Consumers Power
POWERING MICHIGAN'S PROGRESS
General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-1636

Kenneth W Berry
Director
Nuclear Licensing

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Nuclear Regulatory Commission
Document Control Desk
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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT - ADDITIONAL INFORMATION REGARDING THE RESPONSE TO INSPECTION REPORT 89007 NOTICES OF VIOLATION

On August 10, 1989, Consumers Power Company submitted a response to the NRC's Engineering Team Inspection (ETI), report number 255/89007, which had been transmitted to us by letter dated June 28, 1989. On November 2, 1989, NRC Region III personnel contacted Consumers Power Company personnel by telephone indicating that the NRC staff had completed its review of our August 10, 1989 submittal and further clarification and information from Consumers Power Company was necessary. In addition, NRC Region III requested that we provide on the docket, a summary of our August 15, 1989 presentation to NRC Region III personnel in which Consumers Power Company personnel described the recent upgrades to our design control program, and the causes for and significance of the deficiencies identified in the ETI report. This letter provides the requested clarification and summary.

Enclosure 1 of this letter provides updated responses to several specific violation examples and unresolved items where the NRC requested further clarification and/or supporting information. These responses reflect Consumers Power Company's position related to these conditions being cited as representing violation to 10CFR50, and provide corrective actions to prevent recurrence. Enclosure 2 of this letter provides the summary of our recent presentation to NRC Region III describing design control upgrades at the Palisades Plant.

Bruce D. Johnson for

Kenneth W Berry
Director, Nuclear Licensing

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

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Enclosure 1

Clarification and/or Additional

Information Related to Specific

NRC Engineering Team Inspection

Findings

NRC Violation 255/89007-01c: Consumers Power Company Drawing M-101 Sheet 5113, Revision 0, "Piping Isometric, Auxiliary Feedwater Control Valve CV-0736A and CV-0737A Bypass Piping." [Refer to page 12 of NRC Report 50-255/89007 (DRS).]

Example

- The size of the fillet weld was determined by the requirements of Welding Specification WPS-11.21, Revision 2; however, for the socket welded fittings, the size of the fillet weld was not specified on this drawing.

- In reviewing the Repair Inspection Checklist (RIC) for the welds in question, the weld size specified is 1-1/2 inches. This is misleading in that this is the size of the pipe and not the size of the fillet weld. In order for the welder to determine the size of the fillet weld, the pipe wall thickness must be obtained and a calculation of 1.09 times the wall thickness must be performed. Although this is a relatively simple calculation, it is a design function and as such must be controlled. There is no documentation to demonstrate that this design activity was performed. In addition, there are no controls in place to check and verify this design activity.

Reason For Violation

The reason for violation as stated in our August 10, 1989 submittal has not changed. Consumers Power Company acknowledges this example as a violation of 10CFR50, Appendix B, Criterion III, Design Control.

Corrective Actions Taken And Results Achieved

The action described as "interim" in our August 10, 1989 submittal has been completed. All design change engineers have been briefed as to the reported violations by personal letter. The letter required that all engineers involved in design changes scheduled for installation in 1989 review existing design packages for similar problems and correct any identified problems. This letter was issued on September 15, 1989.

Corrective Actions To Be Taken To Avoid Further Noncompliance

The long-term actions to avoid further noncompliance are described in our August 10, 1989 submittal related to this violation example.

Date When Full Compliance Will Be Achieved

The commitment dates provided in our August 10, 1989 submittal related to this violation example remain applicable with the following revision:

1. Training required to address the enhancements to the design control procedures and related program documents will be completed by March 1, 1990. This reflects a change from the original commitment date of January 1, 1990 due to the extent of the enhancements.

2. Development of the generic guideline to support the design engineer throughout the weld design process will be completed by September 1, 1990.

NRC Violation 255/89007-01d: EA-T-FC-722-501-01, "Calculation of Acceptance Criteria for Modification Test Procedure T-FC-722-501," January 13, 1987. [Refer to page 16 of NRC Report 50-255/89007(DRS).]

