is less cumbersome and less difficult to follow and will reduce reliance on indirect references, supplementing instructions, and personal knowledge.

5. A need existed for site-specific communication links to provide user feedback on NE output documents. The WBN design project organization, which includes all required engineering disciplines, has subsequently been stationed onsite and provides a vehicle to fulfill this need. The effectiveness of this and other applicable communication improvement programs will be included in the Phase II Report.

6. The welding program would be improved by adding or revising design output documents as necessary to meet user organization needs in the area of welding and nondestructive examination (NDE). The revised Corporate Nuclear Performance Plan recognizes the need and commits to developing a new system of Office of Nuclear Power policies, directives, standards, procedures, and instructions to govern its nuclear activities. This commitment adequately addresses the welding program needs, and a redundant recommendation is not included in this report.

7. The fact that 57 percent of the quality indicators were categorized as procedural violations provides some evidence that welding activities were controlled by a program of implementing procedures, a quality control program which monitored compliance, and a quality assurance program through which deviations were reported. The frequency in this category also supports the WP conclusion that the site-implementing procedures system was generally cumbersome and difficult to follow. This category encompasses elements which reflect the day-to-day operations of the welding program by identifying, documenting, evaluating, and providing repair/corrective

action instructions, where necessary, for welds and welding-related activities found noncompliant during initial inspection activities.

8. The distribution of 43 percent of the quality indicators over five categories with the majority (19 percent) being in program concerns identifies the need for improvement in the interdependent areas of training and communications. Communications must include enhancement of the written programs, including design output documents, to facilitate clear understanding of the requirements/intent by the users. The need for better training and communication is further supported by the analysis of employee concerns. The majority of the concerns were expressed by individuals who did not fully understand the overall welding quality assurance program and did not know the status of previously accepted work when standards/requirements were upgraded. Also, they perceived that they did not have an effective method of questioning the program and receiving authoritative responses.

1.4 Recommendations

The WP assessment of the NE review, NC review, NO review, and the DOE/WEP review resulted in several programmatic recommendations. These welding-related recommendations are listed here and will be further evaluated during the Phase II work. Those that are validated by the Phase II work will be carried forward in that report as commitments to be fulfilled. Only those recommendations which are programmatic are addressed in this overall summary. Recommendations which are unique to the line organization will be (and in most cases already have been) implemented by the line organization.

1. Upgrade site-implementing procedures to provide clear definition of requirements and responsibilities.

2. Revise G-29 (or properly organize successor documents) to specifically delineate applicability of the individual process specifications.

3. Indoctrinate and provide ongoing training/orientation to engineers, designers, technical supervisors, and engineering managers in the following areas:

   a. Code applicability
   b. Requirements for constructability and inspectability of welded designs
   c. Contents and use of G-29
   d. Logical presentation of information in output documents
   e. Design requirements embodied in welding codes
   f. Responsibility of NE to provide fabrication, erection, and examination requirements

4. Provide more effective training to appropriate engineering, craft, and QA personnel in orientation programs which emphasizes:

   a. Importance of maintaining welder qualification (i.e., limits of qualification and continuity)

b. Preparation of work instructions
c. Use of welding procedures which comply with NE technical requirements
d. Preparation of Notification of Indication (NOI) forms
e. Necessity of accurate filler metal recordkeeping on weld data sheets, particularly when combination process welding procedures are used (i.e., record type, size, and traceability reference for all filler metal used)

5. Communication among supervisors, engineers, inspectors, and craftsmen, as individuals and as groups, is essential. An open and comfortable atmosphere must prevail where individuals feel they can ask responsible questions. When procedure revisions or other changes create departures from past practices, the affected employees must be made aware of the reason and intent, as well as the letter of the changes.

6. Upon completion of Phase II, evaluate the need for NE to review and approve user organization implementing documents to determine that the design intent is satisfied.

7. Perform a corporate review of ANSI N45.2 series standards and the construction implementing documents to determine the level of TVA fulfillment of the standards. Based upon this review, revise the FSAR as appropriate to document the degree to which the standard was implemented.

8. Implement an effective trending program with emphasis on preventive action.

9. Extend the site director's initiative to eliminate separate programs to accomplish like work activities. Specifically, the separate inspector certification programs for each of the units should be eliminated, and control of maintenance welding should be integrated into the program which controls initial installation and modifications.

10. Welding qualifications/continuity and weld data sheets should be computerized to provide quicker and more complete access to data. The need to retrofit past data into these systems should be evaluated and determined by the implementing organizations.

2.0 WELDING PROJECT REVIEW OF DOE/WEP REPORT

2.1 Background

DOE/WEP was formed as a result of a December 1985 interagency agreement and technical assistance plan between DOE and TVA. The DOE/WEP was formed to provide TVA with an independent assessment of the quality of safety-related welding performed by TVA during construction of WBN unit 1. The DOE/WEP was conducted by EG&G Idaho, Inc., as contractor to the DOE.

The specific objectives of the DOE/WEP were to:

1. Assess compliance of TVA's documented weld program to the requirements in the WBN FSAR and amendments through February 1, 1986.

2. Assess the applicable TVA employee concerns and quality documents to determine if they identify quality problems with the TVA-performed, safety-related welds.

3. Evaluate TVA's as-constructed plant weld status by conducting an examination of the plant welds, evaluating the results, and, when deviations were determined to be unacceptable, analyzing and concurring with TVA's corrective action proposals for these deviations.

4. Provide TVA with a statement of the compliance of the plant welds with applicable construction welding codes.

The results of objective 1 were provided to TVA in December 1986 in report No. DOE/ID-10152, "Weld Program Review, Department of Energy Weld Evaluation Project, TVA Watts Bar Plant Unit 1." This report was submitted to the Nuclear Regulatory Commission (NRC) by reference 6.1. Only this portion of the DOE/WEP efforts was assessed for the WP Phase I review. The other three objectives of the DOE/WEP will be addressed in the WP Phase II for WBN.

2.2 Scope

The scope of the DOE/WEP review for Phase I was to establish that programmatic requirements from the applicable codes and standards had been incorporated in the welding program at WBN unit 1. Specifically, the Phase I objective was to assess compliance of the TVA safety-related welding program to the requirements in the WBN FSAR including amendments through February 1, 1986, and to provide TVA with any identified deficiencies. This review was intended to determine whether the welding-related requirements had been incorporated into some aspect of the welding program. It was not intended to verify that all TVA procedures/specifications included each of the criteria.

2.3 Methodology

The program was directed at the construction activities associated with field fabrication and installation and at the subsequent modification and repair activities performed by NO. The review was divided into the following two areas for both NC and NO.

1. Quality and Regulatory Guides

The Quality and Regulatory Guides review was to verify that the quality assurance requirements from the American Society of Mechanical Engineers (ASME) code, regulatory guides, and the American National Standards Institute (ANSI) standards related to inspection and welding activities were incorporated into the TVA Quality Assurance Program.

2. Codes and Standards

The Codes and Standards review was to verify that the technical requirements from the ASME, ANSI, and American Welding Society (AWS) codes and the regulatory guides related to inspection and welding activities were incorporated into the implementing documents.

The review was subdivided into a current and past phase for each organization. The current category represented the TVA welding program in effect on February 1, 1986, and the past category represented the TVA welding programs that had been in effect from the date of the first safety-related weld for each organization.

The review was performed using a series of checklists which identified the applicable criteria from the quality and regulatory guides and the codes and standards. Additionally, checklists were developed to specifically address the following welding and inspection activities:

a. Qualification of welders
b. Assignment and documentation of welders
c. Control and issue of filler material
d. Qualification of inspectors
e. Inspection of welding activities

2.4 Summary of Evaluation Results

1. Quality and Regulatory Guides - NC

The DOE/WEP review identified 115 criteria associated with the quality and regulatory guide checklists related to the construction program. The review also determined that all criteria had been incorporated into the current TVA welding program. Additionally, all but 18 criteria had been incorporated in the welding program in some form from the time of the first safety-related weld, and those 18 criteria were incorporated just after the start of welding. However, these criteria had been addressed in early documents applicable to WBN.

2. Quality and Regulatory Guides - NO

The DOE/WEP review identified 94 criteria associated with the quality and regulatory guide checklists related to the operations program. All criteria had been incorporated into the program from the first safety-related weld.

3. Codes and Standards - NC

The DOE/WEP review identified 480 criteria associated with the codes and standards checklists related to the construction program. The review also determined that all criteria had been incorporated into the current TVA welding program. Additionally, all but 24 criteria had been incorporated in the welding program from the time of the first safety-related weld and those 24 criteria which were added in the early phase of construction. However, those 24 criteria had been addressed through other TVA documents applicable to WBN or had not been used at WBN before the date incorporated.

4. Codes and Standards - NO

The DOE/WEP review identified 484 criteria associated with the codes and standards checklists related to the operations program. All but 11 criteria had been incorporated into the program from the first safety-related welds, and those 11 criteria have not been required for activities performed by NO.

2.5 TVA Assessment

The conclusions presented in the DOE/WEP report support the conclusions independently reached by the TVA Welding Project.

The WP considers that the results of the welding program review performed by DOE/WEP can be applied to the entire WBN because all safety-related welding at WBN was performed using the same welding program. The extension of the DOE/WEP conclusions to unit 2 and the extension of the timeframe under study from February 1, 1986 to November 30, 1987, is documented by reference 6.2.

3.0 ENGINEERING REVIEW

3.1 Work Plan

The Welding Project Procedure (WP)-01, "Commitment Verification and Documentation," was used to determine if the NE design drawings and specifications properly depict and convey the welding commitments/requirements for WBN. The evaluation spanned the era from the first safety-related weld (April 1974) through February 1, 1986 (cutoff date for Phase I review). Welding-related quality indicators were reviewed for evidence of any programmatic deficiency.

3.2 Action Steps

1. Review the FSAR (including licensing commitments not directly reflected in the FSAR) to determine the welding-related commitments.

2. Determine if the welding-related commitments are reflected in design output documents.

3. Review the welding-related employee concerns and other welding-related quality indicators for indications of programmatic deficiencies.

4. Determine the adequacy of the NE program to produce documents that correctly depict and convey the welding commitments.

3.3 Methods

The FSAR (including licensing commitments not directly reflected in the FSAR) was reviewed to determine the commitments related to welding that must be satisfied by NE. Using the work plan of section 3.1, a review of NE output documents was performed to determine if commitments related to welding are properly reflected in the output documents. An auditing type technique was used to verify that mechanical and civil welding commitments had been correctly incorporated into the design output documents. A review of the most frequently used welding and NDE procedures of G-29 was performed to verify compliance with the codes and specifications listed in the scope of each procedure.

A review of quality indicators, including employee concerns, was performed to determine if indications of programmatic deficiencies existed. Each employee concern was evaluated in accordance with WP-03, "Evaluation and Analysis of Employee Concerns," to determine the effect of the concern on the welding program or welded components, systems, or structures. All quality indicators were assembled and classified by NC in accordance with WP-02, "Assembling and Evaluating Quality Indicators."

3.4 Results

A review of the FSAR indicated that TVA is committed to a number of national codes, standards, specifications, and regulations. Attachment 7.1 lists these commitments. Attachment 7.2 is a block diagram illustrating the design process as it relates to identifying and specifying welding-related requirements to the user organization and the interrelationships of the written program governing quality.

Attachment 7.3 presents the results of the review of the 25 most commonly used welding procedures of G-29. One minor discrepancy was identified which has been corrected by issue of P.S.3.M.3.1., revision 3, Addendum 2, on March 3, 1986. The results provide confidence that welding-related commitments are properly reflected in G-29.

There were 100 separate commitments reviewed for structural welding. Attachment 7.4 provides the distribution of these 100 commitments by feature and building. The data sheets for commitment consistency audits are available in reference 6.3. The audit data sheets are summarized in attachment 7.5. The audits resulted in identification of 7 commitments (of the 100 reviewed) with minor inconsistencies in the incorporation of FSAR requirements into design output documents. In addition, 11 other audit data sheets indicated that, although found consistent, a more precise reference to upper-tier documents would have been helpful if incorporated. In all 18 cases, indirect references through general note drawings and the knowledge and experience of the construction personnel effectively ensured compliance with G-29.

There were 72 separate commitments reviewed for mechanical welding. The data sheets for the commitment consistency audits and the commitment flowcharts developed for each of the 30 mechanical systems involved are available in references 6.4 and 6.5, respectively. The distribution of the 72 commitments over 30 systems is shown in attachment 7.6, and the audit data sheets are summarized in attachment 7.7. One of the 72 commitments was determined to have minor inconsistencies in its incorporation into design output documents. In addition, 19 other audit data sheets indicate that, although found consistent, a more precise reference to upper-tier documents, additional cross referencing, and minor error correcting would have made the program easier to follow. In all 20 cases, the indirect references, obviousness of minor error, and the knowledge and experience of the construction personnel effectively insured compliance with G-29. The need to uniquely identify the technical requirements for welding fabrication of ductwork was also recognized.

Although the reviews of both structural and mechanical welding reflect that the commitments are adequately addressed, the review of the output documents indicates a need for the design requirements to be shown in a more direct manner. The output documents are not always clear and precise in reflecting welding-related requirements that the user organization must implement.

The results of the review of quality indicators did not show indications of any NE programmatic deficiencies. Evaluation of the employee concerns considered to be welding related showed that many of the concerns were not applicable to the welding program. Each of the remaining employee concerns was considered for evaluation purposes to be true and accurate and could be placed in more than one deficiency category. It was determined that improper program implementation was the root cause of the concerns. The results indicated a need for improvement, particularly in the areas of instructions, procedures and drawings, control of special processes, and to a lesser degree in design control, inspections, nonconformances, and QA records. Poor communication between NE and the user organizations was also identified as a possible problem area.

3.5 Conclusions and Recommendations

Based upon a thorough review of the work that has been done for Phase I, the design process as embodied in the NE-written procedures is producing output documents that adequately reflect welding-related commitments. No deficiencies were identified which would question the quality of components, systems, or structures, except as noted in the following.

Adequate requirements were not provided by NE in the design output for welding ductwork for seismic purposes. This initial deficiency was discovered in 1980 and was compounded by subsequent improper implementation of corrective action by both NE and NC. This matter is discussed in detail in the Welding Project Employee Concern Evaluation Report WP-05-WBN, and corrective action is being tracked by Nonconformance Report (NCR) WBN 7077 and Significant Condition Reports WBN MEB 8714, WBN MEB 8721, and WBN MEB 8722.

The review does show the need for improvement in NE output documents to clearly and directly specify welding requirements and to present information in a more logical manner.

The following recommendations are made as a result of the Phase I work and will be reevaluated at the conclusion of Phase II.

1. Indoctrinate and provide ongoing training/orientation to engineers, designers, technical supervisors, and engineering managers in the following areas:

    a. Code applicability
    b. Requirements for constructability of welded designs
    c. Contents and use of G-29
    d. Logical presentation of information in output documents
    e. Design requirements from welding codes.
    f. Responsibility of NE to provide fabrication, erection, and examination requirements.

2. Establish site-specific communication link to obtain feedback from the user on NE output documents. Prepare additional drawings/specifications/instructions or revise existing documents as necessary to meet user organization needs in the area of welding and NDE.

3. When WBN safety-related drawings are revised, specify the related weld and NDE requirements and code requirements in a clear and direct manner.

4. Upon completion of Phase II, evaluate the need for NE to review and approve user organization implementing documents to determine that the design intent is satisfied.

4.0 CONSTRUCTION REVIEW

4.1 Work Plan

WP-01, "Commitment Verification and Documentation," was used to determine whether the WBN site-implementing procedures incorporate and correctly convey the commitments made through the FSAR and the welding requirements defined in the TVA general and WBN project construction specifications. WP-02, "Assembling and Evaluating Quality Indicators," was used to evaluate documented welding-related problems and discrepancies for evidence of programmatic deficiencies. In a similar manner, WP-03, "Evaluation and Analysis of Employee Concerns," was used to evaluate the welding-related employee concerns for indications of programmatic problems.

4.2 Action Steps

1. Review chapters 3 and 17 of the FSAR to identify welding-related TVA commitments to national standards and NRC regulatory guides.

2. Review the national standards and regulatory guides to identify the specific requirements related to the WBN construction welding program. This review does not include the welding construction codes, e.g., the ASME Boiler and Pressure Vessel Code and the AWS Structural Welding Code. Specific code mandated welding requirements are included in the TVA general and site-specific construction specifications, which are evaluated in section 3.0 of this report.

3. Review TVA general and WBN project construction specifications to identify specific welding requirements applicable to the WBN construction welding program.

4. Review the WBN site-implementing procedures to ensure that the requirements of the national standards, regulatory guides, and TVA specifications are incorporated and correctly conveyed to the user.

5. Review the welding-related quality indicators and employee concerns to identify any evidence of programmatic weaknesses or deficiencies.

4.3 Methods

Using the work plan and action steps described above, the WBN site-implementing procedures were reviewed and compared with the national standards, regulatory guides, and TVA specifications. The procedures were reviewed against each identified welding-related requirement to verify that the requirement was correctly defined and that the instructions in the procedures were adequate to implement the requirements. The WP reviewed and categorized the quality indicators and employee concerns in accordance with the WP procedures. These indicators were then analyzed by category to determine whether they provided evidence of a programmatic deficiency or weakness. Based on these reviews, an overall evaluation of the adequacy of the construction welding program was made, conclusions were drawn, and areas for improvement were identified.

4.4 Procedural Compliance Assessment

This assessment included a review of 70 WBN site-implementing procedures. The implementation of the welding program through the site procedures was determined to be adequate. The review did, however, disclose a number of specific discrepancies and general areas of weakness in the WBN welding-related, site-implementing procedures. A listing of the procedures reviewed is provided in attachment 7.8. Specific discrepancies identified and recommendations or actions planned or taken are provided in attachment 7.9.

The site-implementing procedures were augmented by the experience and personal knowledge of individuals doing the work, standard operating procedures (SOPs), and unit level administrative instructions. (SOPs and unit level instructions were not within the quality assurance program, and SOPs were only reviewed in part.) The site-implementing procedures generally display a lack of detail, i.e., the requirement is stated, but the specific details of how to implement the requirement are not defined. In some cases, the requirement source documents are not identified.

4.4.1 Details of Review

The WP evaluated the incorporation of welding-related commitments and requirements into the WBN site-implementing procedures. The following types of documents were identified as potential sources of commitments:

1. FSAR

   The FSAR contains references to a number of industry standards and regulatory guides. These documents contain specific commitments that were addressed by this review.

2. NRC Regulatory Guides (RG)

   Regulatory guides other than those endorsing ANSI N45.2.XX standards were also considered. An interpretation of these documents and applicable commitments has been provided by NE in either general or WBN project specifications. It was therefore unnecessary for NC to perform a detailed review of these RGs:

   a. RG 1.43, "Control of Stainless Steel Weld Cladding of Low Alloy Components"
   b. RG 1.44, "Control of the Use of Sensitized Stainless Steel"
   c. RG 1.50, "Control of Preheat Temperatures for Welding of Low Alloy Steel"
   d. RG 1.71, "Welder Qualification for Areas of Limited Access"

3. Nuclear Quality Assurance Manual (NQAM).

   The NQAM contains general statements which cross-reference the user to other documents and was reviewed only to assure that the cross-references were evaluated elsewhere.

4. Quality Assurance Manual for Nuclear Power Plant Components (NCM).

   The NCM contains the programmatic requirements mandated by section III, subsection NCA of the ASME Boiler and Pressure Vessel Code and was reviewed in detail.

5. General and WBN Project Construction Specifications.

   The following general and WBN project construction specifications were found to contain welding-related requirements:

   a. General Construction Specification G-29, "Process Specification for Welding, Heat Treatment, Nondestructive Examination, and Allied Field Fabrication Operations"

   b. Project Construction Specification N3C-884, "Fabrication and Installation of Pipe Rupture Mitigative Devices and Associated Support Structures"

   c. Project Construction Specification N3G-101, "Inspection, General-Construction Requirements Manual"

   d. Project Construction Specification N3G-881, "Identification of Structures, Systems, and Components Covered by the Watts Bar Nuclear Plant Quality Assurance Program"

6. NC Quality Assurance Program Manual (NC QAPM)

   The NC QAPM was reviewed and found to contain one detailed welding-related technical procedure. There are also general QA program commitments which were reviewed against site-implementing procedures.

7. NC Quality Training Program Manual (NC QTPM).

   The NC QTPM contains the detailed qualification and certification criteria for ASME, AWS, and the American Society for Nondestructive Testing (ASNT). The NC QTPM translates the upper-tier requirements for use at the site. This manual was reviewed against upper-tier documents, and the site-implementing procedures were reviewed against the manual.

Other national standards committed to by the FSAR include the following ANSI Standards with their endorsing NRC regulatory guides:

1. 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"

2. ANSI N45.2.6, "Qualification of Inspection, Examination, and Testing Personnel for Nuclear Power Plants"

3. 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"

ASNT Recommended Practice SNT-TC-1A is also included in the FSAR.

4.4.2 Results of Review

The review of commitment documents against site-implementing procedures revealed that the commitments were identified and incorporated in the site-implementing procedures. There are, however, several areas which are ambiguous, lack sufficient implementing details, or do not identify the source of the commitment. Also, specific requirements of the NCM were in some instances omitted.

The review revealed some instances where the requirements of construction specification N3C-884 were not incorporated into the NC-implementing procedures. Because of a change to the engineering criteria for visual inspection which occurred in February 1981, the visual inspections performed on pipe rupture mitigative devices fabricated after February 1981 may not have been to the same criteria specified in the construction specification. The differences in the criteria were not significant enough to warrant a sample selection for reinspection during Phase II. Nevertheless, those pipe rupture mitigative devices that were reinspected during the Phase II effort were shown by engineering calculations to be acceptable as is. This discrepancy and other minor discrepancies are detailed in attachment 7.9.

The procedural compliance assessment revealed ambiguities in the scope and applicability of the process specifications which make up the civil welding portion of G-29. It is often difficult to determine which of the process specifications is applicable to a given activity. This has resulted in at least one significant condition adverse to quality where welders and welding procedures meeting the requirements of one process specification were not qualified under another.

4.4.3 Conclusions Drawn from Procedural Compliance Assessment

1. The construction requirements manual, WBN Project Construction Specification N3G-101, does not identify the process specifications applicable to the plant features. Rather, this N3G-101 identifies the acceptance criteria source documents as G-29C, G-29E, or G-29M. These specifications no longer exist individually. They have been incorporated into the seven volume General Construction Specification G-29. This specification (and its predecessors) is not a standalone document. It is a cover sheet which bounds all of the individual welding-related, detailed process specifications and welding procedures. There is no approved document in the program which clearly defines which of these specifications and procedures is applicable in a given circumstance.

There is insufficient written guidance in the scope or applicability section of individual process specifications for a user to determine the proper applicability of a specification, unless explicit directions are included in drawings. In addition, some of the conditions stated in the process specifications for use in establishing applicability cannot be determined without reliance on the knowledge of individuals.

2. Not all requirements listed in the identified source documents have been adequately addressed in site-implementing procedures. In many cases, the requirement is stated in the procedure, but the details for implementation of the requirement are not provided. In some cases, the assignment of clear lines of responsibility for implementation of the requirements is not made. This is not to say that the welding requirements have not been properly implemented, rather, in most cases, these requirements have been correctly implemented. This is substantiated by the results of the WP detailed evaluations of the employee concerns which were conducted parallel to this review.

   Apparently, the reliance on the knowledge of individuals and the use of administrative standard operating procedures and unit level instructions has provided the level of detail necessary to implement the welding program requirements. This resulted even though the site-implementing procedures do not themselves contain all of the specific details for each requirement.

3. The site-implementing procedure network is cumbersome. A procedure may require that a welding inspection be conducted, but make no mention of specific weld inspection criteria in the body of the procedure. The user must be aware that the reference section of the procedure directs him to another procedure to obtain these requirements. Although the above condition is not desirable, an individual can locate all of the applicable criteria.

4. The site-implementing procedures are, in general, nonspecific. The terms "Responsible Quality Control Unit" and "Responsible Engineering Unit" are used almost exclusively. In the inspection of welding, this may apply to any engineering unit or quality control unit. Earlier revisions of the procedures lack details on how to perform tasks.

   An exception exists in that the construction specifications that have been "cover sheeted" contain more detail than the actual site-implementing procedures. Also, the level of detail has improved in some of the more recently issued procedures or revisions.

4.5 The WBN Weld Monitoring Program as an Indicator of Welding Program Implementation

A computerized weld monitoring program is used by NC to status and assimilate data on critical piping welds made in the primary fluid systems of the plant. For WBN these welds are in piping systems installed in accordance with ASME Section III and ANSI B31.1 requirements. All piping welds requiring quality assurance documentation are tracked in this program which was initiated in 1975. Prior weld histories were also incorporated into the data base.

The weld monitoring program contains pertinent summary information on each weld and a complete history of all weld repair activities. Thus, data extracted from the weld monitoring program may be used as one indicator of the effectiveness of the welding quality assurance program at WBN.