Example

The calculation on Page 2 of Engineering Analysis EA-T-FC-722-501-01 states that the total volume of gas contained in the nitrogen bottles at 2000 psig is 209 scf. This value is incorrect in that it is the useable cylinder volume as given in calculation EA-FC-722-02. The actual volume is approximately 228 scf. By using the incorrect value, the calculated acceptance criteria for pressure drops were higher and, therefore, nonconservative.

Failure to provide design control measures to correctly translate the useable cylinder volume from the calculation to the test procedure is a further example of violation of 10CFR50, Appendix B, Criterion III.

Reason For Violation

The use of the incorrect volume of gas contained in the nitrogen bottles to establish acceptance criteria is acknowledged. The useable volume of 209 scf was initially utilized by the design engineers to conservatively determine and establish the required number of nitrogen bottles for each nitrogen station. The test engineer, in establishing the modification acceptance criteria, also utilized the volume of 209 scf, failing to recognize that the resulting acceptance criteria are less conservative than those which would result when the volume of 228 scf is utilized. Furthermore, technical reviews of EA-T-FC-722-501 also failed to recognize that the incorrect volume was utilized. Consumers Power Company acknowledges the violation of 10CFR50, Appendix B, Criterion III, Design Control.

Corrective Action Taken And Results Achieved

Engineering Analysis EA-E-PAL-89-031L-01, Revision 1, has been prepared which revises Analysis EA-T-FC-722-501-01 and utilizes the correct total volume of 228 scf. The results of Analysis EA-E-PAL-89-031L-01, Revision 1, lowered the acceptance criteria for each nitrogen station by approximately nine percent.

As a result of EA E-PAL-89-031L-01, Revision 1, EA E-PAL-89-031L-02, Revision 1, was prepared to analyze the test results of Modification Test T-FC-722-501. The results of this analysis clearly show that each nitrogen station meets or exceeds its desired operating period. Therefore no plant modification is required.

Corrective Actions To Be Taken To Avoid Further Noncompliance

Consumers Power Company will issue a written briefing of this violation example to all design engineers. The briefing will stress that careful consideration be made when translating design bases into post-modification testing requirements. In addition, this violation example will be a topic of discussion at our monthly design supervisors meeting.

Consumers Power Company will make enhancements to Plant administrative design control procedures to provide the analysis technical reviewer a review checklist with a "prompt" to justify the numerical values of all constants and variables utilized as inputs to the analysis (the checklist will provide a comprehensive set of "prompts" to ensure an overall accurate, thorough and auditable analysis).

The above commitments supersede the commitments made in our August 10, 1989 submittal related to this violation example.

Date When Full Compliance Will Be Achieved

By January 1, 1990, the briefing will be issued to all design engineers, procedural enhancement will be completed, and the violation example will be discussed at a monthly design supervisors meeting.

NRC Violation 255/89007-01g: FC-756 "HPSI Pump Miniflow Bypass Modification" [Refer to pages 18 and 19 of NRC Report 50-255/89007 (DRS).]

Example

Pipe support drawings in Piping Support Calculation No 03378 of FC-756 did not adequately describe the required weld sizes.

Pipe Support Drawings DC1-H198.1 and DC1-H196.2 contained in Support Calculation No 03378 were reviewed. The inspector found that one drawing showed fillet welds at the structural joints but no weld sizes were specified. The other drawing showed a 3/16 inch fillet weld with a note "assumed." As a result, the design bases of the welds were not adequately translated into the drawings.

Reason For Violation

The subject drawings the inspector had reviewed were actually initial IEB 79-14 calculation file drawings of a preliminary status and not necessarily representative of the final, verified as-built conditions as shown on drawings DC1-H198.1 and DC1-H196.3 (Rev 0). The subject drawings had no impact upon, nor were utilized by, design change FC-756. Nevertheless, Consumers Power Company acknowledges that drawings of preliminary status, or superceded drawings stored in an active controlled file, may lead to user confusion.

Inadequate controls during the IEB 79-14 program implementation resulted in superseded documents accumulating in active, controlled files. Current design practice calls for superseded record documents to be placed into historical files. Consumers Power Company acknowledges this example as a violation of 10CFR50, Appendix B, Criterion III, Design Control.

Corrective Action Taken And Results Achieved

To notice engineering staff as to the inability of our IEB 79-14 records to serve as accurate, quality level design documentation, a letter has been transmitted to all engineering departments describing the existing documentation deficiency and indicating that the documentation should not be relied upon solely for future design work. The letter instructs engineering staff to augment existing IEB 79-14 documentation with Plant walkdown and confirmatory re-analyses where necessary in a given project. This letter has been filed alongside existing IEB 79-14 filed documents.

Corrective Actions To Be Taken To Avoid Further Noncompliance

In recent submittals (LER 89-023/November 9, 1989 and November 21, 1989), we committed to a reverification of IEB 79-14 record documentation and as-built condition. As part of this project, stress packages will be reviewed to identify superseded documentation and either remove such documentation from active file or clearly annotate its superseded status.

Date When Full Compliance Will Be Achieved

Stress packages will be reviewed to identify superseded documents and such documents will be either removed from active file or clearly annotated in accordance with our reverification schedule as identified in the November 21, 1989 submittal.

NRC Violation 255/89007-011: SC-87-090 "Service Water Leak Detection Set Point." [Refer to page 27 of NRC Report 50-255/89007(DRS).]

Example

Specification Change 87-090 changed the service water (SW) leak detection setpoint from 75 gpm to 300 gpm without verifying what size of SW piping break in the containment air coolers would result in a 300 gpm delta-flow alarm.

Reason For The Violation

Our August 10, 1989 submittal provided a detailed description of this specification change (SC) and the degree to which this change had been evaluated (as part of the SC engineering effort) in relation to its impact on requirements at the system level. The submittal indicated that although the SC engineering analysis did not provide justification that the setpoint meets the design intent of the SW leak detection system, the SC safety evaluation did provide a detailed system-level design basis account. The safety evaluation concludes that a break in the SW line representing 300 gpm would not render the containment air coolers incapable of performing their intended safety function since minimum flow requirements for the air coolers would still be provided. The safety evaluation goes on to state that at a 300 gpm break, the operators would have ample time to detect the condition before any significant impact on boron concentration of post-LOCA recirculation inventory is realized.

It should be noted that the safety evaluation is a mandated and integral part of every SC engineering effort. One purpose of the safety evaluation is to assess the impact that the change may have on other safety-related equipment. The safety evaluation is subject to technical review as is any other SC design document. This review is completed by qualified members of the Plant Safety and Licensing staff in accordance with Technical Specification 6.5.3 prior to the change being released for implementation. The safety evaluation (along with other SC design documentation) may be reviewed by the Plant Review Committee if it is determined to be significant to nuclear safety.

Currently, SC administrative procedures do not require that specific component and systems level justification for a particular instrument setting be documented in an engineering analysis dedicated for such purposes. Although the safety evaluation must take into account systems impact and interaction, the safety evaluation process is not designed to extract this specific set point basis information. Due to the lack of clearly defined requirements, SC engineers have in the past elected to use either the engineering analysis or the safety evaluation to document setpoint bases. Consumers Power Company acknowledges the need to establish clear documentation expectation and consistency, and that this condition does reflect a violation of 10CFR50, Appendix B, Criterion III, Design Control.

Corrective Actions Taken And Results Achieved

A letter has been distributed to all engineering personnel describing this specific violation example and stressing the expectation that all setpoint

justification (at both the component and system level) be documented in a SC engineering analysis.

Corrective Actions To Be Taken To Avoid Further Noncompliance

Specification change administrative procedures will be revised to clearly require that all setpoint justification (at both the component and system level) be documented in an SC engineering analysis.

This specific violation example will be discussed at a future design engineering supervisors meeting.

Date When Full Compliance Will Be Achieved

The specification change procedures will be revised by January 1, 1990. In addition, the design engineering supervisors meeting discussion will take place by January 1, 1990.