The weld monitoring program uses a conservative approach to the compilation of both repair and cutout rates. Reject rates are computed on a per weld basis, rather than by total inches of weld rejected versus total inches of weld completed. In addition, any failed inspection, from fitup through a major weld repair, is considered a reject when any attribute of the required inspection is rejectable.

The weld reject may be as minor as simply requiring cosmetic grinding, or as important as a failed radiographic examination which would result in excavation of a portion of the weld, repair welding, and documentation of repair inspections. Weld repairs requiring excavation are characteristically limited to relatively small portions of a weld. For example, a 6-inch pipe weld contains approximately 20.8 circumferential inches of weld and may require repair of a 3-inch section. While this amounts to a reject of only 14 percent of the weld length, the NC program will indicate a 100-percent reject of the weld.

A cut out is defined as the complete removal of a weld. Cut outs result from design changes after initial construction installations are completed and from repairs to defective welds where it is more economical to replace the weld in total than to excavate and repair several areas in the weld. In addition, welds which fail fitup inspections before welding actually commences are counted as cut outs even though the weld joint is only tacked up and prepared for welding.

Table 4-1 presents data extracted from the weld monitoring program for the welds statused up to January 10, 1986. From table 4-1, it can be seen that the piping welds requiring cut out or repair for workmanship (improper implementation of the welding program) represent only one and one-half percent of the total installed as of January 10, 1986.

Thus, the data extracted from the weld monitoring program shows a low incidence of lack of compliance with the welding requirements outlined in the construction specifications. This indicates that, notwithstanding the previously discussed weaknesses in the written program, the welding requirements were adequately conveyed to the craftsmen who installed these welds.

The most significant number of repairs to these welds evolves from the addition of weld filler metal pursuant to a nonconforming condition report. These repairs, involving over 10,000 welds, resulted from a change in weld measurement technique. This problem affected most plants under construction throughout the industry in 1980. Further details relating to this issue may be found in the discussion of quality indicators in section 4.6 of this report.

TABLE 4-1

Data Extracted From The Weld Monitoring System

STATUS AS OF JANUARY 10, 1986	UNIT 1	UNIT 2
Total Welds Completed and Inspected	73,381	36,119
Welds Cut Out for Workmanship	282	231
Weld Repairs		
For Workmanship	547	545
Addition of Weld Metal to Socket Welds	9,146	1,287
ASME Section XI ISI Grinding or Repairs	85	775
Total Weld Repairs	9,778	2,607
Overall Weld Reject Rate By Unit		
Total Welds Made	73,381	36,119
Total Cuts and Repairs	10,060	2,838
Total Reject Rate	13.7%	7.9%
Cuts and Repairs - Workmanship	829	776
Total Reject Rate - Workmanship	1.1%	2.1%
Overall Weld Reject Rate for Both Units		
Total Welds Made	109,500	
Total Cuts and Repairs	12,898	
Total Reject Rate	11.78%	
Cuts and Repairs - Workmanship	1,605	
Total Reject Rate - Workmanship	1.5%	

4.6 Analysis of Quality Indicators at WBN

4.6.1 Details of Analysis

An analysis of quality indicators was performed to identify overall welding program weaknesses. Data was assembled, categorized, and analyzed in accordance with the provisions of WP-02, "Assembling and Evaluating Quality Indicators, Revision 1, Appendix B."

The data base was made up of in-process and overview type documents. The majority of the data was extracted from NC-initiated deficiency reporting documents. These documents, or quality indicators, best define the documented problem areas of compliance within TVA's overall welding program. The presence of documented quality indicators is indicative that a quality assurance program is identifying and documenting nonconforming activities.

The data base considered in this evaluation was comprised of 2,235 quality indicators for NC, NE, and NO. Employee concerns are included in this study to provide additional data for overview and analysis purposes. (Section 4.7 of this report summarizes a separate evaluation of employee concern data only.)

4.6.2 Results of Analysis

The quality indicators were first grouped into six categories in accordance with WP-02, Appendix G, "Problem Categories." The problem categories and the categorization results are described below in descending order of occurrence. These results are presented graphically in attachment 7.10.

1. The analysis placed 1,273 (57 percent) of the indicators into the Procedural Violations category. This category is composed of elements which reflect the day-to-day operations of the welding program. These routinely identified noncompliant conditions require repairs by welding or other corrective methods along with the attendant issue of documentation.

   The analysis revealed three main areas of interest. Slightly over one-half of the quality indicators in this group evolved from individuals failing to follow procedures. Approximately one-quarter of the indicators were caused by inaccurate or missing weld documentation. Fourteen percent of the procedural violation group involved nonspecific weld defects reported in investigations and employee concerns.

   The fact that this category contains a large amount of data is indicative that a welding quality assurance program was in place. The program is identifying, documenting, evaluating, and providing repair instructions, when appropriate, for welds and welding-related activities found noncompliant during first line inspection, surveillance, and document review.

2. The Program Concerns category contains 19 percent of the data, or 432 indicators. This category is composed of elements which reflect the overall program operation. Specifically, it reflects the overall knowledge and perception of the program workings by individual craftsmen, inspectors, and engineers. Over one-half of the Program Concerns category were related to inadequacies in the procedures, including a lack of clear and definitive weld acceptance criteria.

3. The Hardware Concerns category accounted for 172 indicators, or eight percent of the data. This category is comprised of identified hardware deficiencies for specific components, systems, or structures. The quality indicators evolved principally from NCRs and employee concerns, with 70 percent related to specific components.

4. Six percent (141) of the indicators were placed in the Welding Materials category. This category relates to the control and quality of welding material and equipment. Most of the indicators in the Welding Materials group were based on employee concerns which questioned the practices for control of welding electrodes.

5. The Personnel Qualifications category contains six percent of the data, or 136 indicators. This category relates to the qualification of the individuals performing the various tasks. Welder qualification, including welding outside of the individual limits of qualification or welding with the wrong qualification, accounted for two-thirds of these indicators. Approximately one-third involved improper or questionable inspector qualification.

6. The Design Deficiencies category accounted for four percent (81) of the indicators. This category relates to deficient design documents (drawings and/or specifications). Most of the indicators in this group stem from drawing inadequacies identified in audits or NCRs.

The construction-related quality indicators from the six problem categories were encoded and redistributed into three major groups in accordance with WP-02, Appendix E, "Problem Codes and Definitions." These broad headings are Material, Program, and Documentation.

This part of the analysis, consisting of 2,154 items, excluded the 81 design-related quality indicators. The results of this step are described below and are presented graphically in attachment 7.11.

1. The Material group includes quality of welding electrodes, suitability of welding equipment; deficiencies in completed TVA welds, deficiencies in vendor welds; and deficiencies in specific components, systems, or structures. The analysis placed 640 indicators, approximately 30 percent of the NC quality indicators, in the Material group. Two significant subgroups appeared:

   - Nonspecific defects in TVA welds reported in investigations and employee concerns made up 28 percent of the group.

- Nonconformances and employee concerns on specific components made up 19 percent of the group.

2. The Program group accounted for 957 indicators, approximately 44 percent of the NC quality indicators. This group includes workmanship, personnel qualification, adequacy of training, control of welding electrodes, and procedure implementation. The major subgroup problem revealed in the Program group, 650 items, was individual failures to follow procedure. This included procedure violations of all types.

3. The third group, Documentation, involves welding-related records and the adequacy of the procedures and included 557 indicators, or approximately 26 percent of the total NC quality indicators. Slightly over one-half of the indicators in this group were related to missing or inaccurate weld records. Procedural inadequacies, including lack of clear cut weld acceptance criteria, accounted for 42 percent of this group.

4.6.3 Conclusions Drawn From Analysis of NC Quality Indicators

The following is a discussion of the conclusions drawn from the quality indicator analysis.

1. Material: The majority of the data in this group is in the Undetected Weld Defects and Specific Components problem classifications. This points to the following potential problems:

   a. The program has identified and documented problems with previously accepted work which, having been reinspected after acceptance, required rework or engineering evaluation. This problem was much more prevalent in structural welding than in mechanical (piping) welding. This indicates that inspection and documentation requirements, while they are incorporated in the procedure system, are not clearly presented. This review further substantiates the earlier conclusion that the procedure system is fragmented and difficult to follow. The previously discussed difficulty in determining the applicability of the process specifications for structural welding is also reflected in this group.

   b. Also indicated is a broad program misunderstanding on the part of individuals and a lack of communication between individuals within the program. This indication is also reflected in the results of the detailed WP evaluations being performed to resolve the welding-related employee concerns.

   c. The significance of the size of the Undetected Weld Defects and Specific Components categories is somewhat lessened in that a large number of the indicators relate to undersize socket and fillet welds made during the early years of construction. During the early 1980s, an industry wide change in the method of measuring fillet welds occurred. Where the previous practice had been to verify fillet weld size as being nominally

correct, the new approach was to accurately measure each linear increment of the entire length of the weld. This led to a large number of nonconformances at WBN and most other nuclear plants under construction throughout the industry.

2. Program: Over two-thirds of the indicators in this group were in the Procedure Violation category. This category contained elements such as not welding in accordance with the drawing, bypassing mandatory hold points, welding or grinding without approval, and violating essential variables of the detail welding procedures. Analysis of the Program group indicates a number of potential weaknesses.

   a. Individuals failed to properly comprehend the importance of compliance with the specific requirements of the program and/or the procedures. This premise implies root causes such as lack of adequate training, or failure to communicate the importance of the quality assurance program to individuals engaged in activities to which the program applies.

   b. These indicators also point to the need for an improved trending program and failure to implement effective preventive actions. Specific nonconforming conditions are corrected as they are identified. Preventive action is effectively taken where the area of nonconformance is seen as a significant deficiency. As an example, when a problem was discovered in controlling and documenting welder qualification continuity, a series of effective preventive actions accompanied the corrective action.

   c. The program does not, however, identify trends or patterns of less significant deficiencies with a view toward prevention of recurrence. Effective trending should isolate patterns of recurrence in deficiencies which singly are relatively minor problems, but collectively could become significant problems.

   d. There is an apparent need for improved training of line managers, first line supervisors, and individual workmen in the overall purpose and scope of the welding quality assurance program, as well as in the implementing details applicable to specific tasks.

3. Documentation: Over one-half of the quality indicators in the Documentation group were related to missing or inaccurate process control and inspection documentation. While it is to be expected that occasional losses and inaccuracies will occur, the more than 300 indicators in this category point to a need for improvement.

   a. Implementing procedures do not define the requirements for record completion. Sample forms and records are shown as attachments to the procedures, but no instruction is provided for completion of these forms. Also, the document handling procedures for compilation, routing, and filing of records after completion are often unclear or nonexistent.

b. A more effective trending program would have stimulated preventive action to reduce the occurrence of the document-related quality indicators.

c. The Adequacy of Procedures classification accounts for approximately 43 percent of the Documentation group. This indicates a lack of definitive instruction and detail necessary for individuals to properly perform day-to-day tasks. A detailed discussion of the WP review of the site procedures may be found in section 4.4 of this report.

4.6.4 NE Quality Indicators

The indicators in this group evolved principally from NCRs and audits. Approximately three-fourths of the indicators were in the Drawings and Specifications categories.

1. Drawings: The Drawing indicators included failure to correctly incorporate field change requests into the drawings, weld details and symbols inconsistent with the national standards, field interferences would not allow installations as designed, and application of the quality assurance standards is not consistently addressed.

2. Specifications: Analysis of the Specification category indicates that the specifications are, in some instances, cumbersome and difficult to follow. As noted in section 4.4 of this report, the scope and applicability of some of the process specifications are difficult to determine.

Deficiencies resulting from these quality indicators were corrected through the quality assurance program, with engineering evaluation and rework of hardware performed as necessary. Review of the indicators in the design group leads to a conclusion that requirements in some design output documents have been ambiguous, cumbersome, and inconsistent. It should be noted, however, that design accounted for less than four percent of the total of the quality indicators at WBN.

4.7 Analysis of Employee Concerns at WBN

4.7.1 Details of Analysis

The WP chose to review and analyze the construction welding-related employee concerns in concert with the WBN construction quality indicators. The data base assembled for this evaluation included 446 employee concerns. These concerns were selected for their potential as program indicators, and they may not in all cases be the same concerns addressed by the WP Phase II reinspections or the employee concerns investigations.

Employee concerns accounted for approximately 21 percent of the construction quality indicator data in the evaluation. The analysis of employee concerns generally parallels the format previously discussed for all WBN quality indicators.

4.7.2 Results of Analysis

The employee concerns were first grouped into five of the six problem categories described by WP-02, Appendix G. The sixth category, Design, consisted of 13 concerns and was not included in this evaluation. The results are discussed below in descending order of occurrence and are presented graphically in attachment 7.12.

1. Approximately 30 percent of the concerns were placed in the Program Implementation category. The principal elements in this category are reinspection and sampling criteria, quality of TVA workmanship, quality of vendor welds, and adequacy of procedures, instruction and training. Over one-half of the employee concerns in this category questioned the adequacy of the procedures, or expressed concerns relating to specific provisions outlined in the procedures.

2. The Procedural Violations category accounted for approximately 24 percent of the employee concerns. This category principally includes the adequacy of weld documentation, undetected defects on quality accepted welds, and failure to follow procedures. Almost 60 percent of the employee concerns in the Procedural Violations category resulted from individuals failing to comply with the implementing procedures.

3. The Personnel Qualifications category, containing 16 percent of the concerns, relates to the qualifications of the inspectors, welders, and engineers. Of 72 employee concerns in this area, welder qualification continuity was the most significant group, accounting for almost 60 percent of the concerns. Approximately 39 percent of the concerns questioned the initial qualification of visual welding inspectors.

4. The Welding Materials category includes control and quality of welding electrodes and suitability of the welding equipment used in construction. The analysis placed 70 concerns, approximately 15 percent of the total, in this category. The control practices for shielded metal arc welding electrodes were the basis for over one-half of these concerns. This was followed by electrode quality, 27 percent of the category.

5. Hardware concerns accounted for approximately 14 percent of the total. This category consists of employee concerns relating to specific components, structures, and systems. The most significant group in the Hardware category, approximately 48 percent, evolved from employee concerns related to specific piping systems.

Over 20 groups of welding-related issues were raised by the employee concerns. The Phase I Program Evaluation did not include a technical evaluation of each of the concerns or their attendant issues. Rather, an effort was made to isolate the major programmatic issues raised by the concerns. These major issues were then evaluated from a program adequacy point of view.

A detailed technical evaluation of each of the concerns is being performed by the WP and the Employee Concerns Special Project. These detailed evaluations will determine the factuality and significance of the concerns; and where indicated, the required corrective and preventive actions.

4.7.3 Issues Identified from Analysis

Five major issues evolved from this step in the analysis. Each of these issues appeared to have a potential to show a significant deficiency in the TVA welding program at WBN. These issues are listed below:

4.7.3.1 Listing of Issues

1. Performance of prewelding inspections on structural steel: The root of this issue is the TVA practice of allowing foremen, who are responsible for production, to verify that structural steel members are correctly fit up before welding.

2. Inspection of welded structural connections coated with primer: The issue evolved from a site-unique process specification which allowed certain reinspections to be performed on welds which had been prime coated.

3. Welding electrode control: Of the 37 concerns in this area, the principal issues were traceability of the electrodes to ensure that only the specified welding materials were used and protection of coated electrodes from absorbing moisture contained in the atmosphere.

4. Inspector qualification: Several employees expressed concerns that the structural weld inspectors had insufficient training and/or experience.

5. Welder qualification continuity: At issue were the methods used to verify that welders had actually used the processes in which they were qualified within the time limits mandated by the construction codes.

4.7.3.2 Discussion of Issues

1. Performance of prewelding inspections on structural steel: The issue centers around the TVA practice of having the welding foremen verify the correct fit up (preparation and assembly) of structural members before welding. The foremen are not certified inspectors yet they are directly responsible for the work being verified. This practice was viewed as a violation of ANSI N45.2.5. The foreman is responsible to ensure that preweld requirements, including correct fit up, are met before weld out. Certified inspectors monitor each foreman at least biweekly to ensure that the foremen are properly performing the required activities.

The concerns are a restatement of an issue which was addressed and resolved in 1980. First raised in a Bellefonte Nuclear Plant audit report, the issue was determined to be applicable to all TVA nuclear sites and reported to the USNRC under the provisions of 10 CFR 50.55(e).

A review of ANSI N45.2.5, the AWS Structural Welding Code, and the TVA Quality Assurance Topical Report was performed. The conclusion was that the practice of having the foremen verify prewelding activities under a quality control surveillance program was in compliance with the TVA commitment to ANSI N45.2.5.

2. Inspection of welded structural connections coated with primer: This is also a restatement of a previously addressed issue. The question evolved from a large reinspection effort which principally addressed the geometric attributes of small fillet welds on structural items. In late 1981, the engineering design organization (now NE) granted limited approval for reinspection of fillet welds which had been coated with carbo-zinc primer. This was perceived by some individuals to be a violation of the AWS Structural Welding Code, which requires that welds be inspected before painting.

   This limited reinspection of primed welds was first approved by memoranda. In January 1982, Process Specification 3.C.5.4, "Watts Bar Final Visual Weld Examination," was issued. The specification included provisions for reinspection of primed welds.

   The practice in question did not allow initial acceptance inspection of coated welds, nor did it allow reinspection for attributes which might have been masked by the prime coat. In that the intent of inspection through primer was to allow reinspection of previously inspected welds, it was not a violation of the governing code. Allowing limited reinspection of primed welds was within the authority of the engineer.

   The provision which allowed the reinspection of primed welds was made as part of an action to resolve a number of NCRs. As such, the reinspection methodology and criteria should have been included as part of the NCR dispositions, rather than in the process specification. By allowing reinspection of primed welds through the process specification, some confusion was created regarding the intent and limitations of the practice. This confusion was compounded by poor wording and organization of the specification. Thus, it appeared to some that the process specification allowed initial acceptance inspection of coated structural welds, which would be in violation of the Structural Welding Code.

   The Nuclear Safety Review Staff performed a thorough investigation of this issue. The results showed that three individuals had actually performed acceptance inspections of

primed electrical support welds. These supports were identified, the primer was removed from the welds, and the supports were properly inspected.

3. Welding electrode control: At issue were two major elements of the WBN program for control of welding filler materials.

At WBN, TVA does not maintain direct traceability from the weldment to a heat or lot number of filler material. This created a perception that the program was not in compliance with the ASME Boiler and Pressure Vessel Code, Section III, Nuclear Power Plant Components.

Section NB-4122 of ASME Section III provides two methods to ensure that only the specified materials are used in a weldment. Either of the two methods is acceptable. One method is to provide direct traceability from the weldment to a heat or lot number of filler material.

The second method, employed at WBN, requires that a control procedure be used to ensure that only the specified materials are used. This control system includes elements whereby the engineer assigns the detail weld procedure, which in turn specifies the type filler material to be used for each welding process. The foreman, based on the detail weld procedure assignment, completes the weld material requisition, which specifies the type, size, and quantity of material to be issued to the welder. The type and size of filler material used in the weldment is recorded on the process control document and verified by the welding inspector. These steps are detailed in the WBN-implementing procedures and are adequate to satisfy the second control method allowed by ASME Section III, NB-4122.

Several employee concerns questioned the TVA practice of allowing low hydrogen shielded metal arc welding electrodes to remain exposed to the atmosphere for an entire shift. Previous practice had been to limit the exposure of these electrodes in accordance with a table shown in AWS D1.1, the American Welding Society Structural Welding Code. According to this table, the maximum exposure for the most commonly used electrode was four hours. In order to save lost time during the work shift, the electrodes were issued in portable electric holding ovens, which made the exposure time negligible.

The Structural Welding Code was changed in 1979 to allow low hydrogen coated electrodes to exceed the specified atmospheric exposure times if certain qualification tests were performed. The new AWS rules were incorporated into the WBN-implementing procedures in early 1982. TVA began to qualify some electrodes by testing for an extended atmospheric exposure. Typically, the new limit was ten hours. Purchase specifications were changed to require all newly purchased electrodes to be capable of meeting the test requirements for extended exposure. Over a period of time, all electrodes at WBN were tested and either qualified for the new exposure limits or disposed of.

Discontinuing use of the portable ovens, while allowing the electrodes to remain exposed for up to ten hours, led many individuals to believe that the electrode control program was in violation of AWS D1.1.

4. Inspector qualification: The employee concerns in this area evolved in part from an accelerated training program for structural welding inspectors. It was possible for inspectors from the nonwelding disciplines to qualify under this accelerated program in approximately two weeks. This created a perception that TVA at WBN was in violation of the Quality Assurance Topical Report commitment to ANSI N45.2.6, "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants."

   Before 1980, all weld inspection was performed by qualified and certified NDE personnel. In 1980, a decision was made to allow non-NDE personnel to perform the final visual weld inspections on structural items. Some of the inspectors assigned to the Electrical, Mechanical, Instrumentation, and Structural Engineering Units were provided a combination of classroom, on-the-job, and self-study training in visual inspection of structural welds. These personnel were already qualified in the applicable disciplines under the TVA ANSI N45.2.6 program. They were familiar with the structures to be inspected and the associated drawings. As previously noted, it was possible to complete this accelerated training in as little as two weeks.

   In comparison with the NDE inspectors assigned to the Weld Engineering Unit, these personnel appeared to be inadequately trained. When viewed in relation to the limits of qualification, however, the training was adequate. The structural weld inspectors only performed final visual inspections of structural connections. The major structural welding had largely been completed. Thus, the welds inspected were principally small fillet welds. These personnel were not allowed to perform any of the more complex in-process welding inspections or to perform any inspections on pressure boundary welds.

   Major changes in the TVA program for qualification and certification of welding inspectors occurred in 1981. These changes led some to believe that before 1981 inspector training was inadequate or nonexistent.

   Before 1981, TVA did not have a uniform program for training and certification of visual welding inspectors. Rather, each site certified the inspectors to individual-implementing procedures. Welding inspection was treated as an activity performed under the surface NDE (liquid penetrant and magnetic particle) certifications. In early 1981, NC established visual weld inspection as a separate area of certification. Uniform education, training, experience, and examination requirements were specified, using the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A as a guide. At the same time, completion of a formal training program for all visual weld

inspectors was made mandatory. Before this new program, each site established the training requirements for visual weld inspection.

While these changes generally paralleled improvements being made throughout the nuclear construction industry, they were seen by many within TVA as the initial effort toward training and qualification of visual welding inspectors.

At WBN, the program for qualification and certification of welding inspectors meets the guidelines established by SNT-TC-1A. It is, however, unnecessarily complicated by having separate qualification and documentation requirements for unit 1 and unit 2. It is possible under the current program that a welding inspector qualified to perform an activity under the rules for one unit would not be qualified to perform the same activity in the other unit. Additionally, one must refer to four separate documents to identify all of the program requirements.

5. Welder qualification continuity: Several questions were raised through the employee concerns program concerning the adequacy of the welder qualification continuity program at WBN. Individuals and groups believed that, because of the methods used to verify that the welders had used the processes for which they were qualified within the specified time limits, TVA at WBN was in noncompliance with the ASME Boiler and Pressure Vessel Code and the AWS Structural Welding Code.

   In August 1985, TVA issued a stop work order which suspended all welding being performed by NC at WBN. Work was suspended pending correction and adequate updating of the welder performance qualification continuity records. This action was taken as a result of an NRC investigation of allegations of possible noncompliant conditions in the WBN NC welder performance qualification continuity program. The problem was documented as a nonconforming condition and reported to NRC in accordance with 10 CFR 50.55(e).

   At the time of the stop work order, the total scope of the problem could not readily be determined by a records review. TVA elected to retest all welders, thus establishing an accurate base from which to maintain qualification continuity. Welders who had successfully taken initial qualification tests within the 90 days preceding the stop work order were not retested. A small number of welders were not retested due to termination or health reasons.

   The computerized weld monitoring system identified the welds of all welders who had a rejected test coupon during the qualification renewal test, who did not retest, and whose records showed a break in qualification continuity. These welds formed a population which was sample inspected in accordance with NCIG-02, "Sampling Plan for Visual Inspection of Welds," by the Nuclear Construction Issues Group. The sample reinspection produced a small number of discrepant welds, which were addressed through an NCR.

A number of corrective and preventive actions were taken. Over a period of approximately six months, the number of welders was reduced from over 500 to less than 200. This aligned the number of welders with actual needs at WBN, which improved the utilization of currently qualified welders. The likelihood of a lapse in continuity was thus decreased.

The Welder Performance Qualification Continuity Program was revised to strengthen control and documentation of continuity updates. Site personnel were given documented training in the requirements for welder qualification continuity. Also, the importance of adherence to program requirements was stressed to all personnel involved in the program.

NRC reviewed the details of the corrective actions, and in September 1985 authorized resumption of welding activities.

4.7.4 Conclusions Drawn From Employee Concerns Analysis

The conclusions drawn as a result of the employee concerns analysis evolve principally from the above discussion of the five major issues. A sixth area, individual failures to follow procedure, also appears significant when shown graphically in attachment 7.10. This area, however, was fully addressed in section 4.6, and is not discussed further in this section.

The welding quality assurance program was in place, was adequate to meet the TVA commitments, and was being implemented as intended relative to four of the five major issues: performance of prewelding inspections, inspection of welded structural connections coated with primer, welding electrode control, and inspector qualification. The root of these issues is found in a need for improved communication and a broadening of the training presented to individuals and groups. Also, the inspector qualification program, while technically adequate, is cumbersome and difficult to follow.