NRC Violation 255/89007-01m: SC-87-163 "Upgrade Feedwater Flow Transmitters" [Refer to pages 27 and 28 of NRC Report 50-255/89007 (DRS).]

Example

Specification Change 87-163 added a series voltage regulating zener diode to the feedwater flow transmitter instrument loop for transmitters FT-0701 and FT-0703 without specifying the required zener diode design parameters.

Reason For Violation

Consumers Power Company acknowledges the violation of 10CFR50, Appendix B, Criterion III, Design Control. Since our August 10, 1989 submittal, the SC-87-163 change package has been again reviewed. Based on this detailed review, the following is concluded:

1. The SC-87-163 change package and associated Drawing E-69 Sh 1, Rev 22 clearly indicate that a 1N2984 zener diode (rated at 20 volts) was to be (and was) installed in the FT-0701 instrument loop, and a 1N2986A zener diode (rated at 24 volts) was to be (and was) installed in the FT-0703 instrument loop. The August 10, 1989 submittal indicated incorrectly that the required zener voltage was 11 volts.

2. Although the proper zener diodes were specified in the change package, the basis for selection of these particular diodes was not provided. Discussions with Instrument and Control engineering personnel revealed that the appropriate diodes were selected based on field voltage measurements to identify the zener voltage drop necessary to provide the transmitter a voltage within its rated operating range. The bases for the diode selection (ie, required transmitter voltage, existing transmitter voltage, and voltage drop expected from the zener diode to be specified), however, was not documented in the change package.

3. Although the specification change engineering process at the time required (and currently requires) that a determination be made as to whether electrical interfaces (operating characteristics) of the replacement device (in this case, flow transmitter) are consistent with the original device, this determination was marked "not applicable" on the associated checklist form. This evidence reflects an inadequate determination on the part of the specification change engineer. Although the diodes were later identified as necessary (as part of a scope change to the specification change package), and were properly specified and installed, a proper and thorough response to this checklist item would have resulted in documenting the bases for the change.

4. Design control measures were not developed as part of SC engineering or implemented as part of SC installation and testing to verify the adequacy of zener diode installation.

Corrective Actions Taken And Results Achieved

A letter has been distributed to all engineering staff describing this condition and stressing the need to document the detailed bases for the change intended. This action supersedes the action identified as "Interim" in our August 10, 1989 submittal relating to this violation example.

Corrective Actions To Be Taken To Avoid Further Noncompliance

The actions described in our August 10, 1989 submittal relative to this violation example serve to ensure that adequate bases are developed to justify the change, that these changes are technically reviewed and documented within the specification change package, and that measures for verifying critical as-built features are verified (eg, inspection or test). In addition to these actions, additional clarifying guidance will be added to the specification change checklist to assist in assuring that interface requirements are addressed in detail; thereby providing essential design basis information. It should be noted that the response to this checklist item falls within the scope of the technical review mentioned above.

Also, this violation will be the subject of discussion in an upcoming Design Engineering Supervisors Meeting. During this discussion, the need for documenting specification change design bases will be stressed.

Date When Full Compliance Will Be Achieved

Clarifying guidance will be added to the specification change checklist by January 1, 1990. In addition, this violation will be discussed in the December 1989 Design Engineering Supervisors Meeting.

NRC Violation 255/89007-01p: SC-88-102 "Upgrade Containment Pressure Transmitter PT-1812." [Refer to pages 31 and 32 of NRC Report 50-255/89007 (DRS).]

Example

Specification Change No 88-102 installed a different model containment pressure transmitter for Transmitter No PT-1812 without performing a seismic analysis to determine the acceptability of installing the new transmitter on the old mounting.

Reason For Violation

The reason provided in our August 10, 1989 submittal has not changed.

Corrective Actions Taken And Results Achieved

The actions taken as described in our August 10, 1989 submittal have not changed.

Corrective Actions To Be Taken To Avoid Further Noncompliance

The actions to be taken as described in our August 10, 1989 submittal have not changed.