The welder qualification continuity issue originally appeared to be a problem of a greater magnitude than was actually the case. Upon further review, however, there were identified only a small number of welders for which the documentation system could not readily and conclusively show the qualification continuity status of each welder.

The problem was compounded by maintaining a force of welders too large relative to the workload. Once identified, the welder qualification continuity problem was reported to NRC and documented and corrected through the quality assurance program. Action to prevent recurrence was effectively implemented.

4.8 Recommendations for Improvement in the WBN Welding Program

The conclusions drawn from the implementing procedure, quality indicator, and employee concerns reviews led to several recommendations for improvement in the WBN welding program. These recommendations are discussed below. The review of the data extracted from the Weld

Monitoring Program did not produce any additional recommendations. Actions are underway which, when completed and fully implemented, will satisfy most of the WP recommendations. These actions are described in section 4.9 of this report. The specific discrepancies identified in attachment 7.9 should be corrected to fully address the requirements of the general and project specifications.

1. The WBN procedure system should be reworked to provide an accurate, simple to follow process for work accomplishment. This rework should clearly define each of the welding requirements, provide explicit instructions for implementation of the requirements, and clearly define each employee's responsibility in implementing these requirements.

2. A revision should be made to WBN Project Construction Specification N3G-101 to accurately reflect the inspection acceptance criteria source requirements. For welding, these documents should be identified by individual process specification, rather than by naming the general specification which includes all welding requirements.

3. G-29 should be revised to specifically define applicability of the individual process specifications, principally in the area of structural welding process specifications. Consideration should be given to reducing the number of G-29 process specifications which provide welding and inspection requirements for work governed by the AWS Structural Welding Code.

4. Wherever possible, the practice of issuing separate specifications and procedures to address the same activity for NC and NO should be discontinued.

5. The training program should be expanded. In addition to specific procedural training, personnel should be provided with an overview of the program. Emphasis on program mechanics should show the individual the overall responsibilities of his work group and the interactions between his and other groups under the quality assurance program.

6. The analysis of the quality indicators shows a need for a more effective trend analysis program. Past practice has been to correct identified problems or deficiencies, with insufficient emphasis on action to prevent recurrence. The trending program should be made to identify recurring nonconformances and to stimulate effective preventive actions.

7. Communication among supervisors, engineers, inspectors, and craftsmen as individuals and as groups is essential. An open and comfortable atmosphere must prevail, where individuals feel they can ask responsible questions.

8. A common thread through most of the employee concerns is a perception of program inadequacy or degradation. These perceptions are often stimulated by acceptable changes in practice, policy, or procedure, where the employees are not aware of the reasons for the changes.

When procedure revisions or other changes create departures from past practices, the affected employees must be made aware of the reason and intent, as well as the letter of the changes.

4.9 Actions Planned, Underway, or Completed

Actions have been taken to correct some of the specific procedure discrepancies discussed in section 4.4. These actions are identified in attachment 7.9. The remaining uncorrected items are under review at WBN to determine the necessary corrective action.

The standardized procedure system is being implemented by NC. The NC general construction procedures and construction process procedures currently under development will clearly define the construction requirements, define the lines of responsibility for implementing these requirements, and provide the level of detail necessary for individuals to correctly and uniformly implement the requirements. These new procedures will be implemented by all construction and modifications activities under NC control.

The G-29 process specifications and the Division of Nuclear Power Procedure Manual DPM N73M2 are being reviewed by NE. These two sets of welding specifications will be combined into one set of NE master specifications for use throughout the welding program. This is an important step, in that, it will lead to one uniform set of welding specifications for use by construction, modifications, and maintenance welding personnel.

The WBN site director has mandated that the two separate welding programs currently being implemented by the operations and construction organizations will be consolidated into one program. This mandate specifically includes welder qualification, welding materials, process control, preparation and control of weld maps, heat treatment, surveillance, and documentation. Responsibility to implement and operate the consolidated welding program has been tasked to NC. The site Welding Engineering Unit is responsible to review the pertinent site procedures and effect the changes necessary to implement the program consolidation.

Office of Nuclear Power Directive 7.1 establishes a requirement that orientation training for new employees include their duties and responsibilities; orientation to work related regulations, procedures, and instructions; and their role in quality and the Nuclear Quality Assurance Program. This directive also makes the NE, NC, NO managers, and the site directors responsible to assess organizational and individual performance against established standards to identify needs for training.

A general construction procedure has been issued by NC which establishes responsibilities at the sites to assess all welding activities for compliance with the procedures and specifications. Under this procedure, the Welding Engineering Unit supervisor is responsible to schedule and perform the assessment activities and to notify site construction and modifications management of the results of the activity verifications for use in making improvements or correcting problems. Management is made

responsible to ensure that the crafts are performing in accordance with the procedures and specifications and to provide educational programs and other corrective actions as necessary to improve performance. Results of the welding verification program are also transmitted to NC Field Services Branch and to the NE project engineer.

TVA has committed through its Nuclear Performance Plan to improve communication at all levels of the Office of Nuclear Power organization. This plan includes close contact between supervisors and employees and recognition of the importance of employees providing feedback of their questions, concerns, and ideas.

5.0 NUCLEAR OPERATIONS REVIEW

5.1 Introduction

5.1.1 Purpose

The primary purposes of Phase I were to determine if the WBN welding program, as it exists today, (a) addresses TVA licensing commitments; and (b) identifies trends and evaluates these trends for possible programmatic enhancements through a review of welding-related quality indicators.

5.1.2 Scope

This work is limited to welding-related activities performed by NO since systems were transferred to NO from construction.

5.1.3 Method

The method for accomplishing this work is outlined as follows.

Welding Program Assessment: Section 5.2 of this report identifies the source documents to which WBN is committed with regard to welding-related activities. Programmatic and technical requirements pertaining to welding are identified in Welding Requirements Implementation Matrices. Corporate level and site-implementing procedures which address these commitment requirements are identified in the matrices. Each corporate and site-implementing procedure was reviewed to determine whether or not it adequately addresses the commitment requirement. A written assessment which documents each review is contained in each matrix package. Recommendations are made in areas where programmatic enhancements are warranted. Procedural deficiencies are identified and corrective actions are initiated. The matrices developed for this review are available in reference 6.6.

Analysis of Programmatic Indicators: Section 5.3 of this report identifies and evaluates all known welding program quality indicators that have been generated by NO since system transfer. These indicators include corrective action reports (CARs), discrepancy reports (DRs), TVA audit reports and surveillance surveys, audit reports prepared by organizations outside TVA, and WBN-specific employee concerns. These quality indicators are divided into three categories and prominent trends are identified and evaluated to identify programmatic deficiencies and/or areas for program enhancement.

5.2 Welding Program Assessment

5.2.1 Background

NO is committed to welding requirements through an assortment of source documents. The Welding Requirements Commitment Summary (attachment 7.13) lists these documents, some of which invoke programmatic requirements, while others invoke technical requirements. All of these requirements, programmatic and technical, are applicable to safety-related items and activities.

Programmatic requirements are implemented through the NQAM and its supporting procedures and instructions as described in chapter 17.2 of the TVA QA Topical Report (TVA TR75-1A). Technical requirements found in various codes and regulatory guides are incorporated into site-implementing procedures.

When a plant item is repaired, replaced, or modified by welding, an established program of written procedures and instructions is used to ensure conformance to applicable programmatic and technical requirements.

Applicable procedures and instructions were reviewed to ensure conformance to source document requirements. Procedural deficiencies and areas for improvement are summarized in applicable matrix packages. A procedural deficiency is a failure of the procedure to fully include document requirements. An area for improvement is an area where the procedure is weak, unclear, or unnecessarily cumbersome, but no deficiency exists. Recommended corrective action is included for both deficiencies and areas for improvement.

5.2.2 Programmatic Requirements

Welding Requirements Implementation Matrices were developed for an assessment of procedural implementation of the following programmatic requirement areas:

- Procurement Document Control
- Instructions, Procedures, and Drawings
- Document Control
- Control of Purchased Material, Equipment, and Services
- Identification and Control of Material, Parts, and Components
- Control of Special Processes
- Inspection
- Handling, Storage, and Shipping
- Quality Assurance Records
- Maintenance and Modifications

5.2.3 Technical Requirements

Welding Requirements Implementation Matrices were developed for an assessment of procedural implementation of the following technical requirement areas:

- ASME Section XI Repairs (IWA-4000) and Replacements (IEA-7000)
- ASME Section XI Pressure Test
- ASME Section XI Preservice Inspection (PSI) Program
- ASME Section IX Welding Qualifications
- AWS Structural Welding Code - Steel
- Regulatory Guide 1.31, "Control of Ferrite Content in Stainless Steel Weld Metal"
- Regulatory Guide 1.44, "Control of the Use of Sensitized Stainless Steel"

5.2.4 Conclusions and Recommendations

A total of 17 requirement areas were assessed to ensure conformance of the written welding program to source document requirements. Ten of the areas contain programmatic requirements, and seven contain technical requirements.

5.2.4.1 Programmatic Requirements

Programmatic requirements were generally found to be addressed in procedures and instructions. However, two procedural deficiencies were identified. These deficiencies were:

1. NQAM, Part II, Section 6.1, does not address checks of contractor welder qualifications before work onsite. There was no hardware affected due to this deficiency as the NO personnel did in fact review the qualifications of contractor welders even in the absence of a procedural requirement to do so. Site instructions will be revised when the NQAM procedure revision incorporating this requirement is issued.

2. The structural welding requirements of Process Specification O.C.1.1 of DPM N73M2 were not included in implementing procedures until March 1986. This procedural deficiency resulted in the lack of documented fitup inspections by the welder foremen and fitup surveillance by quality control inspectors for structural welding performed by NO before March 1986. The possible effect of this procedural deficiency on plant hardware will be addressed in the Welding Project Phase II efforts.

Twelve areas for improvement of procedures were identified, none of which are considered to be conditions adverse to quality. These items have been forwarded as recommendations for procedure enhancement to responsible organizations for coordination and revision of the appropriate procedures. The areas for improvement are summarized as follows:

Procurement Document Control

- Delete obsolete attachments from Standard Practice WB 4.12.

Identification and Control of Material, Parts, and Components

- Revise NQAM to state the intended purpose of material control in accordance with 10 CFR 50 Appendix B.

- Revise DPM N73M2 to state the purpose of weld data sheets and give instructions regarding their use.

- Revise DPM N73M2 to more clearly address proper issue of welding materials.

Control of Special Processes

- Clarify MI-270.04 to specify that quality control verifies the proper location of thermocouples.

- Correct editorial errors in Administrative Instruction (AI)-9.4.2.

- Revise Modification and Addition Instruction (MAI)-16 to address requirements for welding and inspection for fabricating and installing seismic supports.

Handling, Storage, and Shipping

- Revise AI-5.6 to specify storage instructions for welding materials.

Quality Assurance Records

- WBN AI-4.1 to specify retention times for welding records.

Maintenance and Modifications

- The NQAM needs revision to properly specify ASME Section XI requirements.

- The NQAM needs revision to properly specify ANI/ANII involvement in component supports.

- The NQAM needs revision to properly clarify the purpose of the procedures.

5.2.4.2 Technical Requirements

Technical requirements for AWS D1.1; ASME Section IX; and ASME Section XI, IWA-4000, and IWA-7000 were considered to be adequately addressed by procedures and instructions. However, two areas for improvement of an editorial nature were identified for WBN Program Procedure 1402.02 and WBN AI-9.15. These areas for improvement are not of the type, however, which if left uncorrected, could result in a condition adverse to quality. These recommendations have been forwarded to the appropriate plant sections and to the Nuclear Services Welding and Metallurgy Section for coordination and revision of the above procedures.

Technical requirements for ASME Section XI preservice inspection program and ASME Section XI pressure testing following the repair and replacement of components which require welding on the pressure retaining boundary of the component were considered to be adequately implemented in procedures and instructions.

However, one area for improvement of an editorial nature was identified. This area for improvement represents procedure clarification of WBN MAI-11 and is not indicative of a potential condition adverse to quality.

These recommendations have been forwarded to the appropriate plant section and to Nuclear Services, Inservice Inspection Programs Section for coordination and revision of WBN MAI-11.

The technical requirements of Regulatory Guides 1.31, "Control of Ferrite Content In Stainless Steel Weld Metal," and 1.44, "Control of Use of Sensitized Stainless Steel," were considered to be adequately addressed by procedures and instructions.

5.3 Analysis of Programmatic Indicators

5.3.1 Background

As part of the Welding Project Charter, NC initiated an analysis of data extracted from NC and NO to determine overall welding program weaknesses. This data base is made up of in-process and overview type documents collected from NC and NO, with the great bulk of them being NC-generated, in-process documents. These documents or "Programmatic Indicators" best define the condition of the agency's overall welding program. These programmatic indicators were categorized so that meaningful trends could be identified and evaluated for any possible programmatic enhancements. Employee concerns were also included in this study to obtain additional data for overview and analysis purposes. The data analysis of this report only addresses programmatic indicators for NO with regard to WBN.

5.3.2 WBN Nuclear Operations Analysis

The documentation for WBN NO that was analyzed included CARs, DRs, site surveillance reports, TVA audit reports, and audit reports from organizations external to TVA, and WBN-specific employee concerns that were available when the data was analyzed. A detailed evaluation and disposition of the welding-related WBN employee concerns (both specific and generic) is addressed in section 4.0 of this report. Because of the small number of indicators (25), a detailed trend analysis cannot be performed; however, a majority of indicators in one particular classification and few indicators in another can provide meaningful early trending.

The program indicators were classified in two ways; first, the reason for the finding, and second, the method of resolution. These two classifications are illustrated graphically in attachments 7.14 and 7.15, respectively.

From attachment 7.14, it is readily apparent that program implementation is a problem with 68 percent of the indicators. Failure to follow procedures (not shown in the figure) was the largest subgrouping in this area which indicates a need for more emphasis on training in the areas of procedure content and the need to follow procedures.

The most significant indication in the attachment 7.15 graph is that only one of the 25 findings required a disposition by requiring the hardware to be reworked to the original requirements. Over half of the findings were resolved by correcting documentation. Combined with revising procedures and specifications, it can be seen that about three-fourths of the problems are paperwork related. It can also be seen that training is not adequately emphasized since one-fifth of the resolutions involved training for craft personnel. It appears that more effective training should be given to engineering, inspection, and supervisory personnel also.

5.3.3 Conclusions Applicable to the Nuclear Operations Analysis

The total amount of data available for NO analysis consists of only 25 items compared to about 2,200 items which were analyzed for the construction era at WBN. This analysis of the NO data was performed because it is representative of the present program at WBN, and the preliminary analysis indicates that it is typical of the construction data. The following conclusions are based on both analyses.

From a review of program indicators (primarily CARs and DRs) only 25 (approximately five percent) were welding related. This is not an insignificant quantity but indicates, along with site QA surveillance and weld quality checks, existence of an effective program to produce welds in accordance with code and other program requirements. The essential elements of an acceptable welding program exist but could use improvement in their implementation (see Recommendation section).

Sporadic noncompliance to program requirements is evident and is attributable to lack of adequate training at all personnel levels.

Weld information, data accumulation, and welder qualification/continuity are maintained by manual systems which are slow to access and cumbersome to use.

5.3.4 Recommendations

A significant number of program indicators exist in the area of welding to warrant implementation of the following recommendations.

1. Establish a formal training program which emphasizes maintaining welder qualification records, preparation of work instructions, selection of proper welding and nondestructive examination procedures, and preparation of NOI, CAR, and DR forms. It is recommended that this training be given to appropriate engineering, craft, and QA personnel at least once a year or at the beginning of each major refuel outage.

2. Recordkeeping - Welder qualifications/continuity and weld data sheets should be computerized to provide quicker and more complete access to data.

In summary, the analysis of programmatic indicators reveals the need for improvement in training of all personnel performing welding-related activities and improvement in disposition of welding-related CARs and DRs although an improvement trend was noted. The recommendations in this section of the report reflect the need for some programmatic improvements in the welding program. They do not, however, reflect QA program conditions that could potentially result in a condition adverse to quality or safety.

6.0 REFERENCES

6.1 Memorandum from Steven A. White, Manager of Nuclear Power, TVA, to Stewart P. Ebeneter, Director, Office of Special Projects, NRC; Subject: DOE/WEP Watts Bar Nuclear Plant Reports. RIMS accession number: L44 880217 808.

6.2 Memorandum from L. G. Hebert to R. E. Kosky; Subject: Weld Program Review Watts Bar Unit 2. RIMS accession number: T25 880210 862.

6.3 Memorandum from J. W. Henry to H. S. Beckner; Subject: WBN - Welding Project Phase I Review, FSAR/Commitment Consistency Review Forms for Civil Welding. RIMS accession number: B27 880318 004.

6.4 Memorandum from J. W. Henry to H. S. Beckner; Subject: WBN - Welding Project Phase I Review, FSAR/Commitment Consistency Review Forms for Mechanical Welding. RIMS accession number: B27 880318 002.

6.5 Memorandum from J. W. Henry to H. S. Beckner; Subject: WBN - Welding Project Phase I Review - Typical Commitment Path Flow Diagrams for Mechanical Welding. RIMS accession number: B27 880318 001.

6.6 Memorandum from J. W. Henry to H. S. Beckner; Subject: WBN - Welding Project Phase I Review - Welding Requirements Implementation Matrices. RIMS accession number: B27 880318 003.

7.0 ATTACHMENTS

7.1 SOURCE DOCUMENTS OF WELDING COMMITMENTS FOR WATTS BAR NUCLEAR PLANT

7.2 DESIGN PROCESS BLOCK DIAGRAM

7.3 WELDING AND NDE PROCEDURE SPECIFICATION ADEQUACY

7.4 DISTRIBUTION OF COMMITMENTS REVIEWED FOR STRUCTURAL WELDING AISC-AWS

7.5 SUMMARY OF STRUCTURAL WELDING REQUIREMENTS OUTPUT

7.6 DISTRIBUTION OF COMMITMENTS REVIEWED FOR MECHANICAL WELDING ANSI-ASME-SMACNA

7.7 SUMMARY OF MECHANICAL WELDING REQUIREMENTS OUTPUT

7.8 WATTS BAR SITE-IMPLEMENTING PROCEDURES REVIEWED

7.9 PROCEDURE DISCREPANCIES AND RECOMMENDATIONS OR ACTIONS TAKEN

7.10 WATTS BAR QUALITY INDICATOR PROBLEM CATEGORIES

7.11 CONSTRUCTION QUALITY INDICATOR PROBLEM DISTRIBUTION

7.12 WATTS BAR EMPLOYEE CONCERN PROBLEM CATEGORIES

7.13 NUCLEAR OPERATIONS COMMITMENT SUMMARY

7.14 NUCLEAR OPERATIONS WELDING PROGRAM INDICATORS - FINDINGS CATEGORIZATION

7.15 NUCLEAR OPERATIONS WELDING PROGRAM INDICATORS - DISPOSITION CATEGORIZATION

SOURCE DOCUMENTS OF WELDING COMMITMENTS FOR WATTS BAR NUCLEAR PLANT

10CFR50 APPB

ASME Sec. III CL 1

ASME Sec. III CL 2

ASME Sec. III CL 3

ASME Sec. VIII Div. I

ANSI B16.5

ANSI B16.34

ANSI B31.1

ANSI B31.5

ANSI N45.2.5

ANSI N45.2.8

ANS N18.2 CL 1

ANS N18 2 CL 2a

ANS N18.2 CL 2b

ANS N18.2 CL 3

AISC

AWS

MSS-SP-66

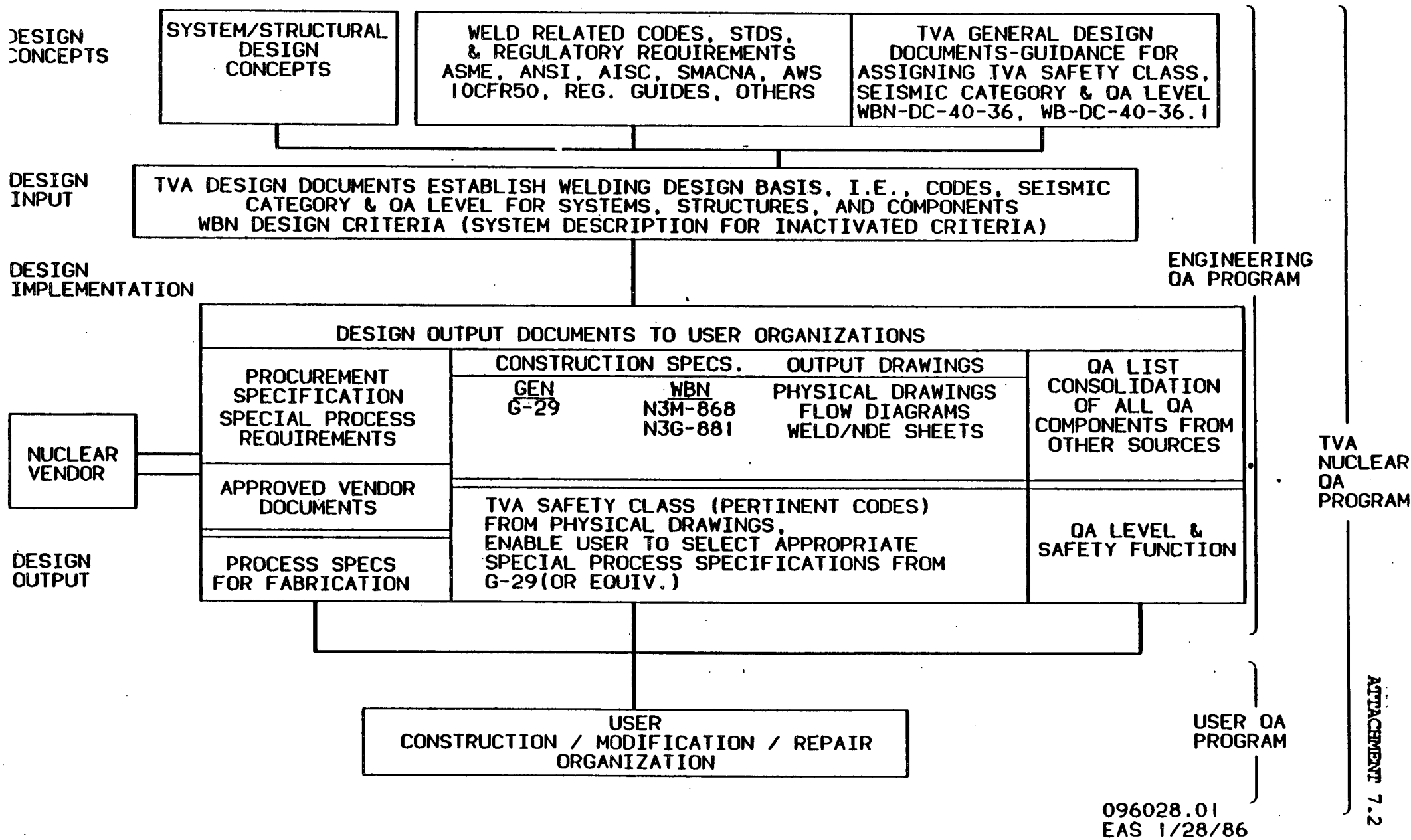
SMACNA

ASME Sec. IX

ASME Sec. XI

DESIGN PROCESS BLOCK DIAGRAM

WBN DNE WELDING PROGRAM (JANUARY 1986)



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ATTACHMENT 7.2

WELDING & NDE PROCEDURE SPECIFICATION ADEQUACY

The following process specifications for nondestructive examination or qualified welding procedures have been reviewed for compliance with the codes and standards listed in their respective statements of intended scope:

GENERAL WELDING PROCEDURE SPECIFICATION	DETAIL WELDING PROCEDURE	WELDING PROCEDURE QUALIFICATION RECORD	COMPLIES YES/NO
1.M.1.2(R4)	SM11-B-3 R7	SM11-B-9	YES
1.M.1.2(R4)	SM88-B-1 R2	SM88-B-1	YES
1.M.1.2(R4)	GT-SM11-0-3B R8	GT-SM11-0-3C	YES
1.M.1.2(R4)	GT-SM13-0-1 R0	GT-SM1-12B-0-1	YES
1.M.1.2(R4)	GT-SM18-0-1 R4	GT-SM18-0-1	YES
1.M.1.2(R4)	GT-SM88-0-1A R5	GT-SM88-0-2	YES
1.M.1.2(R4)	GT11-0-1A R7	GT11-0-1A	YES
1.M.1.2(R4)	GT18-0-1 R5	GT88-0-1	YES
1.M.1.2(R4)	GT88-0-1A R1	GT88-0-1	YES
1.M.1.2(R4)	GT43.43-0-1 R1	GT43.43-0-1	YES
1.C.1.2(R3)	SM-P-1 R9	PREQUALIFIED	YES
1.C.1.2(R3)	SM-U-1 R6	PREQUALIFIED	YES
1.C.1.2(R3)	SM-U-1B R6	PREQUALIFIED	YES
1.C.1.2(R3)	SM-U-4 R2	PREQUALIFIED	YES
1.C.1.2(R3)	GM-SD-L-1 R2	PREQUALIFIED	YES
1.C.1.2(R3)	GM-SD-U-1 R2	PREQUALIFIED	YES
1.C.1.2(R3)	GMA-FC-P-1 R3	PREQUALIFIED	YES
1.C.1.2(R3)	SA-U-1 R1	PREQUALIFIED	YES
1.C.1.2(R3)	AW-SW-P-1 R3	PREQUALIFIED	YES
1.C.1.2(R3)	GM-SD-L-1 R2	PREQUALIFIED	YES

PROCESS SPECIFICATION	TITLE	COMPLIES YES/NO
3.C.5.4 (R2)	WBN Final Visual Weld Examination	YES[1]
3.M.1.1 (R4)	Liquid Pen. Exam. Color Contrast Meth.	YES
3.M.5.1 (R6)	Exam of Weld Ends, Fit-Up Visual & Dimen Exam of Weld Joints	YES
3.M.3.1 (R3)	Radiographic Examination of Welded Joints	YES[2]
3.M.2.1 (R3)	Dry Mag. Particle Exam of Welds & Weld Edge Preps.	YES

[1]Represents the TVA WBN visual weld acceptance criteria developed by Engineering as permitted by AWS D1.1.