Date When Full Compliance Will Be Achieved

Our August 10, 1989 submittal indicated that if necessary, additional clarification in administrative procedures related to Q-List interpretation will be provided by January 1, 1990. Our review of this violation example has resulted in our conclusion that additional clarification, relative to Q-Listing instrumentation serving as part of safety-related pressure boundary is desirable. As a result, revision to our Q-List administrative procedure is underway. Given the unscheduled, emergent activity related to our Pressurizer Power Operated Relief Valve Project and the recent IEB 79-14 reverifications, our procedure revisions and associated engineering training will not be complete until February 28, 1990. All other committed dates as provided in our August 10, 1989 submittal related to this example remain unchanged.

NRC Violation 255/89007-01q: EA-FC-722-10 "N_2 Backup Test Evaluation for Station 5," February 27, 1987. [Refer to page 15 of NRC Report 50-255/89007 (DRS).]

Example

The calculation stated that the nitrogen usage rate was 32.5 psig ΔP/hour based on the test results from Functional Test T-FC-722-501-01. However, the test results failed to account for the post-test calibration shift of 5 psig for one of the pressure gauges. By incorporating this additional factor, the usage rate is increased to 33.75 psig ΔP/hour.

Using the above rate in the calculation reduces the "actual operating period" from 10.3 days to 9.93 days. This is below the assumed acceptance limit given in the original calculation. No safety significance was attributed to this occurrence, however, the instrument accuracy requirements specified in the test procedure were inadequate as noted below.

Procedure No T-FC-722-0501, "CV Air Supply - N_2 Backup Performance Test," Revision 0, February 6, 1987:

Under Special Tools/Equipment, a 0-3000 psig pressure gauge is called for. The accuracy specified is ± 2 percent minimum. This equates to a ± 60 psig accuracy. The acceptance criteria for three of the four nitrogen stations ranged from 24 psig to 68 psig over the four hour span of the performance test.

Failure to delineate appropriate acceptance criteria is a further example of violation of 10CFR50 Appendix B, Criterion III Design Control.

Reason For Violation

NRC Report 50-255/89007 (DRS) cites this condition as an example of violation to 10CFR50, Appendix B, Criterion III "Design Control." Based on further review of this condition and subsequent discussion with NRC Region III on November 2, 1989, Consumers Power Company concludes that this condition represents a violation of 10CFR50, Appendix B, Criterion V "Instructions, Procedures and Drawings" and not a violation of Criterion III. The basis for this determination is given below.

1. Plant administrative design control procedures required, and currently require, that modification test procedures feature requirement for:

   - The use of calibrated test equipment of the proper range and accuracy to determine conformance to specified acceptance criteria,

   - Test equipment be identified along with its calibration status, and

   - Acceptance criteria (with appropriate tolerances) be specified to effectively determine whether critical design requirements have been satisfied.

2. Although a test gauge of greater accuracy (± 0.1 percent) than specified (± 2 percent) was utilized during the performance of Test Procedure T-FC-722-0501, the test specifications for equipment accuracy failed to comply with administrative design control procedure requirements. Not only did the test procedure fail to cite required equipment accuracy, the procedure failed to require that post-calibration data be factored in to correct the raw data obtained from test equipment indication.

Corrective Action Taken And Results Achieved

This modification test procedure deficiency has been discussed with the engineering section head of the group responsible for preparing the test procedure as well as the testing superintendent responsible for conduct of the test. During the discussion, the need for adherence to administrative design change controls was stressed.

Corrective Actions To bBe Taken To Avoid Further Noncompliance

This specific violation will be input to our monthly Design Engineers Supervisors Meeting as topic for engineering staff discussion. In addition, a letter will be sent to all engineering personnel describing this violation, and that failure to comply with existing procedural requirements is intolerable.

Date When Full Compliance Will Be Achieved

By January 1, 1990 this violation will have been presented to the supervisors meeting and the briefing letter will have been issued.

NRC Violation 255/89007-02a: CPCo Drawing M-101 Sheet 5113, Revision 0, "Piping Isometric, Auxiliary Feedwater Control Valve CV-0736A and CV-0737A Bypass Piping." [Refer to pages 12 and 13 of NRC Report 50-255/89007(DRS).]