[2]Minor deviation in that P.S.3.M.3.1 does not require the date, the weld number and manufacturer's identification to be recorded on the film. However, it has been TVA practice to include this information on the film. The procedure was changed 3-3-86 to reflect these requirements.

DISTRIBUTION OF COMMITMENTS REVIEWED FOR STRUCTURAL WELDING

AISC - AWS

WATTS BAR NUCLEAR PLANT

DESCRIPTION	NUMBER OF ITEMS	BUILDING	NUMBER OF ITEMS
STRUCTURAL STEEL	24	AUXILIARY	42
MISCELLANEOUS STEEL	39	REACTOR	44
PIPE SUPPORTS	20	DIESEL GEN	1
CONDUIT SUPPORTS	0	ADD DG	4
CABLE TRAY SUPPORTS	9	CONTROL	6
INSTR & CONTROL SPT	1	GENERAL	0
HVAC DUCT SUPPORTS	1	INT PMP ST	2
EQUIPMENT SUPPORTS	2	YARD	1
EMBEDDED PARTS	4	TOTAL	100
TOTAL	100		

SUMMARY OF STRUCTURAL WELDING REQUIREMENTS OUTPUT
AISC - AWS

WATTS BAR NUCLEAR PLANT

STATUS CODE
C=CONSISTENT
M=MINOR INCONSISTENCY
I=INCONSISTENT

PLANT	NUMBER	COMMITMNT SOURCE	COMMITMENT LOCATION	APPLIC SPEC/CODE	DESCRIPTION	STATUS	BLDG	
WBN	WBEPC01	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC02	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC03	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC04	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC05	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC06	FSAR	3.8.1.2	AISC/AWS	MISC STL SUPPORT STL	C	REACT	
WBN	WBEPC07	FSAR	3.8.4.2	AISC/AWS	EQUIPMENT SUPPORT	C	AUX	
WBN	WBEPC08	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC09	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC10	FSAR	3.8.4.2	AISC/AWS	STR STL NMS VALVE RM	C	AUX	
WBN	WBEPC11	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VALVE RM	C	AUX	
WBN	WBEPC12	FSAR	3.8.1.2	AISC/AWS	STR STL DETAILS	C	REACT	UNIT 2
WBN	WBEPC13	FSAR	3.8.1.2	AISC/AWS	STR STL DETAILS	C	REACT	UNIT 1
WBN	WBEPC14	FSAR	3.8.4.2	AISC/AWS	EMBEDDED PARTS	C	AUX	
WBN	WBEPC15	FSAR	3.8.4.2	AISC/AWS	STR STL FRAMING	C	CONT	
WBN	WBEPC16	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC17	FSAR	3.8.4.2	AISC/AWS	HVAC DUCT SUPPORT	C	AUX	
WBN	WBEPC18	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC19	FSAR	3.8.4.2	AISC/AWS	STR STL NMS VAVLE RM	C	AUX	
WBN	WBEPC20	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC21	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC22	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC23	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC24	FSAR	3.8.1.2	AISC/AWS	MISC STL LAD PLAT	C	REACT	

SUMMARY OF STRUCTURAL WELDING REQUIREMENTS OUTPUT
AISC - AWS

WATTS BAR NUCLEAR PLANT

STATUS CODE
C=CONSISTENT
M=MINOR INCONSISTENCY
I=INCONSISTENT

PLANT	NUMBER	COMMITMNT SOURCE	COMMITMENT LOCATION	APPLIC SPEC/CODE	DESCRIPTION	STATUS	BLDG	
WBN	WBEPC01	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC02	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC03	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC04	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC05	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC06	FSAR	3.8.1.2	AISC/AWS	MISC STL SUPPORT STL	C	REACT	
WBN	WBEPC07	FSAR	3.8.4.2	AISC/AWS	EQUIPMENT SUPPORT	C	AUX	
WBN	WBEPC08	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC09	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC10	FSAR	3.8.4.2	AISC/AWS	STR STL NMS VALVE RM	C	AUX	
WBN	WBEPC11	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VALVE RM	C	AUX	
WBN	WBEPC12	FSAR	3.8.1.2	AISC/AWS	STR STL DETAILS	C	REACT	UNIT 2
WBN	WBEPC13	FSAR	3.8.1.2	AISC/AWS	STR STL DETAILS	C	REACT	UNIT 1
WBN	WBEPC14	FSAR	3.8.4.2	AISC/AWS	EMBEDDED PARTS	C	AUX	
WBN	WBEPC15	FSAR	3.8.4.2	AISC/AWS	STR STL FRAMING	C	CONT	
WBN	WBEPC16	FSAR	3.8.4.2	AISC/AWS	MISC STL ACC PLATF	C	AUX	
WBN	WBEPC17	FSAR	3.8.4.2	AISC/AWS	HVAC DUCT SUPPORT	C	AUX	
WBN	WBEPC18	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC19	FSAR	3.8.4.2	AISC/AWS	STR STL NMS VAVLE RM	C	AUX	
WBN	WBEPC20	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC21	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC22	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC23	FSAR	3.8.4.2	AISC/AWS	STR STL SMS VAVLE RM	C	AUX	
WBN	WBEPC24	FSAR	3.8.1.2	AISC/AWS	MISC STL LAD PLAT	C	REACT	

WBN	WBEPC25	FSAR	3.8.4.2	AISC/AWS	STR STL NMS VAVLE RM	C	AUX	
WBN	WBEPC26	FSAR	3.8.1.2	AISC/AWS	STR STL OUT CR WALL	C	REACT	
WBN	WBEPC27	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC28	FSAR	3.8.1.2	AISC/AWS	STR STL INSIDE CONT	C	REACT	
WBN	WBEPC29	FSAR	3.8.4.2	AISC/AWS	STR STL ROOF FMG	C	AUX	
WBN	WBEPC30	FSAR	3.8.4.2	AISC/AWS	STR STL MN ST VLV RM	C	AUX	
WBN	WBEPC31	FSAR	3.8.4.2	AISC/AWS	EMB PTS N. VLV RM	C	AUX	
WBN	WBEPC32	FSAR	3.8.4.2	AISC/AWS	STR STL PLATFORM	C	CONT	
WBN	WBEPC33	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	
WBN	WBEPC34	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	
WBN	WBEPC35	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	UNIT 2
WBN	WBEPC36	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	
WBN	WBEPC37	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	
WBN	WBEPC38	FSAR	3.8.1.2	AISC/AWS	EMBEDDED PARTS	C	REACT	
WBN	WBEPC39	FSAR	3.8.1.2	AISC/AWS	MISC STL RESTRAINT	C	REACT	
WBN	WBEPC40	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC41	FSAR	3.8.1.2	AISC/AWS	MISC STL PAN&FRAME	C	REACT	
WBN	WBEPC42	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC43	FSAR	3.8.1.2	AISC/AWS	MISC STL FRAMING	C	REACT	
WBN	WBEPC44	FSAR	3.8.1.2	AISC/AWS	MISC STL ACC PLATF	C	REACT	
WBN	WBEPC45	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	AUX	
WBN	WBEPC46	FSAR	3.8.4.2	AISC/AWS	MISC STL CURB RAILNG	C	ADD DG	
WBN	WBEPC47	FSAR	3.8.4.2	AISC/AWS	MISC STL FRAMES	C	ADD DG	
WBN	WBEPC48	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	ADD DG	
WBN	WBEPC49	FSAR	3.8.4.2	AISC/AWS	MISC STL SPRAY SHLD	C	ADD DG	
WBN	WBEPC50	FSAR	3.8.1.2	AISC/AWS	MISC STL FIRE PROTEC	C	REACT	
WBN	WBEPC51	FSAR	3.8.4.2	AISC/AWS	PIPE SPT BLOWDOWN	C	AUX	ATTACH B
WBN	WBEPC52	FSAR	3.8.1.2	AISC/AWS	PIPE SPT SAFETY INJ	C	REACT	ATTACH B

WBN	WBEPC53	FSAR	3.8.1.2	AISC/AWS	PIPE SPT CHM VOL CON	C	REACT	ATTACH B
WBN	WBEPC54	FSAR	3.8.1.2	AISC/AWS	PIPE SPT MAIN STEAM	C	REACT	ATTACH B
WBN	WBEPC55	FSAR	3.8.1.2	AISC/AWS	PIPE SPT SAFETY INJ	C	REACT	ATTACH B
WBN	WBEPC56	FSAR	3.8.1.2	AISC/AWS	PIPE SPT FEEDWATER	C	REACT	ATTACH B
WBN	WBEPC57	FSAR	3.8.4.2	AISC/AWS	PIPE SPT ERCW	C	AUX	UNIT 2:ATTACH B
WBN	WBEPC58	FSAR	3.8.1.2	AISC/AWS	PIPE SPT UP HD INJ	M	REACT	UNIT 1:ATTACH B
WBN	WBEPC59	FSAR	3.8.1.2	AISC/AWS	PIPE SPT REC COOL	M	REACT	ATTACH B
WBN	WBEPC60	FSAR	3.8.1.2	AISC/AWS	PIPE SPT REC COOL	C	REACT	ATTACH B
WBN	WBEPC61	FSAR	3.8.4.2	AISC/AWS	PIPE SPT CHM VOL CON	C	AUX	ATTACH B
WBN	WBEPC62	FSAR	3.8.1.2	AISC/AWS	PIPE SPT CS	M	REACT	ATTACH B
WBN	WBEPC63	FSAR	3.8.4.2	AISC/AWS	PIPE SPT FEEDWATER	C	CONT	
WBN	WBEPC64	FSAR	3.8.4.2	AISC/AWS	PIPE SPT SAFETY INJ	C	AUX	ATTACH B
WBN	WBEPC65	FSAR	3.8.4.2	AISC/AWS	MISC STL MAIN STAIR	M	AUX	ATTACH B
WBN	WBEPC66	FSAR	TBL 9.1-3	ASME	STR STL SP FL RACK	C	AUX	
WBN	WBEPC67	FSAR	3.8.1.2	AISC/AWS	MISC STL CRB & LAD	C	REACT	
WBN	WBEPC68	FSAR	3.8.4.2	AISC/AWS	MISC STL ADD EQ BLDG	C	AUX	
WBN	WBEPC69	FSAR	3.8.1.2	AISC/AWS	MISC STL ANNUL LAD	C	REACT	
WBN	WBEPC70	FSAR	3.8.4.2	AISC/AWS	STR STL	C	CONT	
WBN	WBEPC71	FSAR	3.8.4.2	AISC/AWS	MISC STL HV SUPPORT	C	AUX	
WBN	WBEPC72	FSAR	3.8.4.2	AISC/AWS	MISC STL AIR INTAKE	C	AUX	
WBN	WBEPC73	FSAR	3.8.4.2	AISC/AWS	MISC STL RAD SHIELD	C	AUX	
WBN	WBEPC74	FSAR	3.8.4.2	AISC/AWS	MISC STL RAD SHIELD	C	AUX	
WBN	WBEPC75	FSAR	3.8.4.2	AISC/AWS	MISC STL SPT FRMG	C	AUX	
WBN	WBEPC76	FSAR	3.8.4.2	AISC/AWS	MISC STL CRANE RAIL	C	AUX	
WBN	WBEPC77	FSAR	3.8.4.2	AISC/AWS	MISC STL PLN FRM	C	AUX	
WBN	WBEPC78	FSAR	3.8.4.2	AISC/AWS	MISC STL SHIELD PLUG	C	AUX	
WBN	WBEPC79	FSAR	3.8.1.2	AISC/AWS	MISC STL SPT FRMG	C	REACT	
WBN	WBEPC80	FSAR	3.8.4.2	AISC/AWS	STR STL FRAMING	C	CONT	
WBN	WBEPC81	FSAR	3.8.4.2	AISC/AWS	STR STL MICROWV SPT	C	CONT	

WBN	WBEPC82	FSAR	3.8.4.2	AISC/AWS	MISC STL AD EQ BLDG	C	AUX	
WBN	WBEPC83	FSAR	3.8.1.2	AISC/AWS	PIPE SPT UP HD INJ	C	REACT	ATTACH B
WBN	WBEPC84	FSAR	3.8.1.2	AISC/AWS	PIPE SPT ERCW	C	REACT	
WBN	WBEPC85	FSAR	3.8.1.2	AISC/AWS	PIPE SPT CVCS	M	REACT	ATTACH B
WBN	WBEPC86	FSAR	3.8.4.2	AISC/AWS	PIPE SPT REF WTR	M	YARD	ATTACH B
WBN	WBEPC87	FSAR	3.8.1.2	AISC/AWS	PIPE SPT PW	M	REACT	ATTACH B
WBN	WBEPC88	FSAR	3.8.1.2	AISC/AWS	INST SPT IN-CORE	C	REACT	
WBN	WBEPC89	FSAR	3.8.1.2	AISC/AWS	PIPE SPT BLOWDOWN	C	REACT	
WBN	WBEPC90	FSAR	3.8.4.2	AISC/AWS	CABLE TRAY SPT	C	DG	
WBN	WBEPC91	FSAR	3.8.1.2	AISC/AWS	MISC STL SPT FRMG	C	REACT	
WBN	WBEPC92	FSAR	3.8.4.2	AISC/AWS	MISC STL ROOF ACCESS	C	AUX	
WBN	WBEPC93	FSAR	3.8.4.2	AISC/AWS	STR STL MISS PROT	C	IPS	
WBN	WBEPC94	FSAR	3.8.4.2	AISC/AWS	MISC STL WALKWAY	C	IPS	
WBN	WBEPC95	FSAR	3.8.4.2	AISC/AWS	MISC STL FILTER SPT	C	AUX	
WBN	WBEPC96	FSAR	3.8.1.2	AISC/AWS	EQUIPMENT SPT	C	REACT	
WBN	WBEPC97	FSAR	3.8.1.2	AISC/AWS	MISC STL SPT FRMG	C	REACT	
WBN	WBEPC98	FSAR	3.8.4.2	AISC/AWS	MISC STL AIR INTAKE	C	AUX	
WBN	WBEPC99	FSAR	3.8.1.2	AISC/AWS	MISC STL FIRE PROTEC	C	REACT	
WBN	WBEPC100	FSAR	3.8.1.2	AISC/AWS	EMBEDMENTS	C	REACT	

NOTE: Attachment B is a form utilized in the work plan described in Section 3.1 of this report. This form provided a vehicle for the revision to make specific observations and recommendations. The completed forms are available as attachments to Reference 6.3.

DISTRIBUTION OF COMMITMENTS REVIEW

FOR MECHANICAL WELDING

ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

SYS NO.	SYSTEM	NUMBER AUDIT PACKS
1	MAIN STEAM	3
3	AUXILIARY	3
15	STEAM GEN BLOWDOWN	1
18	FUEL OIL	1
26	HIGH PRESS FIRE PROT	2
30	VENTILATION	6
31	AIR CONDITIONING	2
32	CONTROL AIR	1
33	SERVICE AIR	2
40	STATION DRAINAGE	1
41	STEAM GEN LAYUP	1
43	SAMPLING & WATER QUA	1
59	DEMIN WATER	1
61	ICE CONDENSER	1
62	CHEM VOLUME & CONTRO	9
63	SAFETY INJECTION	4
65	EMERG GAS TREATMENT	1
67	ESS RAW COOLING	3
68	RAW COOLING WATER	5
70	COMP COOLING WATER	5
72	CONTAINMENT SPRAY	1
74	RESIDUAL HEAT REMOVA	2
77	WASTE DISPOSAL	3
78	SPENT FUEL POOL	5
79	FUEL HANDLING	1
81	PRIMARY MAKE-UP	1
82	STANDBY DIESEL GEN	1
84	FLOOD MODE BORATION	2
87	UPPER HEAD INJECT	2
90	RADIATION MONITORING	1
30	TOTAL	72

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

NUMBER	ECN NUMB	ECN YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	OUTPUT WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
WBM01	NA		ASME III-2	9.2.2.10	C	70	B	III-2	PIPE	BW	FULL	I	FLOW DIAG	47W464-1,-20 N3M-868
WBM02	NA		ASME III-2	9.2.3	C	59	B	III-2	PIPE	BW	FULL	I	FLOW DIAG	47W492-1 N3M-868
WBM03	NA		B31.5	9.4.3.2.4	C	31	M	B31.5	PIPE	BW	LIM	I	DSN CRIT FLOW DIAG	47W920-31
WBM04	NA		ASME III-3	T 3.2-2a/6	C	78	C	III-3	PIPE	BW	FULL	I	FLOW DIAG	47W454-1 N3M-868
WBM05	NA		ASME III-2	9.2.2.10	C	70	B	III-2	PIPE/PENT	BW	FULL	I	FLOW DIAG	47W464-1 N3M-868
WBM06	NA		ASME III-2	T 3.2-2a/3	C	67	B	III-2	PIPE/PENT	BW	FULL	I	FLOW DIAG	47W450-1,-25 N3M-868
WBM07	NA		ASME III-2	T 3.2-2a/2	C	62	B	III-2	ANCHOR	FW	FULL	I	FLOW DIAG	47W406-1,-4,-6,-203 47A060-62-112
WBM08	NA		ASME III-2	T 3.2-2a/2	C	62	B	III-2	PIPE	BW	FULL	I	FLOW DIAG	47W406-4 N3M-868
WBM09	NA		ASME III-2	T 3.2-2a/9	C	63	B	III-2	PIPE/LUGS	FW	FULL	I	FLOW DIAG	47W435-1,-6,-205 63-1SIS-R63
WBM10	NA		ASME III-2	T 3.2-2a/2	C	62	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W406-2,-4 47W600-82
WBM11	NA		ASME III-3	T 3.2-2a/3	C	67	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W302-1,-7 N3M-868
WBM12	NA		ASME III-3	9.2.2.10	C	70	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W464-1,-2 N3M-868
WBM13	4172	84	ASME III-2	T 3.2-2a/9	C	74	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W432-1,-6 N3M-868
WBM14	NA		B31.1	9.3.3.2	C	40	G	B31.1	PIPING	BW	LIM	I(L)	FLOW DIAG	47W480-1,-2

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

NUMBER	ECN NUMB	ECN YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	OUTPUT WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
														N3M-868
WBM15	NA		SMACNA	9.4.5.2	C	30	S	SMACNA	HVAC/DUCT	FW	FULL	I	FLOW DIAG	17W910-1,-2
													DES CRIT	47W930-1
WBM16	NA		SMACNA	T 3.2-2a/7	C	30	S	SMACNA	HVAC/DUCT	FW	FULL	I	FLOW DIAG	47W930-1
													DES CRIT	
WBM17	NA		SMACNA	9.4.2-1	C	30	S	SMACNA	HVAC/DUCT	FW	FULL	I	FLOW DIAG	47W920-1,-23
													DES CRIT	47W930-1
WBM18	NA		ASME III-3	T 3.2-2a/1	C	62	C	III-3	PIPING	FW	FULL	I	FLOW DIAG	47W555-1,-10
														N3M-868
WBM19	NA		ASME III-2	9.3.1.3	C	33	B	III-2	PIPE/PENE	BW	FULL	I	FLOW DIAG	47W492-1
														N3M-868
WBM20	4174	84	ASME III-2	T 3.2-2a/9	C	74	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W432-1,-6
														N3M-868
WBM21	5698	85	ASME III-3	9.2.2.10	C	70	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W464-1,-10
WBM22	NA		ASME III-3	T 3.2.2a/6	C	78	C	III-3	INSTRU	SW	FULL	I	FLOW DIAG	47W454-1,-3
														47W600-152
WBM23	NA		ASME III-3	9.2.2.10	C	70	C	III-3	ANCHOR	FW	FULL	I	FLOW DIAG	47W464-1,-216
														47A060-70-29,29A
WBM24	NA		ASME III-3	9.4.6.2	C	30	C	III-3	HVAC/PIPE	FW	FULL	I	FLOW DIAG	47W915-1,-7
WBM25	NA		SMACNA	9.4.6	C	30	S	SMACNA	HVAC/DUCT	FW	FULL	I	FLOW DIAG	47W915-1,-7
													DSN CRIT	47W930-1
WBM26	NA		ASME III-2	10.3.1	C	01	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W400-1
														N3M-868
WBM27	5548	85	ASME III-2	T 3.2-2a/9	C	63	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W435-5,-11
														N3M-868

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

NUMBER	ECN NUMB	ECN YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	OUTPUT WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
WBM28	NA		ASME III-2	T 3.2-2a/3	C	72	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W437-1 N3M-868
WBM29	NA		ASME III-2	T 3.2-2a/7	C	61	B	III-2	PIPE/PENE	BW	FULL	I	FLOW DIAG	47W462-1,-12 N3M-868
WBM30	3614	85	ASME III-2	T 3.2-2a/9	C	63	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W435-5,-10 N3M-868
WBM31	NA		ASME III-2	10.3.1	C	01	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W400-1,-2,-3 47W600-30
WBM32	NA		ASME III-2	T 3.2-2a/10	C	87	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W435-1,-2,-5,-17 N3M-868
WBM33	NA		ASME III-2	9.4.7.3	C	31	B	III-2	PIPE/PENE	BW	FULL	I	FLOW DIAG DSN CRIT	47W915-1,-10
WBM34	NA		ASME III-2	9.4.6	C	30	B	III-2	HVAC/PIPE	BW	FULL	I	FLOW DIAG DSN CRIT	47W915-1,-6
WBM35	5317	84	ASME III-2	T 3.2-2a/2	C	62	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W406-2,-4 N3M-868
WBM36	5318	84	ASME III-2	T 3.2-2a/2	C	62	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W406-2,-4 N3M-868
WBM37	NA		ASME III-2	T 3.2-2a/10	C	77	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W560-1,-34 N3M-868
WBM38	NA		ASME III-3	T 3.3-2a/5,6	C	84	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W406-16,-17 N3M-868
WBM39	3713	65	ASME III-3	T 3.2-2a/1,2	C	62	D	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W555-1,-6 N3M-868
WBM40	NA		ASME III-1	5.5.3	C	68	A	III-1	PIPING	BW	FULL	I	FLOW DIAG	47W465-1,-2
WBM41	NA		ASME III-3	T 3.2-2a/5,6	C	84	C	III-3	INSTRU	SW	FULL	I	FLOW DIAG	47W406-4,-16,-17

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

	ECN							OUTPUT						
NUMBER	NUMB	YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
														47W600-179
MBM42	NA		ASME III-2	T 3.3-2a/9	C	15	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W400-1,-6
														N3M-868
MBM43	NA		ASME III-2	T 3.2-2a/4	C	03	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W401-1,-4
														N3M-868
MBM44	NA		ASME III-3	T 3.2-2a/6	C	18	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	17W856-1
														N3M-868
MBM45	5339	85	ASME III-2	5.5.3.2	C	68	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W465-1,-2
														N3M-868
MBM46	NA		ASME III-2	T 3.2-2a/4	C	03	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W427-1,-7
														N3M-868
MBM47	NA		ASME III-3	T 3.2-2a/4,5	C	03	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W427-1,-7
														N3M-868
MBM48	NA		ASME III-3	T 3.2-2a/10	C	77	D	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W560-1,-4
														N3M-868
MBM49	NA		ASME III-3	T 3.2-2a/10	C	77	D	III-3	INSTRU	SW	FULL	I	FLOW DIAG	47W560-1,-17
														N3M-868
MBM50	5611	85	ASME III-2	T 3.2-2a/2	C	62	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W406-4,-11,-12,-15
														N3M-868
MBM51	NA		ASME III-2	5.5.3.2	C	68	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W645-1,-2
														N3M-868
MBM52	NA		ASME III-2	5.5.3.2	C	68	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W645-1,-2
														N3M-868
MBM53	NA		ASME III-2	T 3.2-2a/6	C	78	B	III-2	PIPE/PENE	BW	FULL	I	FLOW DIAG	47W454-1,-2
														N3M-868
MBM54	3981	83	ASME III-2	T 3.2-2a/10	C	87	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W435-1,-2,-24
														N3M-868

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

NUMBER	ECN NUMB	ECN YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	OUTPUT WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
WBM55	NA		ASME III-2	T 3.2-2a/6	C	78	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W454-1,-2 N3M-868
WBM56	NA		ASME III-2	5.5.3.2	C	68	B	III-2	INSTRU	SW	FULL	I	FLOW DIAG	47W465-1,-2 47W600-172
WBM57	4194	84	ASME III-2	T 3.2-2a/9	C	63	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W435-5,-16 N3M-868
WBM58	3713	85	B31.1	T 3.2-2a/2	C	62	G	B31.1	PIPING	BW	LIM	I(L)	FLOW DIAG	47W555-1,-6 N3M-868
WBM59	5698	85	ASME III-3	T 3.2-2a/3	C	67	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	47W450-1,-35 N3M-868
WBM60	NA		ASME III-3	T 3.2-2a/6	C	78	C	III-3	INSTRU	SW	FULL	I	FLOW DIAG	47W454-1,-3 47W600-152
WBM61	NA		ASME III-2	10.3.1	C	01	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W400-1,-11 N3M-868
WBM62	NA		ASME III-2	10.4.11.2	C	41	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W496-5 N3M-868
WBM63	NA		ASME III-2	T 3.2-2b	C	81	B	III-2	PIPING	BW	FULL	I	FLOW DIAG	47W492-1,-2 N3M-868
WBM64	NA		ASME III-2	9.3.1.3	C	33	B	III-2	ANCHOR	FW	FULL	I	FLOW DIAG	47W492-1,-2,-17,-200 47A492-2-17
WBM65	NA		ANSI B31.1	9.5.6	C	82	G	B31.1	PIPING	SW	FULL	I(L)	FLOW DIAG	17W586-1&2 N3M-868
WBM66	NA		ASME III-3	T 3.2-2a/5	C	26	C	III-3	PIPING	BW	FULL	I	FLOW DIAG	37W206-1 N3M-868
WBM67	NA		ASME III-2	9.3.2.2	C	43	B	III-2	PIPING	SW	FULL	I	CONTROL DIAG	47W625-1&3 47W432-1
WBM68	NA		ASME III-3	T 3.2-2a/1	M	32	C	III-3	PIPING	SW	FULL	I	FLOW DIAG	47W600-206

SUMMARY DNE MECHANICAL WELDING REQUIREMENTS OUTPUT
ANSI - ASME - SMACNA

WATTS BAR NUCLEAR PLANT

NUMBER	ECN NUMB	ECN YR	WELD CODE COMMITMENT	FSAR LOCATION	STAT	SYS	TVA CLS	OUTPUT WELD CODE	APPLICAT	WELD TYPE	QA	SEIS CAT	DESIGN INPUT	DESIGN OUTPUT
WBM69	NA		ANSI B31.1	T 3.2-2a/5	C	26	G	B31.1	PIPING	BW	LIM	I(L)	FLOW DIAG	47W491-1 N3M-868
WBM70	NA		SMACNA	6.2.3.2.2	C	65	Q	SMACNA	HVAC/DUCT	BW	FULL	I	FLOW DIAG	47W915-1 47W920-24 47W930-1
WBM71	NA		ASME III-2	T 3.2-2a/8	C	79	B	III-2	PIPING	FW	FULL	I	FLOW DIAG	47W455-1 47B333-278
WBM72	NA		ASME III-3	T 11.4-1	C	90	C	III-3	PIPING	SW	FULL	I	CONTROL DIAG	47W406-2&4 47W600-103

WATTS BAR NUCLEAR PLANT PHASE I REPORT
SITE IMPLEMENTING PROCEDURES REVIEWED

PROCEDURE NUMBER	TITLE
WBNP-QCI-1.01 Revision 15	Drawing and Document Control
WBNP-QCI-1.02 Revision 15	Control of Nonconforming Items
WBNP-QCI-1.02-1 Revision 9	Inspection Rejection Notice
WBNP-QCI-1.02-2 Revision 0	Review of Significant NCR Action Required to Prevent Recurrence
WBNP-QCI-1.06 Revision 1	Receiving
WBNP-QCI-1.07 Revision 11 Addendum 1 Addendum 2	Work Release
WBNP-QCI-1.08 Revision 11	Quality Assurance Records
WBNP-QCI-1.10 Revision 11 Addendum 1 Addendum 2	Preparation and Control of Quality Control Instructions, Procedures, and Tests
WBNP-QCI-1.10-1 Revision 0	Review of Quality Control Instructions, Procedures, and Tests
WBNP-QCI-1.10-2 Revision 0	Review of Standard Operating Procedures
WBNP-QCI-1.11-1 Revision 3	Indoctrination and Training Program
WBNP-QCI-1.11-2 Revision 7 Addendum 1	Qualification/Certification of CONST Quality Control Inspectors
WBNP-QCI-1.11-3 Revision 1	Qualification Program for Engineering Functions
WBNP-QCI-1.11-4 Revision 2	Craft Qualification/Certification Program
WBNP-QCI-1.12 Revision 8	Control and Calibration of Construction Tools, Gauges, Instruments, and Measuring Devices

WATTS BAR NUCLEAR PLANT PHASE I REPORT
SITE IMPLEMENTING PROCEDURES REVIEWED

PROCEDURE NUMBER	TITLE
WBNP-QCI-1.12-15 Revision 0	Step Wedges
WBNP-QCI-1.20 Revision 10	Site Control of Procurement
WBNP-QCI-1.20-3 Revision 2	Supplier Evaluation and Selection
WBNP-QCI-1.25 Revision 8	Control of As-Constructed Drawings
WBNP-QCI-1.31 Revision 6	Handling Allegations, Employee Concerns, and Differing Opinions
WBNP-QCI-1.32 Revision 5	Stop Work Authority
WBNP-QCI-1.36 Revision 11 Addendum 1 Addendum 2	Storage and Housekeeping
WBNP-QCI-1.40 Revision 7	Records Accountability Program
WBNP-QCI-1.40-5 Revision 1 Addendum 1	Weld Monitoring Program
WBNP-QCI-1.44 Revision 1	ASME NPP-1 and NPV-1 Code Data Reports
WBNP-QCI-1.45 Revision 5 Addendum 1	N-5 Preparation
WBNP-QCI-1.48 Revision 5	Handling Construction Quality Assurance Branch Verification and Deviation Reports
WBNP-QCI-1.51 Revision 2	Surveillance of Site Contractors
WBNP-QCI-1.56 Revision 9	Work Packages
WBNP-QCI-1.58 Revision 3	Trend Analysis

WATTS BAR NUCLEAR PLANT PHASE I REPORT
SITE IMPLEMENTING PROCEDURES REVIEWED

PROCEDURE NUMBER	TITLE
WBNP-QCI-3.11 Revision 4	Seismically Qualified Instrumentation Supports
WBNP-QCI-3.11-1 Revision 4	Seismically Qualified Instrument Supports and Instrumentation Lines
WBNP-QCI-3.13-6 Revision 0	Installation of Tubing and Instrumentation Lines
WBNP-QCI-4.01 Revision 5	Storage, Issue, and Control of Welding Material
WBNP-QCI-4.02 Revision 6	Welder and Welding Operator Performance Qualification
WBNP-QCI-4.03 Revision 6	Process Control, Welding Surveillance, and Weld Procedure Assignment
WBNP-QCI-4.03-1 Revision 1	Base Metal Defect Removal
WBNP-QCI-4.03-2 Revision 0	NDE Procedure Demonstration
WBNP-QCP-1.06 Revision 18	Receipt Inspection of Safety Related Items
WBNP-QCP-1.36 Revision 8	Storage and Housekeeping
WBNP-QCP-1.50 Revision 6	Material Verification and Validation
WBNP-QCP-2.04 Revision 14	Fabrication, Erection, and Inspection of Structural and Miscellaneous Steel
WBNP-QCP-2.09 Revision 9	Splicing and Welding of Reinforcing Bars
WBNP-QCP-4.07-1 Revision 4	Equipment Setting
WBNP-QCP-4.10-2 Revision 9	Pipe Location Verification
WBNP-QCP-4.10-18 Revision 5	Arc Strikes

WATTS BAR NUCLEAR PLANT PHASE I REPORT
SITE IMPLEMENTING PROCEDURES REVIEWED

PROCEDURE NUMBER	TITLE
WBNP-QCP-4.12 Revision 10	Assembly and Installation of RPV Head and Control Rod Drive Mechanisms
WBNP-QCP-4.13-FU&VM Revision 6	Fit-up and Visual Mechanical
WBNP-QCP-4.13-MTC Revision 1	Magnetic Particle Examination
WBNP-QCP-4.13-MTM Revision 1	Magnetic Particle Examination
WBNP-QCP-4.13-PTC Revision 3	Liquid Penetrant Examination
WBNP-QCP-4.13-PTM Revision 4	Liquid Penetrant Examination
WBNP-QCP-4.13-RTC Revision 1	Radiographic Examination
WBNP-QCP-4.13-RTM Revision 1	Radiographic Examination
WBNP-QCP-4.13-SW Revision 0	Stud Weld Examination
WBNP-QCP-4.13-TM Revision 1	Thickness Measurement
WBNP-QCP-4.13-UTC Revision 1	Structural Ultrasonic Testing
WBNP-QCP-4.13-UTM Revision 2	Mechanical Ultrasonic Testing
WBNP-QCP-4.13-VTC Revision 1	Final Visual Weld Examination
WBNP-QCP-4.20 Revision 8	Inspection and Documentation of the Ice Condenser System Installation
WBNP-QCP-4.23-4 Revision 2	Visual Examination of Support Weld Joints
WBNP-QCP-4.25 Revision 3	Fuel Transfer System

WATTS BAR NUCLEAR PLANT PHASE I REPORT
SITE IMPLEMENTING PROCEDURES REVIEWED

PROCEDURE NUMBER	TITLE
WBNP-QCP-4.27 Revision 1	Inspection and Documentation of Ductwork
WBNP-QCP-4.55 Revision 1	Vacuum Box Leak Testing
WBNP-QCP-3.09 Revision 2	Inspection of Supports for Electrical Conduit and Junction Box
WBNP-QCP-3.11 Revision 14	Inspection and Documentation of Instrument Line Bending and Supports
WBNP-QCP-3.11-1 Revision 6	Inspection and Documentation of Instrumentation Supports
WBNP-QCT-3.15 Revision 3	Pneumatic Testing of Instrumentation Sensing Lines
WBNP-QCT-4.37 Revision 3 Addendum 1 Addendum 2 Addendum 3	Hydrostatic Testing
WBNP-QCT-4.45 Revision 4	Pneumatic Testing

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTION TAKEN TO RESOLVE DISCREPANCY
	Process Specification I.C.I.2, Revision 3	The requirements of Section 6.0, Base Metal Preparation are not addressed by the site procedures.	The requirements have been incorporated into WBN-QCP-4.13-FU&VC, Attachment A, Section 2.I.
	Process Specification I.M.2.2 Revision 3	The requirements of Section 4.0, Renewal of Qualification, Paragraph 4.2 for involvement of the ASME Code Inspector are not addressed by the site procedures.	The provision for the ANI to question the ability of a welder or welding operator evolves from ASME Section III, NCA-5000. This provision would necessarily be implemented by the ANI, and need not be stated in the site procedure.
	Process Specification 2.M.I.I, Revision 4	The requirements of the process specification for postweld heat treatment are not addressed by the site procedures.	Construction Engineering Procedure CEP-4.09 references the process specification, and includes the specification requirements in the procedure body and attachments. WBN-QCP-4.09 requires inspections for compliance with CEP-4.09.
	Nuclear Components Manual Revision 22	The requirements of Section 4.I, Paragraph 2.2.2.c(e) that WEU maintain a computer program for tracking and status of weld joints are not addressed by the site procedures.	The requirement is generally outlined by WBN-OCI-I.40 and specific implementation details are defined by WBN-CEP-I.40-5.
	Site Construction Specification N3C-884, Revision 0	The requirement of Paragraph 3.3 that welding of temporary handling lugs on structural elements or subassemblies shall comply with the requirements of G-29C, Process Specification I.C.I.2 (a) are not addressed by the site procedures.	The P.S. I.C.I.2 requirements for tack and temporary attachment welding are incorporated into WBN-QCP-4.13 -FU&VC, Attachment A.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTION TAKEN TO RESOLVE DISCREPANCY
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-101, Revision 2	For N3G-101 Feature 2.2.26, Welding, Paragraph 12, Weld History Record, the site procedure does not list N3G-881 as an acceptance criteria source document.	WBN-QCP-2.04 lists N3G-881 as a reference at 3.1.4.
WBN-QCP-4.13 Series	Site Construction Specification N3G-101, Revision 2	For N3G-101 Feature 2.2.13, Special Processes, Paragraph 2, Stud Welding, the WBN-QCP-4.13 Series does not list General Specification G-63 as an acceptance criteria source document.	The requirements of Specification G-63 are implemented through WBN-QCP-1.47.
WBN-QCP-4.13-VTC Revision 0	Process Specification 1.C.1.2 Revision 3	The requirememts of Section 7.0 Assembly and Welding Tolerance, are not addressed by the site procedure.	WBN-QCP-VTC has been superseded. The requirements of P.S. 1.C.1.2, Section 7.0, are incorporated into WBN-QCP-4.13-FU&VC, Attachment A, Section 2.2.
WBN-QCP-1.36 Revision 8	Nuclear Components Manual Revision 18	The requirement of Section 3.1 that all items except welding filler material be issued by the warehouse to the crafts is not addressed by the site procedure.	WBN-CEP-1.07 requires that all permanent QA material and engineering controlled items be issued from the construction warehouse. WBN-CEP-4.01 provides the details for issue of welding filler material.
WBNP-QCI-4.01 Revision 5	Nuclear Components Manual Revision 23	The site procedure does not address the welder helper as being allowed to withdraw welding material as provided for by Section 5.1.	The NCM, Revision 28, Section 5.1, provides for welders' helpers to withdraw welding material at Bellefonte only.
WBNP-QCI-4.02 Revision 6	Nuclear Components Manual Revision 23	The site procedure does not address Weld Test Shop personnel and QC Inspectors being authorized to sign the Welding Verification Statement as allowed by Section 5.1.	The NCM, Revision 28, Section 5.1, defines the personnel authorized to sign the verification statement as the craft Foreman, the Assistant General Construction Superintendent, and weld test shop personnel. WBN-QCI-4.02 required a verification statement signed by the welder and by the Foreman or Supervisor. The site procedure

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTION TAKEN TO RESOLVE DISCREPANCY
			did not, however, address the requirement of NCM Section 5.1 that the WEU establish a list of the personnel authorized to sign the verification statement. Welder performance qualification is now controlled by WBN-CEP-4.02. All of the NCM requirements are detailed in the procedure.
WBNP-QCI-4.02 Revision 6	Nuclear Components Manual Revision 23	The requirement of Section 5.1 that Craft Foremen who elect to maintain their welding certification must have the verification Statement signed by their supervisor or other authorized personnel is not addressed by the site procedure.	Welder performance qualification is now controlled by WBN-CEP-4.02. This procedure requires at 6.4.2 that welders who are reclassified to foreman shall have their certifications rescinded.
WBNP-QCI-4.02 Revision 6	Nuclear Components Manual Revision 23	The requirement of Section 5.1 that the Construction Engineer is responsible to provide facilities and equipment for for welder and welding operator training is not addressed by the site procedure.	Welder and welding operator training is now controlled by WBN-CEP-1.11. WEU is responsible for the training of welders and welding machine operators. Provision of the necessary facilities and equipment is implicit in the requirement to conduct the training.
WBNP-QCI-4.03 Revision 6	Process Specification 0.C.1.1 Revision 1	The site procedure does not accurately reflect the two-week surveillance of each Inspector and welder's Foreman required by Section 6.0.	WBN-QCP-4.03-1 is the applicable site procedure. The details necessary to implement P.S. 0.C.1.1, Section 6.0 are defined by WBN-QCP-4.03-1 and QMI 810.8.
WBNP-QCI-4.03 Revision 6	Nuclear Components Manual Revision 23	The requirement of Section 5.1 that the craft make only those welds on Operation Sheets is not addressed by the site procedure.	WBN-QCI-4.03 has been superseded by WBN-CEP-4.03. The NCM requirement is addressed by WBN-CEP-4.03, Section 6.1.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTION TAKEN TO RESOLVE DISCREPANCY
WBNP-QCI-4.03-1 Revision 1	Nuclear Components Manual Revision 23	The requirement of Section 5.1 that if weld repairs to base metal are required after final postweld heat treatment, they shall be performed in accordance with specially qualified procedures which conform to the code is not addressed by the site procedure.	The requirement is defined in WBN-CEP-4.03 at Section 6.1.
WBNP-QCI-4.03-1 Revision 1	Nuclear Components Manual Revision 23	The requirement of Section 5.1 that the ANI be notified to witness all repairs is not addressed by the site procedure.	The requirement is defined in WBN-CEP-4.03 at Section 6.1.
WBNP-QCI-1.11-2 Revision 7	ANSI N45.2.6 1978 Edition	The requirement that any person who has not performed inspection, examination, or testing activities for a period of one year shall be reevaluated is not addressed by the site procedure or the OC QTPM.	The Welding Inspectors are certified using the rules of SNT-TC-1A, 1980 Edition. This standard does not specify a maximum one-year period of inactivity. For unit 1, the limit is placed at one year by QMI-802.6. For unit 2, the limit is placed at 18 months by QMP-198.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTIONS PLANNED OR UNDERWAY
	Process Specification I.C.I.2, Revision 3	The requirements of Section 8.0, Tack Welds and Temporary Welds are not addressed by the site procedures.	The requirements have been incorporated into WBN-QCP-4.13-FU&VC, Attachment A, Paragraph 2.3, except that the requirement of 8.9, arc strikes has not been included. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.
	Process Specification I.C.I.2, Revision 3	The requirements of Section 10.0, Preheat and Interpass Temperatures are not addressed by the site procedures.	The requirement to establish and maintain the specified preheat has been incorporated into WBN-QCP-4.13-FU&VC, Attachment A. However, the details for implementing this requirement, shown in the P.S. I.C.I.2, Paragraphs 10.1, 10.2, 10,3, and 10.5 are not defined in the procedure. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.
	Process Specification I.C.I.2, Revision 3	The requirements of Section 13.0, Repairs and Corrections, are not addressed by the site procedures.	The requirements of P.S. 0.C.I.I, Section 4.7, Repairs, have been incorporated into WBN-QCP-4.13-FU&VC, Attachment F. However, Attachment F is only applicable when P.S. 0.C.I.I is specified for use by the Engineer. Unless otherwise specified, P.S. 3.C.5.4, which does not address repairs and corrections, is the controlling document. WBN is n the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTIONS PLANNED OR UNDERWAY
	Process Specification I.E.I.I, Revision 2	The requirements of Section 5.0, Base Metal Preparation, are not addressed by the site procedures.	The technical requirements of the process specification are not addressed by the site procedures. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.
	Process Specification I.E.I.I, Revision 2	The requirements of Section 8.0, Preheat, are not addressed by the site procedures.	
	Process Specification I.E.I.I, Revision 2	The requirements of Section 10.0, Welding Requirements, Paragraph 10.3, are not addressed by the site procedures.	The technical requirements of the process specification are not addressed by the site procedures. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.
	Process Specification I.M.I.2, Revision 4	The requirements of Section 9.0, Preheat for Welding, are not addressed by the site procedures.	The preheat requirements are now in Section 13.0 of the process specification. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.
	Process Specification I.M.I.2, Revision 4	The requirements of Section 14.0, Welding Requirements, Paragraph 14.2 for welding of temporary attachments are not addressed by the site procedures.	The requirements for temporary attachment welds are now in Section 11.0 of the process specification. For requirement 11.5, the necessary instructions have been incorporated into WBN-CEP-4.09, for postweld heat treatment thermocouples only. WBN is in the process of preparing a new construction engineering procedure which will address all of the applicable general welding requirements.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	ACTIONS PLANNED OR UNDERWAY
	Site Construction Specification N3C-884, Revision 0	The provisions of Paragraph 3.2.1.b, which allow the Construction Engineer to specify the sequence of welds unless otherwise specifically indicated on the design drawing are not addressed by the site procedures.	WBN-QCP-4.13-FU&VC, Attachment F (P.S. 0.C.1.1 attached in its entirety) directly implements P.S. 1.C.1.2, which provides all of the details for stress mitigation and the conditions under which these techniques are required. Attachment F is only applicable when P.S. 0.C.1.1 is specified by the Engineer. Unless otherwise specified, P.S. 3.C.5.4, which does not address pre-welding requirements, is the controlling document. WBN is in the process of adding the requirements for sequencing and peening of welds to WBN-CEP-4.03.
	Site Construction Specification N3C-884, Revision 0	The requirement of Paragraph 3.2.4.a that peening shall be performed in accordance with the peening procedure defined in Appendix A of G-29C are not addressed by the site procedures.	
WBNP-QC1-4.03 Revision 6	Process Specification 1.M.1.2, Revision 4; 1.C.1.2, Revision 3; and 1.E.1.1, Revision 2.	The details for determining how to assign Detail Weld Procedures are not defined by the site procedure.	WBN-QC1-4.03 has been superseded by WBN-CEP-4.03. WBN is in the process of revising CEP-4.03 to clarify non-ASME detail weld procedure assignments and add details related to ASME weld procedure assignments.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
	Site Construction Specification N3C-884, Revision 0	The requirement of Paragraph 3.2.2.a that visual examination of all welds shall be performed in accordance with Process Specification 3.C.5.2 (a) is not addressed by the site procedures. (WBN-QCP-4.13-VTC implements Process Specification 3.C.5.4, and where specified by DNE, P.S. 0.C.1.1).	WBN response to this item indicated that a nonconforming condition report would be initiated. WP has been unable to locate an NCR addressing this finding. Recommend that WBN determine the inspection criteria actually used; that DNE determine the criteria required; and that the implementing procedure and/or the specification be revised as applicable. WP Phase II Specific, Special, and General plant examinations included the subject hardware. Phase II will establish that the hardware is suitable for service, or will be upon completion of committed corrective actions.
	Site Construction Specification N3C-884, Revision 0	The requirements of Paragraph 3.4.2 that all weld spatter shall be removed from sliding joints designated on design drawings by the note "no weld between" (structural element A and structural element B0 are not addressed by the site procedures.	WBN-QCP-4.13-FU&VC, Attachment B, allows weld spatter to remain on plain carbon steel surfaces providing in part that the spatter does not interfere with the function of the structure. The procedure does not, however, specifically require that weld spatter be removed from sliding joints on pipe rupture mitigative devices. Recommend addition of this requirement to QCP-4.13-FU&VC, Attachment A.
WBN-QCP-4.10-18 Revision 5	Process Specification 4.M.3.1 Revision 1	The requirements of Paragraph 3.1 that immediately after each testing the area shall be washed with water, dried, and cleaned with liquid penetrant cleaner are not addressed by the site procedure.	The requirement to wash the area with water after examination is incorporated at 6.2.1.3.6. Recommend that WBN-QCP-4.10-18 be revised to add the requirements for drying and cleaning with liquid penetrant cleaner to Section 6.2.1.3.
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-881, Revision 4	The site procedure does not clearly define the requirement of Paragraph 3.2.2.2 (b) that all Quality Level II welding requires that the Inspector identify with a distinguishing mark all parts or joints which were inspected and accepted.	WBN-QCP-2.04 refers to WBN-QCP-4.13-FU&VC for inspection of Quality Level II welds. QCP-4.13-FU&VC provides two sets of inspection requirements; Attachment A incorporates P.S. 3.C.5.4, which requires that the Inspector identify with a distinguishing mark all parts or joints which he/she has inspected and accepted; Attachment F incorporates P.S. 0.C.1.1, which requires that a record is required for all inspections, and that the record

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
			may be the Inspector's unique identifying mark on the weldment, marked drawings, individual inspection records, or as required by a quality assurance program. For Quality Level II items, the site specification N3G-881 specifically requires the method described by Attachment A. The Structural Welding Code allows either marking of the work or "other recording methods." (It should be noted that the 1986 Commentary to AWS D1.1 specifically recommends against die stamping. The 1972 Commentary cautions against die stamping in members subject to tensile stress). Recommend that N3G-881 be revised to require that the record of acceptance be documentation for all structural welds, and specify the required extent of documentation for all Quality Levels I and II welds. Recommend that WBN-QCP-.13-FU&VC be revised to include the documentation requirements for weld acceptance in the body of the procedure, rather than in the attachments. Recommend that P.S. 0.C.1.1 and P.S. 3.C.5.4 be revised to incorporate the change to N3G-881.
WBN-QCP-4.23-4 Revision 1		The site procedure refers to forms in WBN-QCI-4.03. There is no "NDE Sheet" in either pro-procedure as referred to by Paragraph 7.2.2. The "Operation Sheet" referred to by Paragraph 7.2.3 should be the "Assignment Sheet."	The referenced documents are shown as Pages 1 and 2, Attachment C, WBN-CEP-4.03. Recommend that WBN-QCP-4.23-4 be revised to correct the reference section; and to correctly identify the Welding Operation Sheet displayed in WBN-CEP-4.03. The WP finding comment that the "Operation Sheet" should be the "Assignment Sheet" is incorrect.