Example

A secondary aspect, associated with the socket welds, pertains to the Quality Control (QC) inspection of the completed fillet welds. The RIC forms have a column for "QC verification" but for the socket welds in question, the size of the fillet welds was not inspected by QC. Line No 16 of the RIC form, which specifies the weld, size, gap, and type of joint was marked "NA" (not applicable) for all the welds in question under the QC Verification column.

Although all of the welds received a Nondestructive Testing (NDT) Visual Examination (VT), it is not clear if the size of the welds was verified during these examinations. Since the size of the socket fillet welds was not specified on the drawing, nor noted on the RIC form, the NDT examiner would have had to determine the required size in the same manner as previously described for the welder. No notation of size nor record of the size calculation was available in the documentation provided with the NDT-VT data. In addition, the VT report did not list fillet weld gauges under "Visual Aids Used" giving further indication that the size of the welds was not checked.

As a point of clarification, it should be noted that the VT performed on the socket fillet welds was in accordance with American Welding Society (AWS) D1.1 requirements. This is a structural welding code and allows portions of fillet welds to be undersized by 1/16 inch. This is inconsistent with the requirement of ANSI B31.1, Power Piping Code which specifies minimum fillet weld sizes. If the size of the socket fillet welds was verified by the stated VT examination, it cannot be assured that the weld meets the ANSI B31.1 Code requirements.

Reason For Violation

The reason for violation as stated in our August 10, 1989 submittal has not changed. The failure to verify the size of the socket fillet welds has been attributed to a lack of engineering input to and technical review of the maintenance planning for the welding process.

Prior to actions taken as a result of recent self-identified failures to verify weld size, no specific requirements existed to verify characteristics (weld, type, size, contour) of installed welds. Although Nuclear Operations Department Standards suggest inspection hold points for weld installation verification, working level administrative procedures did not specify a hold point requirement except for fit up. Consumers Power Company acknowledges this example as a violation of 10CFR50, Appendix B, Criterion III, Design Control.

Corrective Action Taken And Results Achieved

The action described as "interim" in our August 10, 1989 submittal has been completed. All design change engineers have been briefed as to the reported violations by personal letter. The letter required that all engineers involved in design changes scheduled for installation in 1989 review existing design

packages for similar problems and correct any identified problems. This letter was issued on September 15, 1989.

In addition to the remedial corrective actions taken as described in our August 10, 1989 submittal, other actions that have been taken are as follows:

To address the generic issue of fillet weld leg lengths and related design control, a sample of field welds was examined during the 1989 MAOUT. 116 total socket welds were examined with two welds found to be undersized using the 1986 ANSI B31.1 leg length requirements. Additionally, a sample of 36 completed hanger welds (fillet) was also examined with no deviations noted. The two undersized welds were repaired as required. To provide additional data and evaluation, the 40-Year Master Inservice Inspection Plan will be augmented to require verification of weld characteristics (ie, leg lengths) on Class 1 socket welds when they are examined per the Inservice Inspection program, (refer to Consumers Power Company response to NRC Unresolved Item 255/89007-06 for details).

- Consumers Power Company initial evaluation of NRC Unresolved Item 255/89007-05 revealed that significant disassembly of piping and/or valves would be required to verify whether four branch connection welds are full penetration welds as required. This verification was postponed to a later outage of sufficient length. Additionally, the evaluation revealed that there were no PT deficiencies as originally thought, (refer to Consumers Power Company response to NRC Unresolved Item 255/89007-05 for details).

Corrective Actions To Be Taken To Avoid Further Noncompliance

The long-term actions to avoid further noncompliance are described in our August 10, 1989 submittal related to this violation example.

Date When Full Compliance Will Be Achieved

Revisions and additions to the commitment dates provided in our August 10, 1989 submittal related to this violation example are as follows:

1. The 40-Year Master Inservice Inspection Plan will be augmented by April 1, 1990.

2. The verification of the four branch connection welds as full penetration welds will be completed by the end of the 90 REFOUT.