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-101, Revision 2	N3G-101, Feature 2.2.13, Special Processes, Paragraph 2, Stud Welding lists site procedure WBN-QCP-2.04 as the implementing procedure; and G-29C as the Acceptance Criteria Source Document. Stud welding per G-29C is addressed by WBN-QCP-4.13-SW.	Site Construction Specification N3G-101 is the WBN Site Construction Requirements Manual. The specification lists the plant features required to be inspected, the acceptance criteria source documents, and the corresponding site implementing procedures. N3G-101 was last revised in late 1985, and is to a large degree no longer current. For welding, the source documents are principally listed as General Construction Specifications G-29C and G-29M, which no longer exist. All of the process specifications and welding procedures which were formerly included in G-29C, G-29E, and G-29M are now incorporated in the seven volume General Construction Specification G-29. G-29 is a series of individual process specifications and procedures. The specific process specifications rather than the general specification should be defined by N3G-101. Since N3G-101 was last revised, the WBN implementing procedure manual has had several changes. Thus, many of the references to site procedures are no longer valid. N3G-101 Section 1.2.3 makes OC (DNC) responsible to notify OE (DNE) of all changes to site implementing procedures referenced in the specification. Recommend a general revision to N3G-101 to reflect organizational changes; specific welding process specifications applicable to the plant features, and correct identification of the site implementing procedures for each of these features. Recommend that DNC and DNE specifically define the offices within their organizations having responsibility for maintaining the currency of the construction requirements of N3G-101; and that this definition be included in the specification.
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-101, Revision 2	N3G-101, Feature 2.2.26, Welding, Paragraph 6, Fitup incorrectly lists WBN-QCP-2.04 as the implementing procedure. Site procedure WBN-QCP-4.13-FU&VC is is the correct procedure.	
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-101, Revision 2	N3G-101, Feature 2.2.26, Welding, Paragraph 7, Tack Welds and and Temporary Welds incorrectly lists WBN-QCP-2.04 as the implementing procedure. Site procedure WBN-QCP-4.13-FU&VM is is the correct procedure.	
WBN-QCP-2.04 Revision 14	Site Construction Specification N3G-101, Revision 2	N3G-101, Feature 2.2.26, Welding, Paragraph 9, Visual Examination, incorrectly lists WBN-QCP-2.04 as the implementing procedure. Site procedure WBN-QCP-4.13-VTC is the correct procedure.	

WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
WBN-OCI-4.03 Revision 6		N3G-101, Feature 2.2.26, Welding, incorrectly lists WBN-OCI-4.03 as as the site implementing procedure in Paragraphs 3, 5, 8 and 10.	
WBN-QCP-4.13-SW Revision 0	Process Specification I.E.2.1 Revision 0	The requirements of the specification for capacitor discharge stud welding are not addressed by the site procedure.	Recommend that WBN-QCP-4.13-SW be revised to reference and define the requirements of P.S. I.E.2.1, or to state that capacitor discharge stud welding is not used at WBN.
WBN-QCP-4.10-18 Revision 5	Process Specification 4.M.3.1 Revision 1	The requirement of Paragraph 2.1 that arc strike areas shall be carefully ground in increments of approximately 0.010 inch until the arc arc strike is no longer visible is not addressed by the site procedure.	The instruction to carefully grind in increments of 0.010 inch is not addressed by the site procedure. Additionally, where the procedure addresses minimum section thickness after grinding, it is by reference to acceptable thickness approved by DNE; ASME Section II; 12.5 percent of nominal pipe wall thickness; and ANSI B16.9, B16.11. and B16.34. P.S. 4.M.3.1 does not provide any acceptance criteria for minimum section thickness. WBN-CEP-4.03, Attachment B, has a space for entering the manufacturer's and the design minimum wall thicknesses, but does not assign engineering responsibility for making the entry; or any instruction on how to determine minimum values. Recommend that the details of how to determine minimum required section thickness be added to a G-29 process specification; and that reference be made to this specification in other affected specifications and in the affected site procedures. Recommend that WBN-QCP-4.10-18 be revised to include the specification requirement for grinding

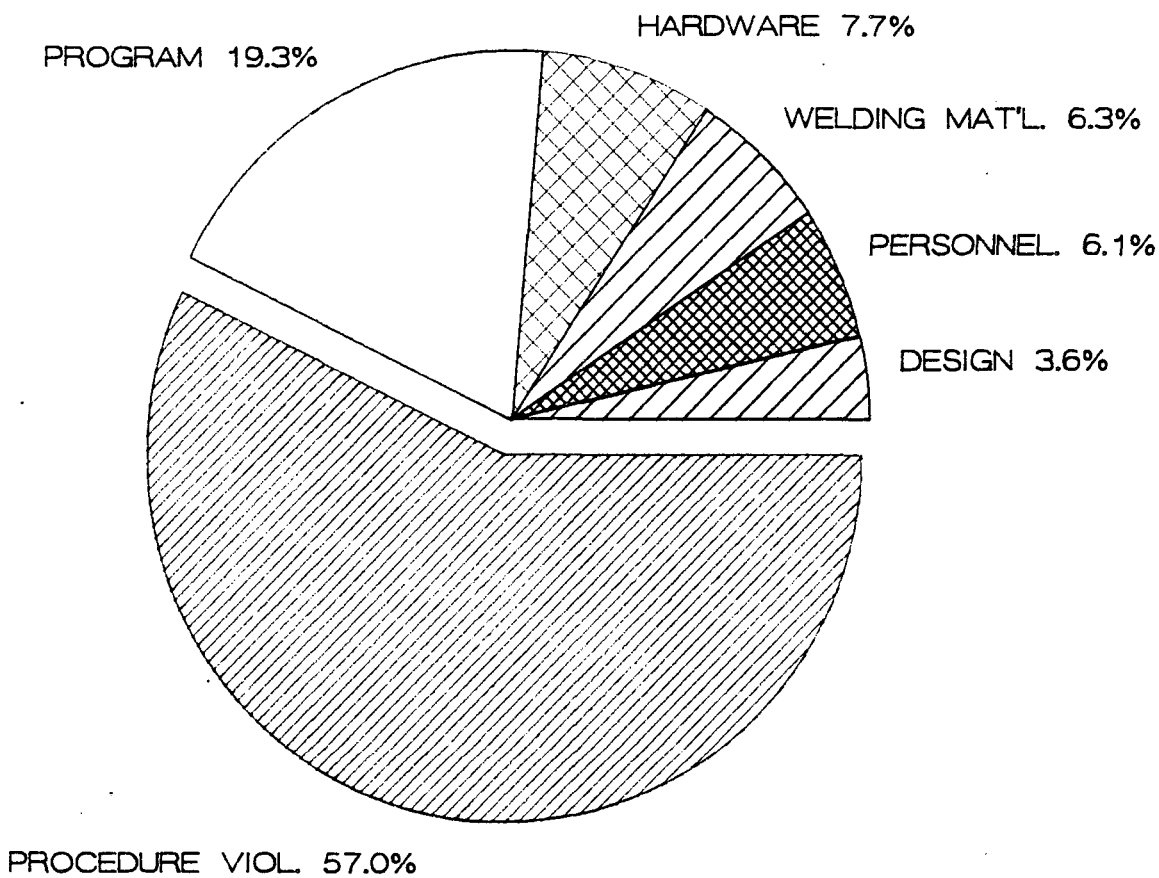
WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
			in increments of 0.010 inch; to delete the list of standards in 6.1.1.1; to require at 6.1.1 that the acceptance criteria for minimum remaining section thickness be in accordance with the CEP-4.03, Attachment B; and to define whether the acceptance or rejection is to be based on the manufacturer's or the design thickness shown on Attachment B. Recommend that WBN-CEP-4.03 be revised to assign engineering responsibility for entering the section thickness requirements on Attachment B, and that instruction be provided on how to determine these requirements, either directly or by reference to these details in a process specification.
WBN-QCP-1.47 Revision 6	Site Construction Specification N3G-101, Revision 2	For N3G-101 Feature 2.2.13, Special Processes, Paragraph 3, Bending of Welded Studs, the site procedure does not list General Construction Specification G-63 as an acceptance criteria source document.	Recommend that General Construction Specification G-63 be added to WBN-QCP-1.47, Section 3.1.
WBN-QCI-1.11-2 Revision 7	ANSI N45.2.6 1978 Edition	The requirement that the certification documents include the activities certified to perform; the basis used for certification; and the date of certification expiration are not addressed by Attachment B to the site procedure or by the OC QTPM.	WBN-QCI-1.11-2 has been superseded by QMI-802.6. QMI-802.6 establishes separate rules for certifications applicable to WBN unit 1 and unit 2. TVA Welding Inspectors recertified using ASNT Recommended Practice SNT-TC-1A, 1980 Edition as a guide. For unit 1, QMI-802.6 requires that NDE (includes visual welding) Inspectors be certified in accordance with PMP 0202.14. The certification records in PMP 0202.14 meet the requirements of Section 9, SNT-TC-1A. For unit 2, QMI-802.6 establishes the certification document

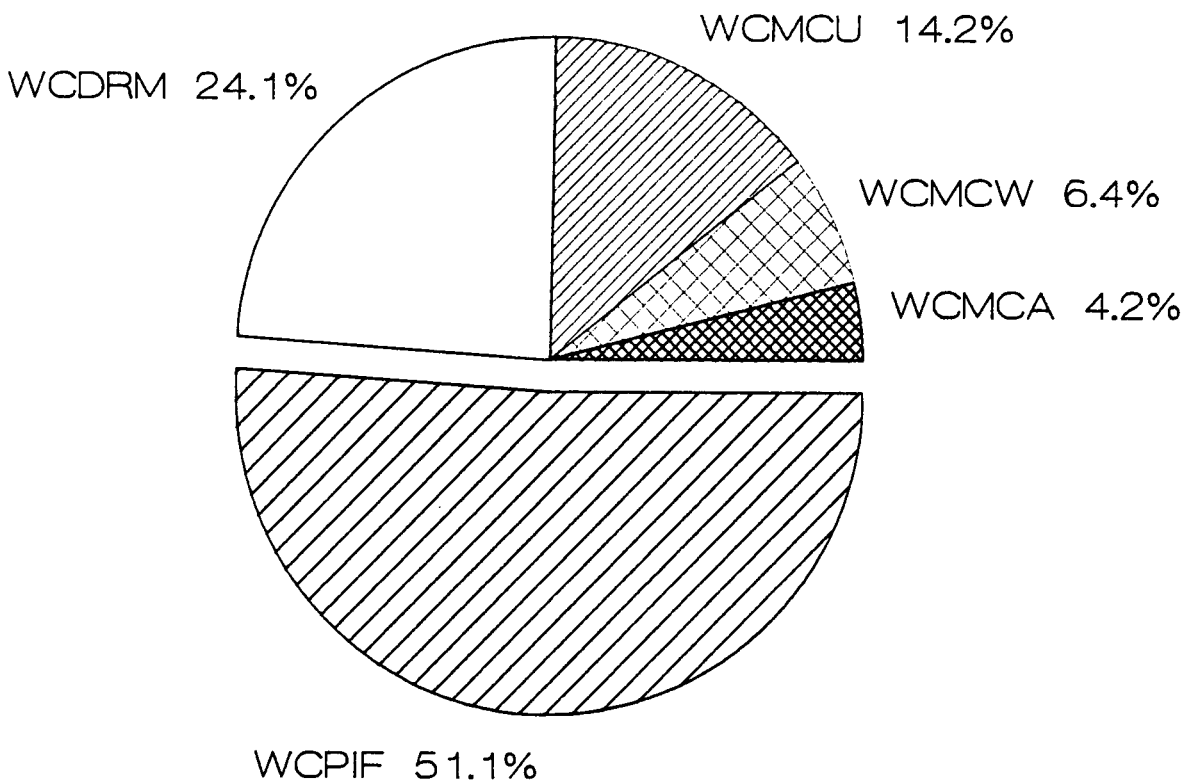
WATTS BAR NUCLEAR PLANT PHASE I REPORT
PROCEDURE DISCREPANCIES

WBN IMPLEMENTING PROCEDURE	REQUIREMENT SOURCE	PROCEDURE DISCREPANCY	RECOMMENDATIONS
			requirements for NDE inspectors. The specified certification documents are Attachments 10 and 11, QMI-802.6. These documents do not meet the requirements of SNT-TC-1A, Section 9.6.1, in that they do not include the level of certification and test method; educational background and experience; results of the physical examination; current examination copy(s) or evidence of successful completion of the examinations; composite grades or suitable evidence of grades; and the dates of certification and/or recertification and the dates of assignment to NDT. QMI-802.6 refers to QMP-198 for the prerequisites for certification of the unit 2 Inspectors. (The OC QTPM has been incorporated into QMP-198.) QMP-198 in turn establishes documentation requirements by reference to QMP-199. QMP-199 meets the requirements of SNT-TC-1A, Section 9. It does not, however, agree with PMP 0202.14. Recommend that QMP-802.6 be revised to clearly define one uniform method for documentation of Welding Inspector certification; and that this unified method clearly include all of the requirements described by SNT-TC-1A-1980. Recommend that QMP-198 be revised to comply with PMP 0202.14. Recommend that the welder performance cadweld operator and coatings applicator qualification records shown in QMP-199 be moved to the procedures which describe these activities; and that QMP-199 be rescinded.

WATTS BAR QUALITY INDICATOR
PROBLEM CATEGORIES



WATTS BAR QUALITY INDICATORS
PROCEDURAL VIOLATION



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WCRDM	WELD DOCUMENTATION
WCMCA	ARC STRIKES
WCMCU	UNDETECTED WELD DEFECTS
WCMCW	WELD REPAIR
WCPIF	FAILURE TO FOLLOW PROCEDURE

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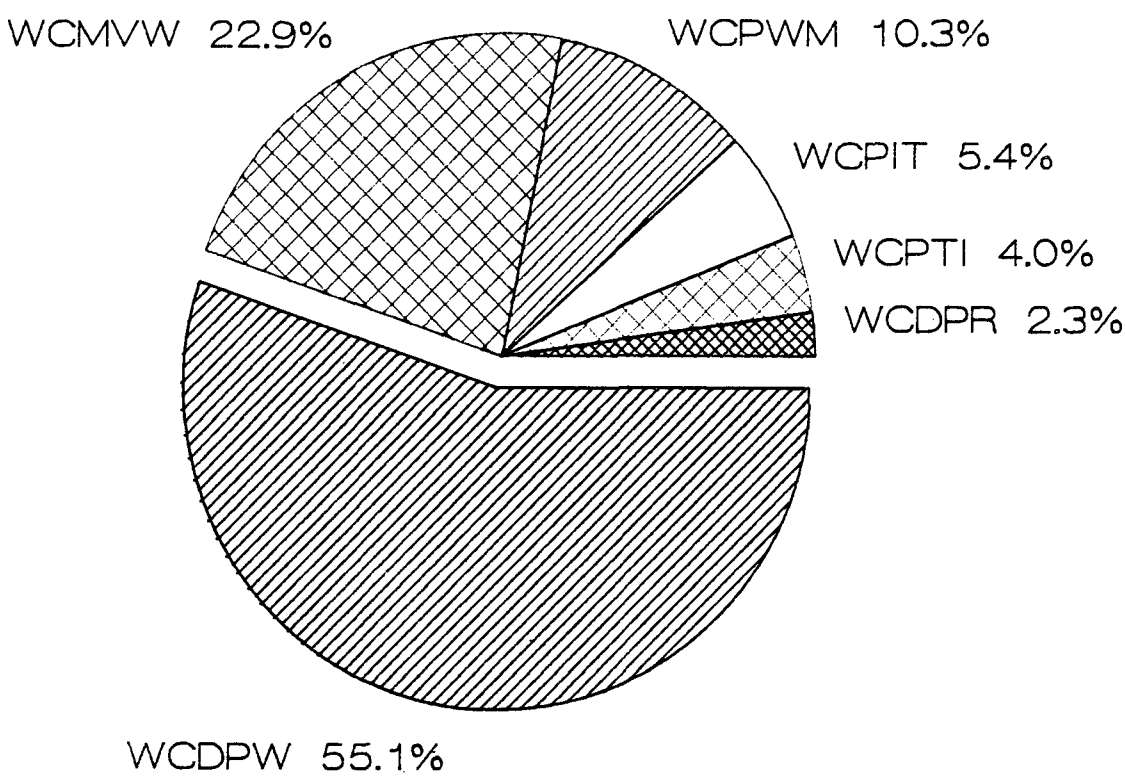
WATTS BAR QUALITY INDICATORS PROGRAM



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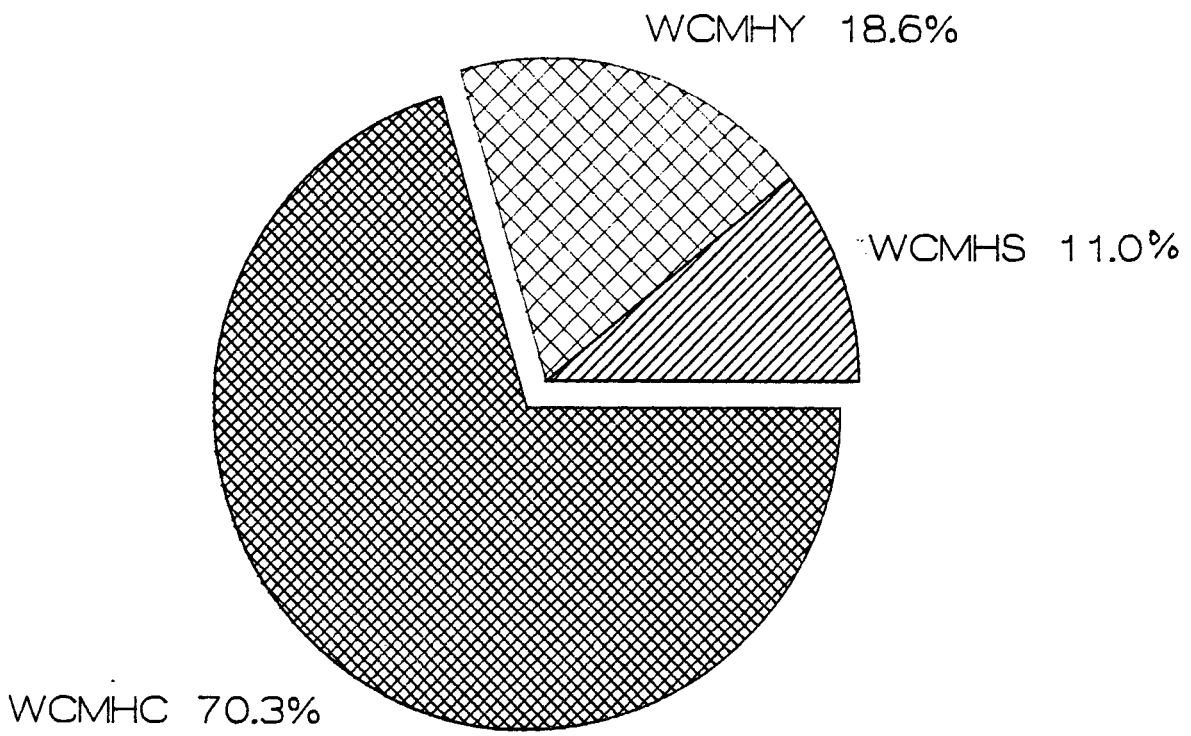
WCDPW	INADEQUATE PROCEDURE		
WCDPS	EVALUATION OF SAMPLING	WCPIT	INADEQUATE TRAINING
WCMVW	VENDOR WELDS	WCPWM	WORKMANSHIP

* ACCESS CODE FOR COMPUTER DATA BASE

WATTS BAR QUALITY INDICATORS
HARDWARE



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WCMHC	SPECIFIC COMPONENT
WCMHS	SPECIFIC STRUCTURE
WCMHY	SPECIFIC SYSTEM

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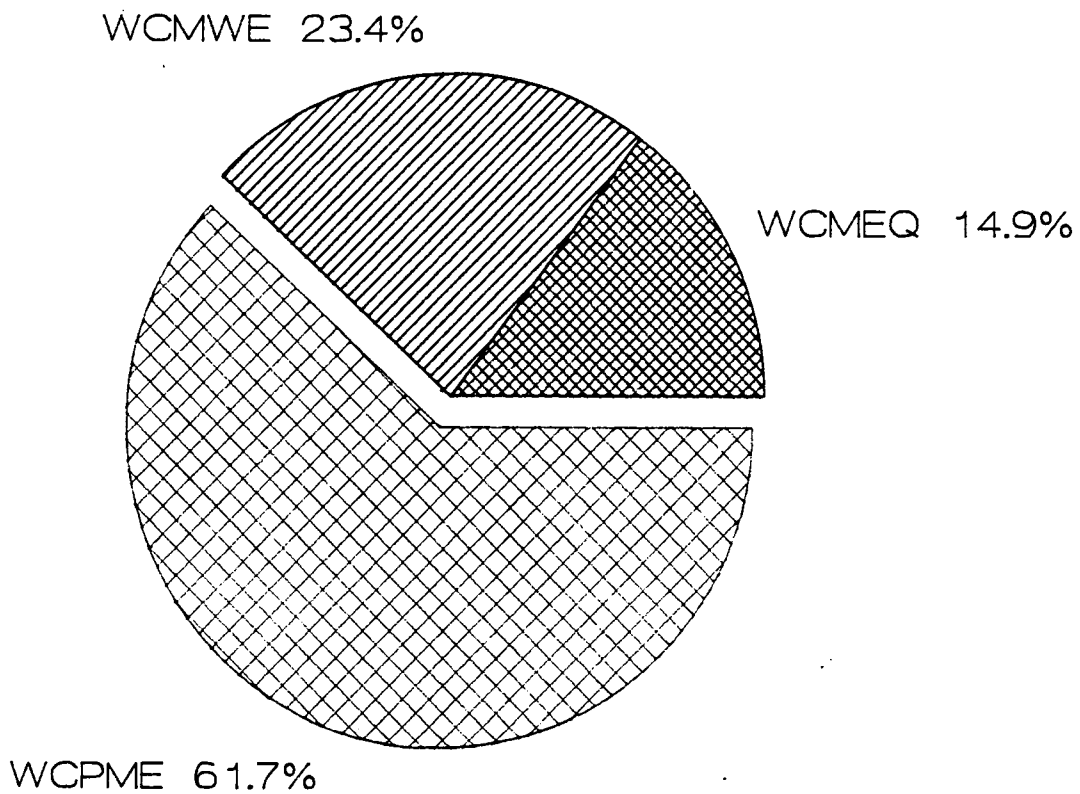
WATTS BAR QUALITY INDICATORS
WELDING MATERIALS



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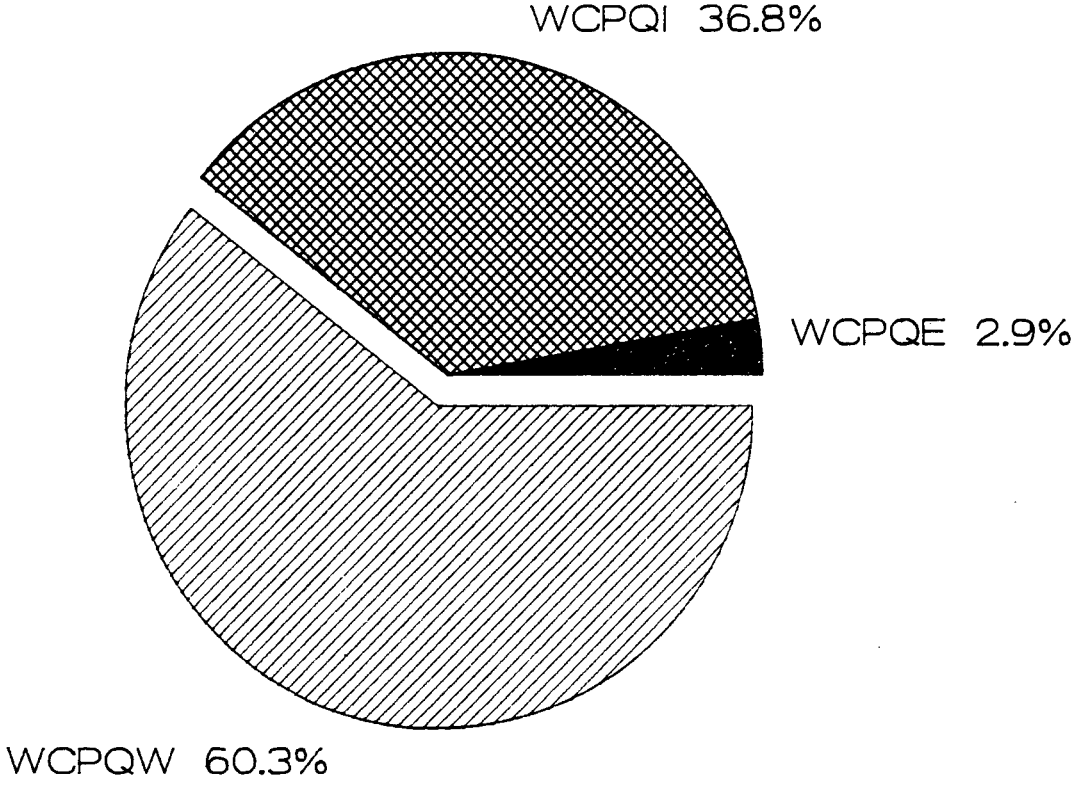
WCMEQ	ELECTRODE QUALITY
WCMWE	WELDING EQUIPMENT
WCPME	ELECTRODE CONTROL

* ACCESS CODE FOR COMPUTER DATA BASE

WATTS BAR QUALITY INDICATORS
PERSONNEL QUALIFICATIONS



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WCPQE	ENGINEER
WCPQI	INSPECTOR
WCPQW	WELDER

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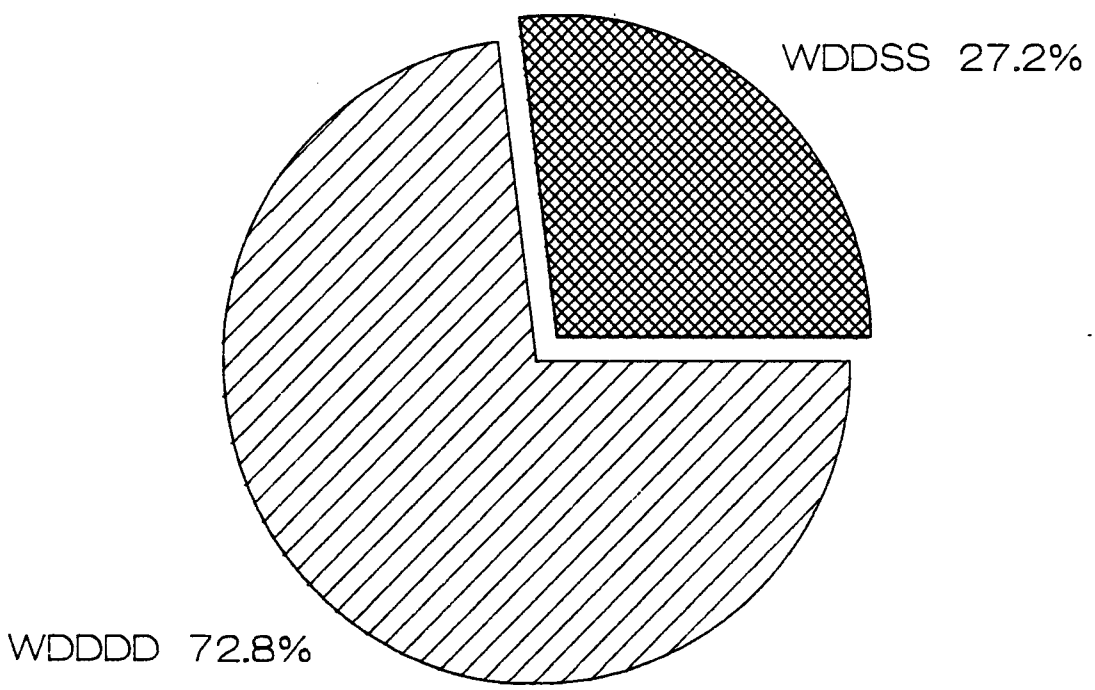
WATTS BAR QUALITY INDICATORS
DESIGN



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CONSTRUCTION QUALITY INDICATOR
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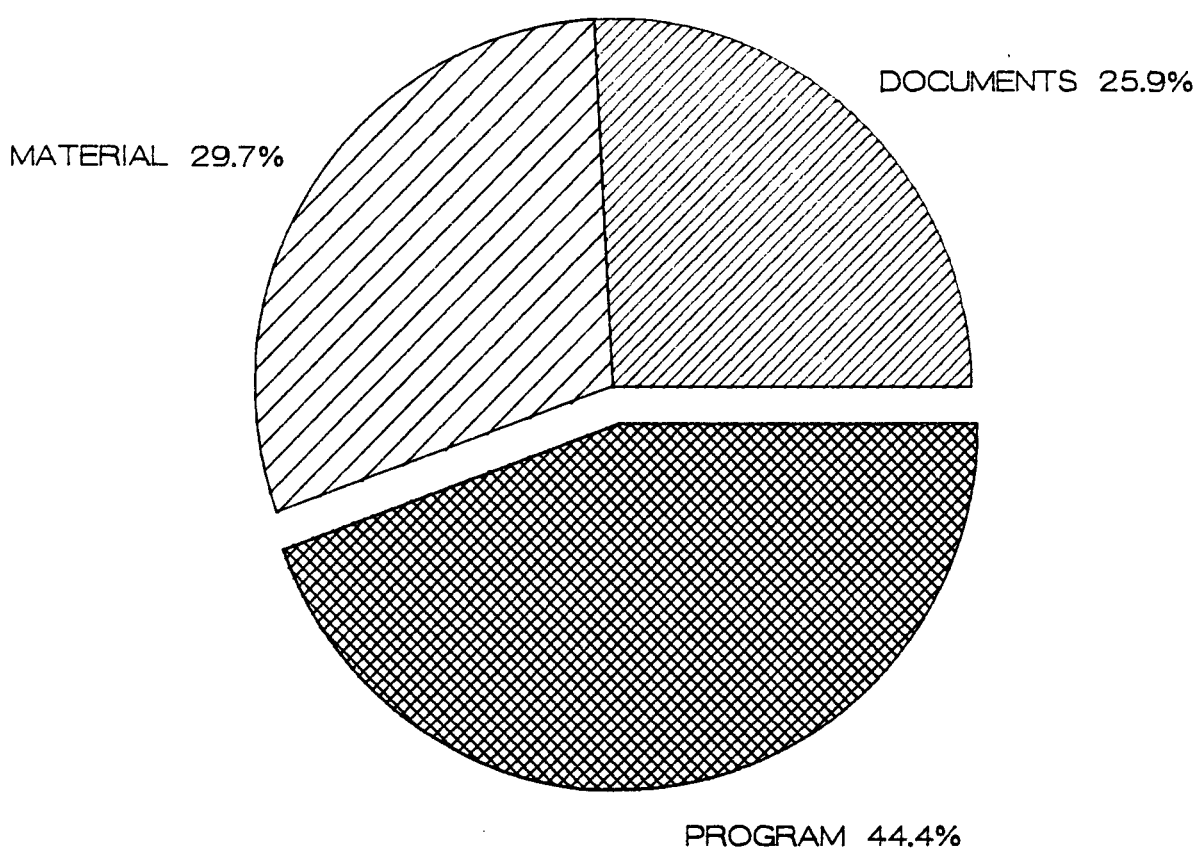

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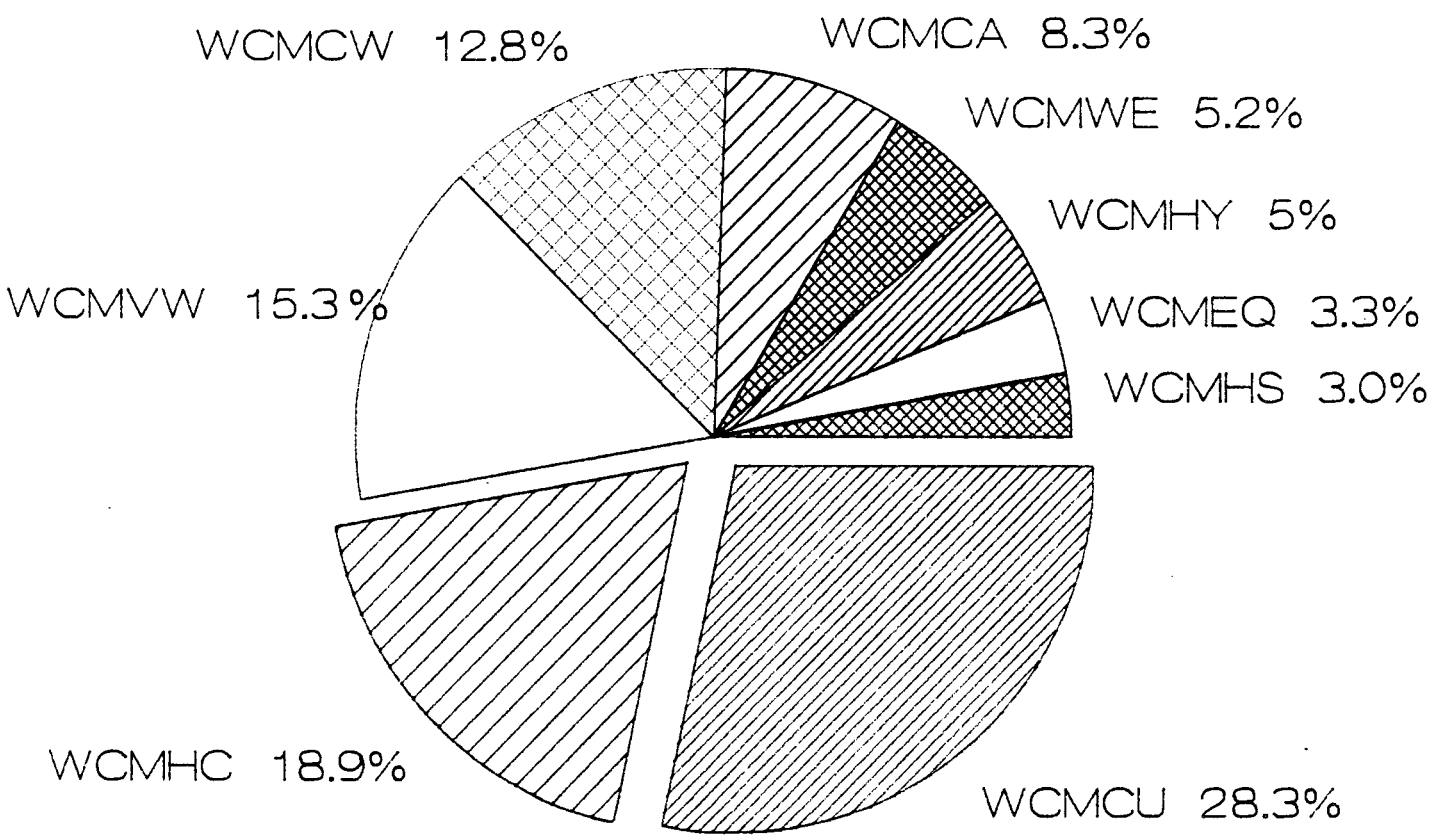

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WCMWE	WELDING EQUIPMENT	WCMVW	VENDOR WELDS
WCMCU	UNDETECTED WELD DEFECTS	WCMHC	SPECIFIC COMPONENTS
		WCMHS	SPECIFIC STRUCTURES
WCMCW	WELD REPAIRS	WCMHY	SPECIFIC SYSTEMS

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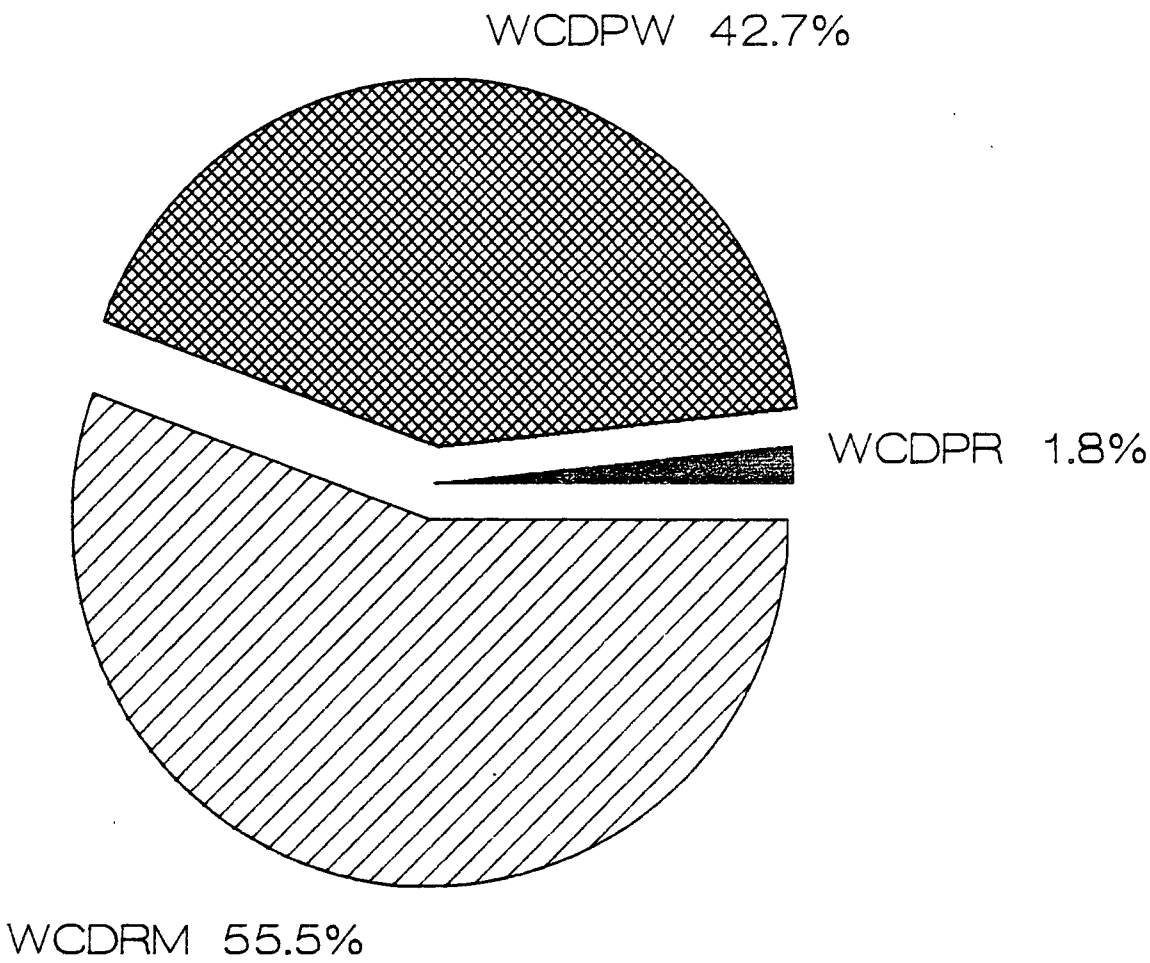
RECORDS AND PROCEDURES



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WCDRM ADEQUACY OF RECORDS
WCDPW WELD ACCEPTANCE CRITERIA AND PROCEDURE ADEQUACY
WCDPR REINSPECTION CRITERIA
WCDPS SAMPLING CRITERIA
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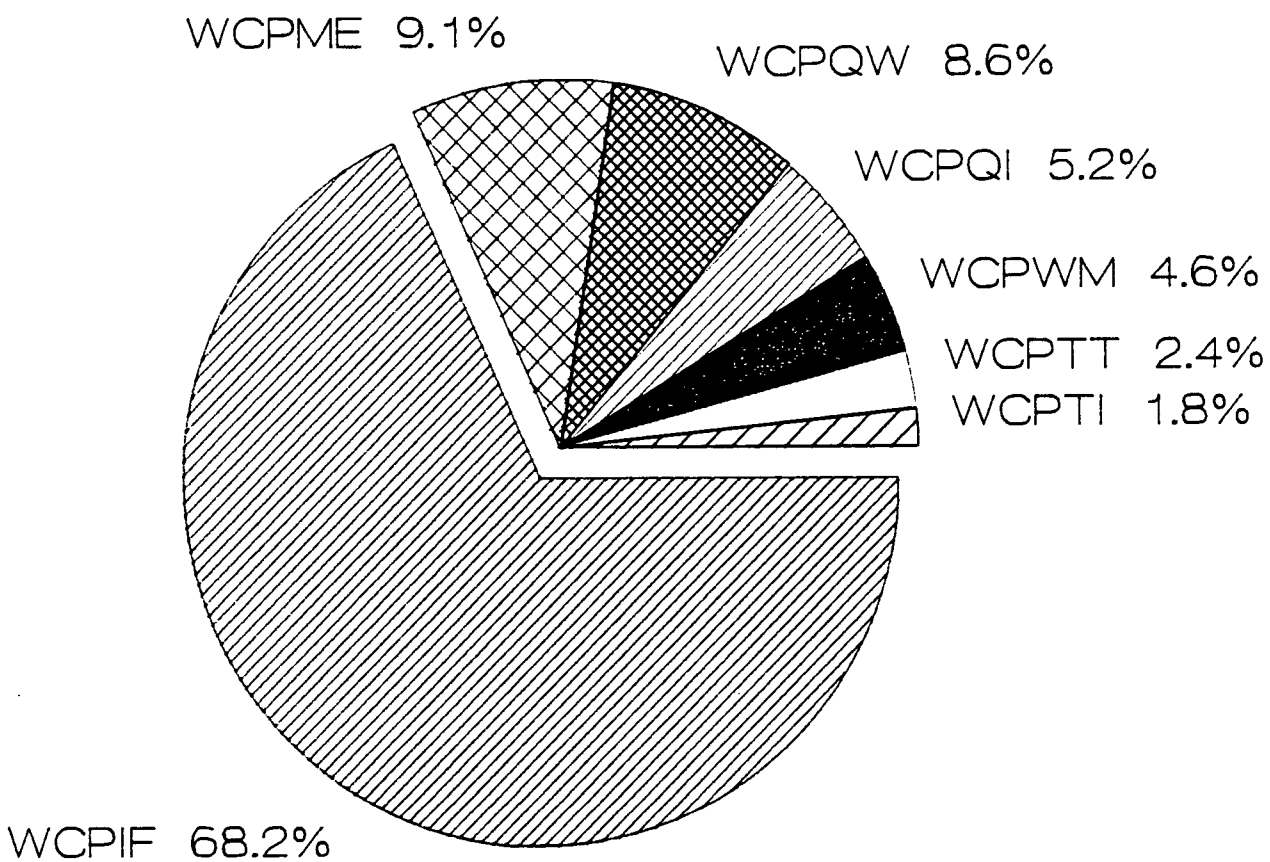
PROGRAM IMPLEMENTATION



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WCPQW	WELDER QUALIFICATION	WCPTI	ADEQUACY OF INSTRUCTION
WCPQI	INSPECTOR QUALIFICATION	WCPME	ELECTRODE CONTROL
WCPQE	ENGINEER QUALIFICATION	WCPIF	PROCEDURE VIOLATION

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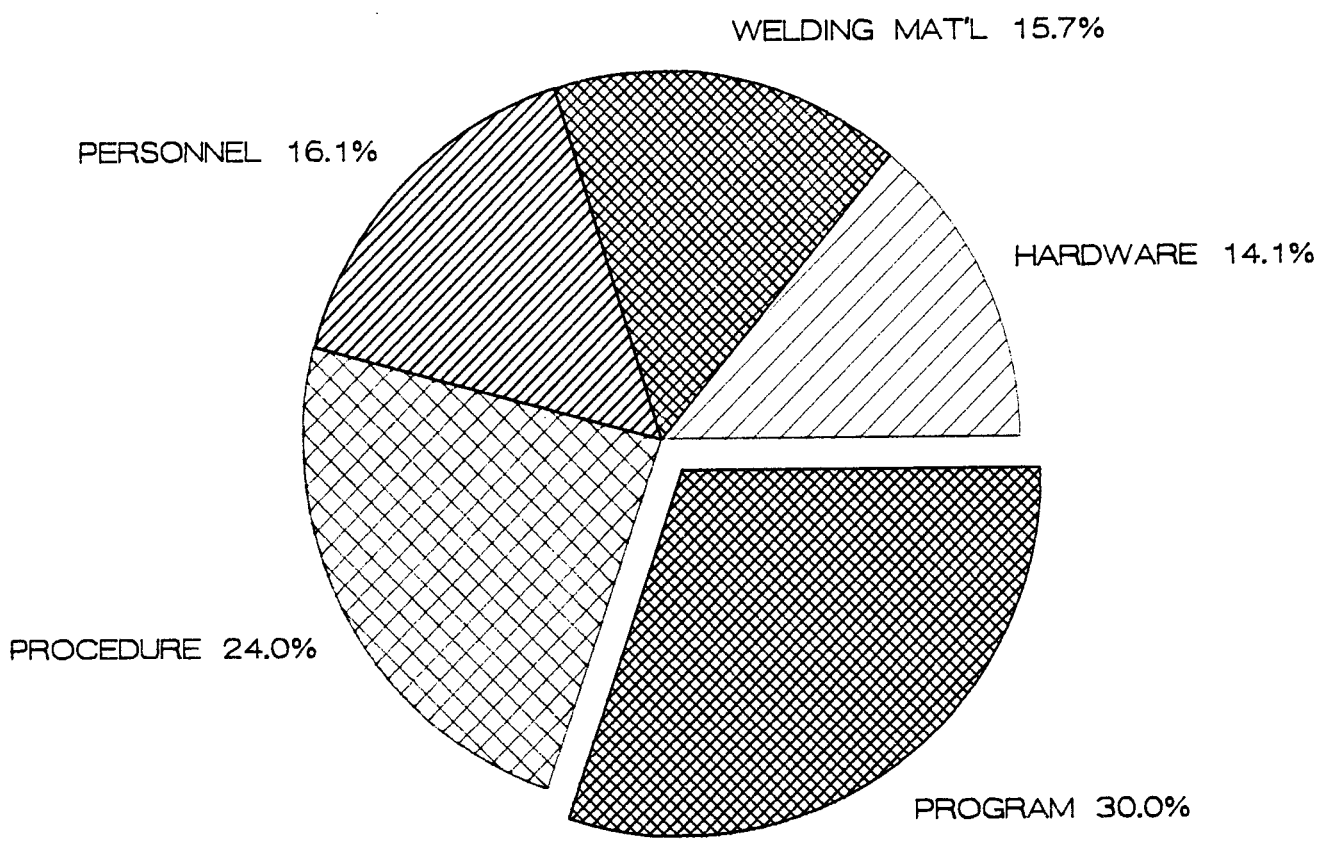
WATTS BAR EMPLOYEE CONCERN
PROBLEM CATEGORIES



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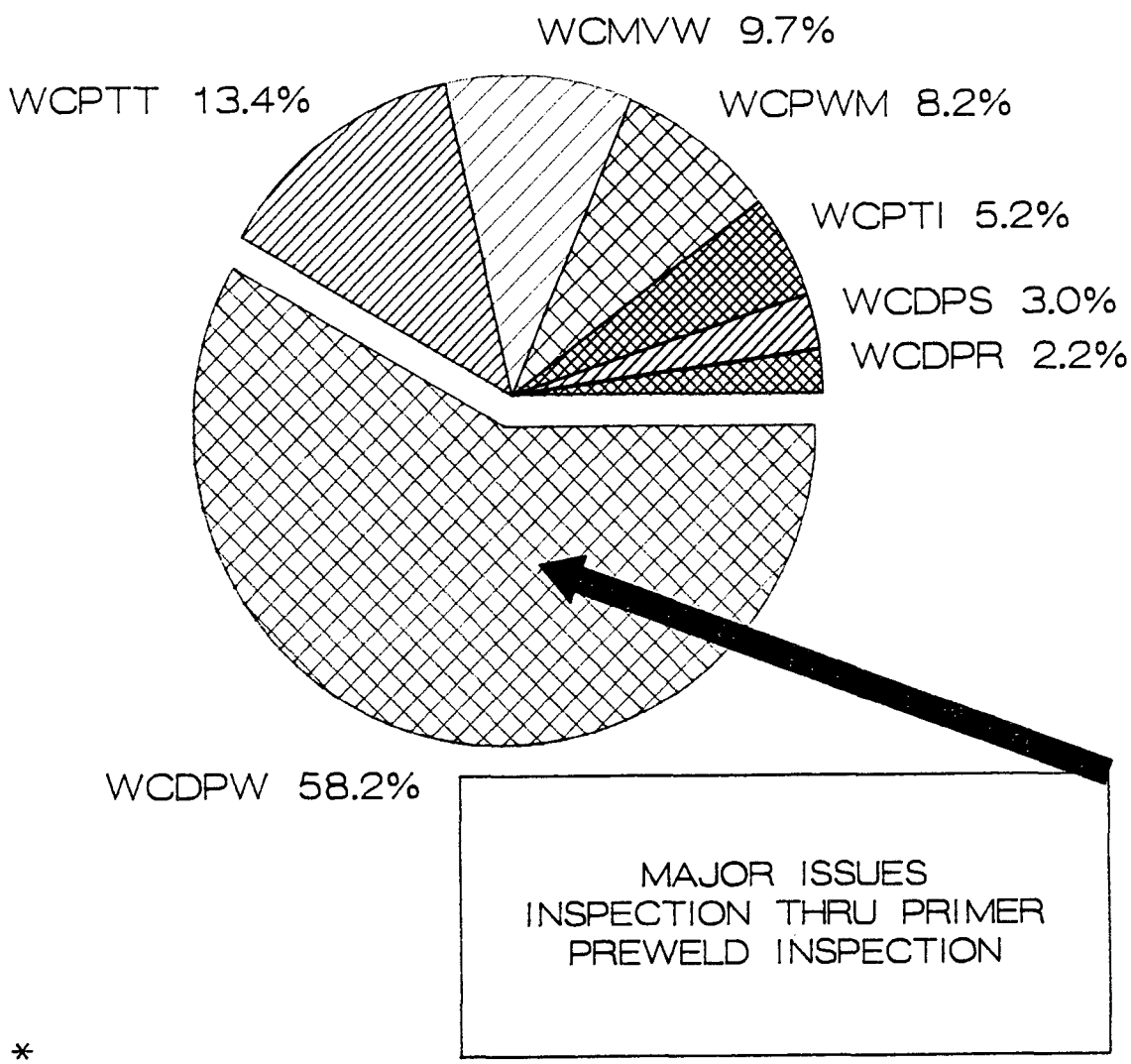

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WCDPR	REINSPECTION CRITERIA		
WCDPS	EVALUATION OF SAMPLING	WCPTI	INADEQUATE INSTRUCTION
WCDPW	INADEQUATE PROCEDURE	WCPTT	INADEQUATE TRAINING
WCMVW	VENDOR WELDS	WCPWM	WORKMANSHIP

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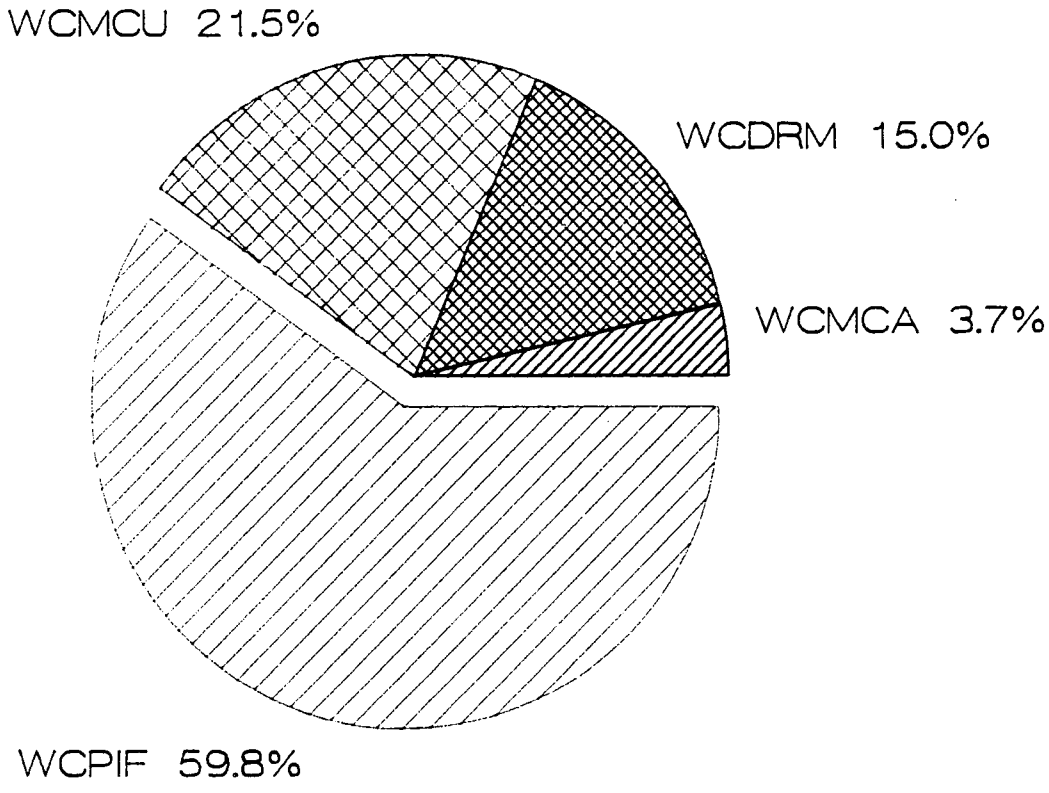
WATTS BAR EMPLOYEE CONCERNS
PROCEDURE VIOLATION



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WCDRM	WELD DOCUMENTATION
WCMCA	ARC STRIKES
WCMCU	UNDETECTED WELD DEFECTS
WCPIF	FAILURE TO FOLLOW PROCEDURE

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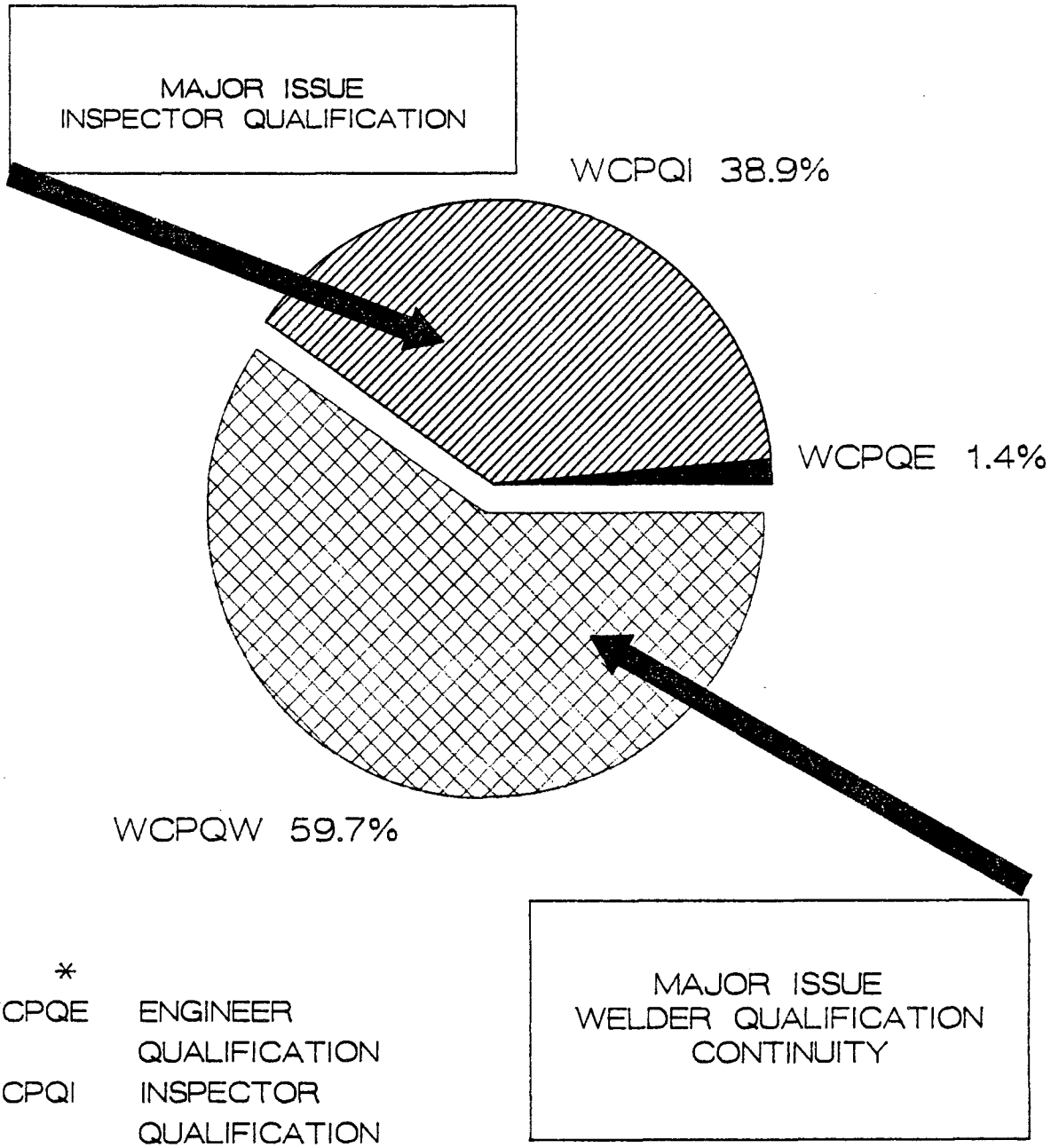
WATTS BAR EMPLOYEE CONCERNS
PERSONNEL QUALIFICATION



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WCPQE	ENGINEER QUALIFICATION
WCPQI	INSPECTOR QUALIFICATION
WCPQW	WELDER QUALIFICATION

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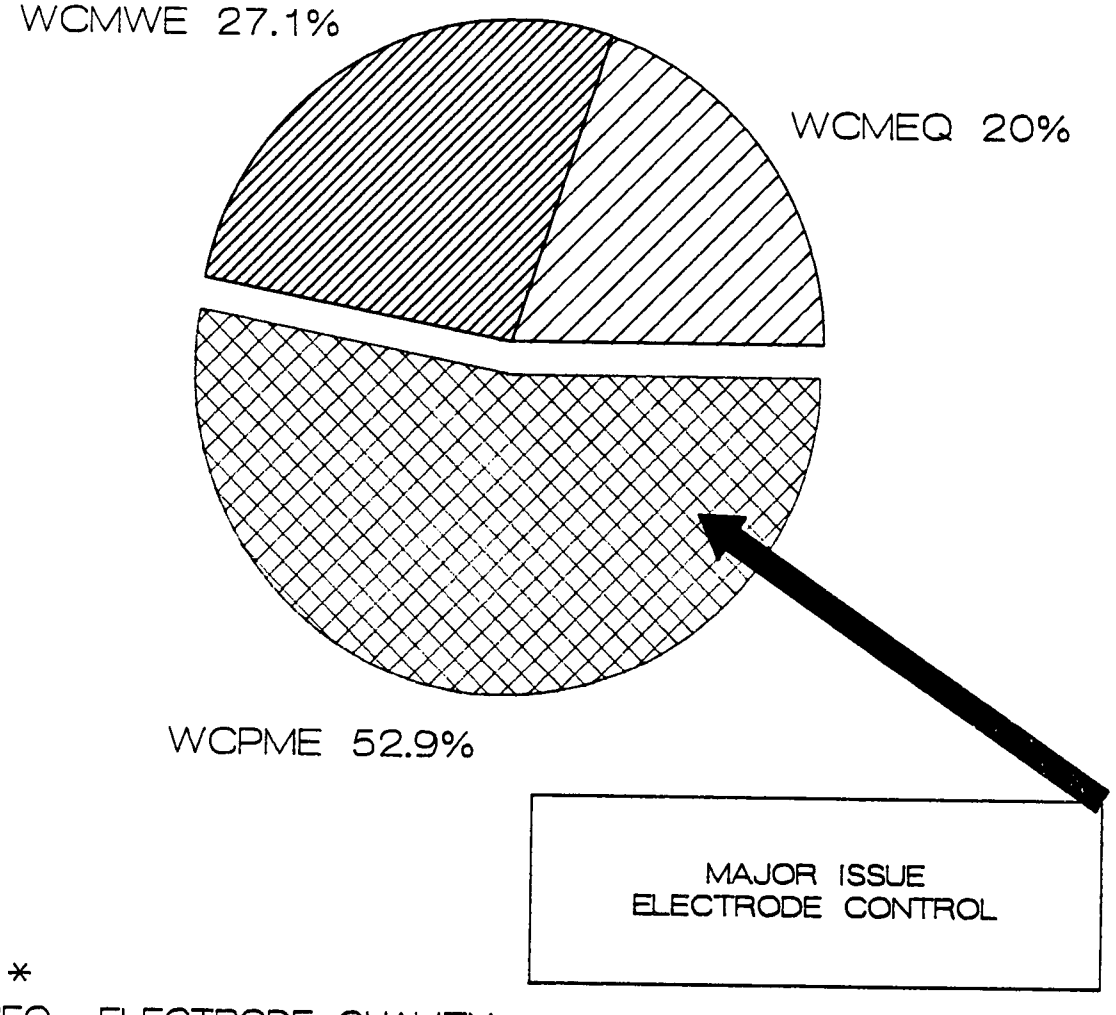
WATTS BAR EMPLOYEE CONCERNS
WELDING MATERIALS



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WCMEQ ELECTRODE QUALITY
WCMWE WELDING EQUIPMENT
WCPME ELECTRODE CONTROL

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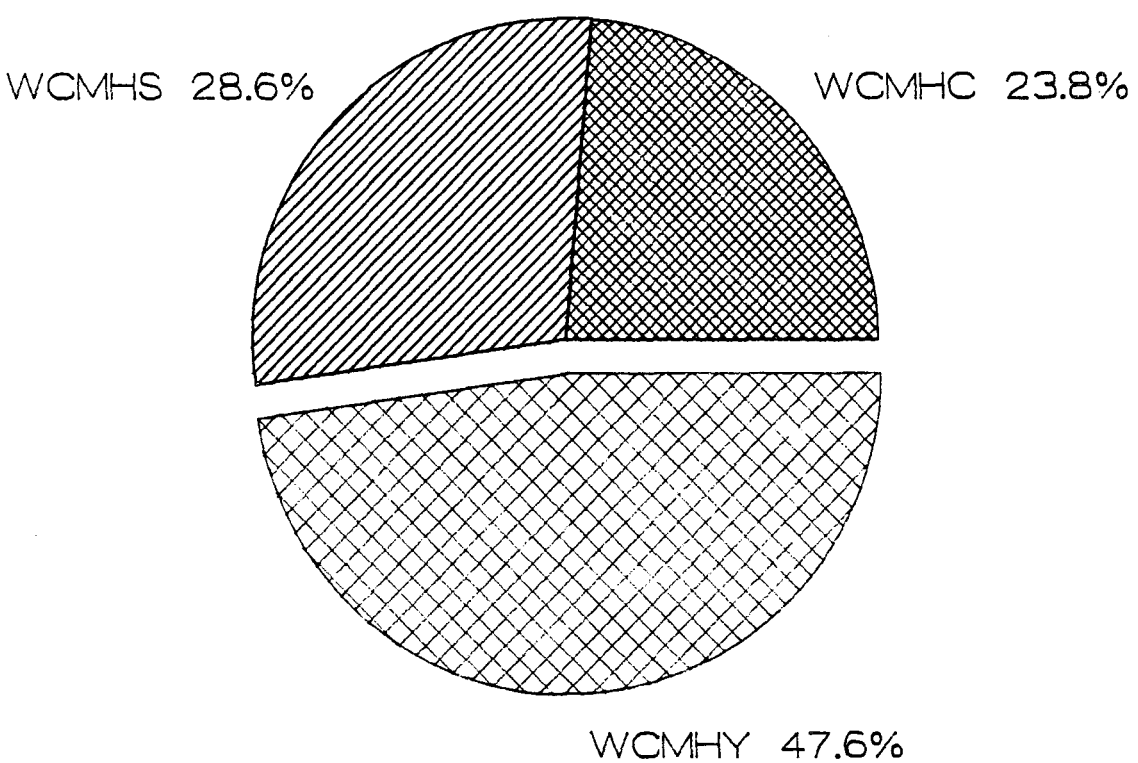
WATTS BAR EMPLOYEE CONCERNS
HARDWARE



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WCMHC SPECIFIC COMPONENTS
WCMHS SPECIFIC STRUCTURES
WCMHY SPECIFIC SYSTEMS

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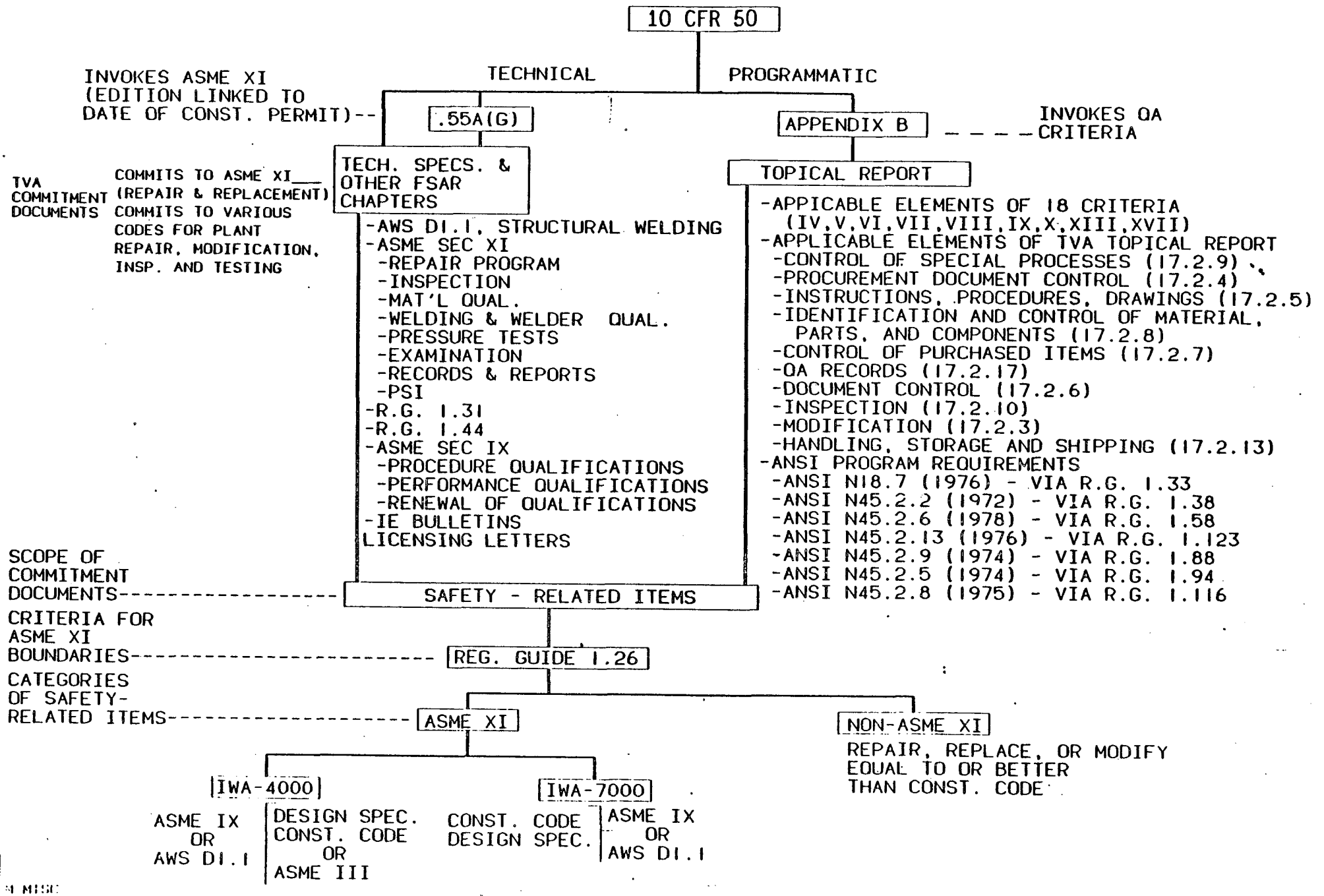
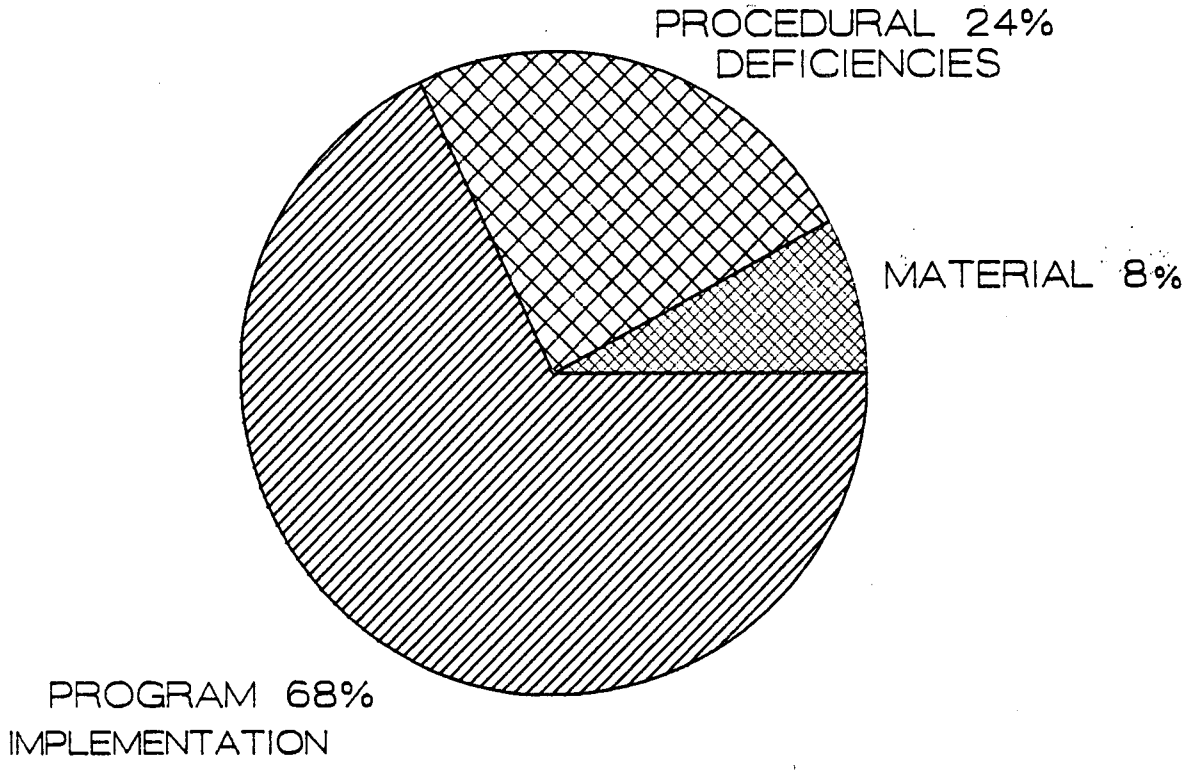
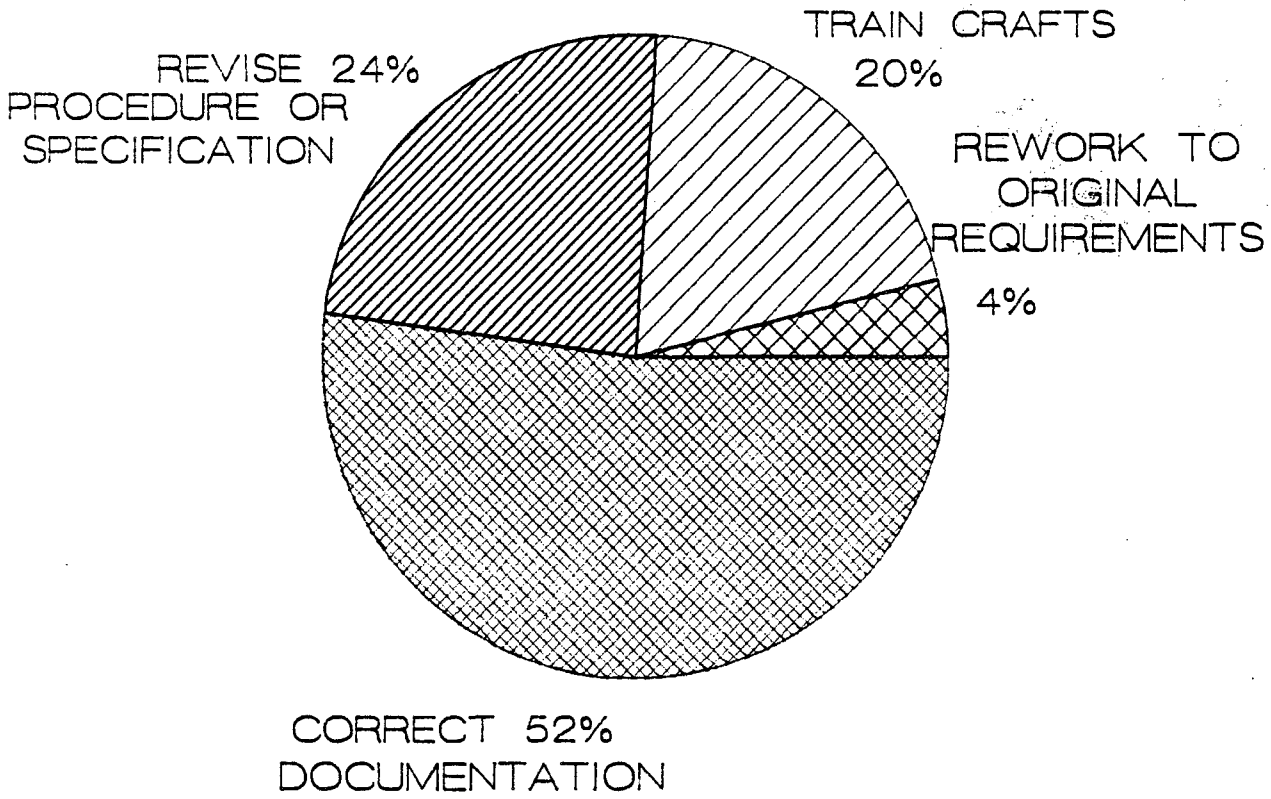
NUCLEAR OPERATIONS COMMITMENT SUMMARY
---WELDING---



WATTS BAR NUCLEAR OPERATIONS
WELDING PROGRAM INDICATORS
FINDING CATEGORIZATION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WELDING PROGRAM INDICATORS
DISPOSITION CATEGORIZATION