3. Training required to address the enhancements to the design control procedures and related program documents will be completed by March 1, 1990. This reflects a change from the original commitment date of January 1, 1990 due to the extent of the enhancements.

NRC Violation 255/89007-02b: SC-89-072 (Deviation Report D-PAL-89-043). [Refer to Page 32 of NRC Report 50-255/89007 (DRS).]

Example

This Deviation Report documented the undersized fillet welds on socket welded fittings for SC-89-072. This specification change was necessary to provide an interim solution to primary coolant system leakage from cold leg drain valves. The change required the installation of a new length of two inch schedule 160 pipe with a socket welded cap on each of the four loop drains. Inspection of all eight socket fillet welds indicated that none of them met the Code required size of 3/8 inch.

During the inspector's review of the Deviation Report, there were several concerns that apparently were not addressed. First, although the corrective actions appear to recognize that the current RIC form does not give the welder sufficient information (specifically the size of the fillet weld), there was no recognition that QC did not and was not required to verify the size of the fillet weld. The undersized condition was not discovered until the authorized inspector (AI) pointed it out to the licensee. All of the welds had been reviewed and approved by the licensee's program and yet the size had never been verified. This is considered another example of violation of 10CFR50, Appendix B, Criterion X, in that the size of the socket fillet welds was not verified (255/89007-02b).

Reason For Violation

The reason for violation as stated in our August 10, 1989 submittal has not changed. Specifying welding requirements (such as applicable code, weld material, weld type and weld size) is a design function. If properly administered by procedure, the maintenance planner can, and has, effectively prescribed welding details for the field provided that adequate input from engineering exists as a basis. In the past, engineering input has been limited to welding specification and/or structural analysis engineering sketches which have lacked size dimensions for the welds. As a result, the planner has failed to provide the proper size on the Repair Inspection Checklist (RIC) thereby requiring the field welder to determine and install the proper weld size. This practice fails to meet current expectations for control of design change implementation.

Corrective Action Taken And Results Achieved

The action described as "interim" in our August 10, 1989 submittal has been completed. All design change engineers have been briefed as to the reported violations by personal letter. The letter required that all engineers involved in design changes scheduled for installation in 1989 review existing design packages for similar problems and correct any identified problems. This letter was issued on September 15, 1989.

In addition to the remedial corrective actions taken as described in our August 10, 1989 submittal, other actions prescribed in this submittal for violation 255/89007-02a have been taken.

NRC Open 255/89007-04: Consumers Power Company Drawing M-101 Sheet 5113, Revision 0, "Piping Isometric, Auxiliary Feedwater Control Valve CV-0736A and CV-0737A Bypass Piping," [Refer to page 13 of NRC Report 50-255/89007 (DRS).]

Example

An additional aspect was associated with the size of socket fillet welds. The inspector noted that the current design practice used by the licensee is inconsistent with the original Code of construction. The current practice utilizes later editions of B31.1 Code which specify the 1.09 times the nominal piping wall thickness. The original code of construction required 1.25 times the nominal wall thickness. From a technical standpoint the current practice is acceptable; however, this inconsistency has not been delineated by the licensee in the FSAR. Pending revision of the FSAR, this item is considered open (255/89007-04).

Reason For Violation

The reason for violation as stated in our August 10, 1989 submittal has not changed. Construction codes related to B31.1 have not been reconciled in a document useable to the modifications engineer.

Corrective Action Taken And Results Achieved

As stated in our August 10, 1989 submittal, presentation has been made to all engineering groups on the results of this inspection. These presentations were completed on August 2, 1989.

The corrective action described as "interim" in our August 10, 1989 submittal has been completed. All design change engineers have been notified as to the reported violations by personal letter. The letter required that all engineers involved in design changes scheduled for installation in 1989 review existing design packages for similar problems and correct any identified problems. The letter was issued on September 15, 1989.

Corrective Actions To Be Taken To Avoid Further Noncompliance

Palisades staff will complete a reconciliation between the original construction code for the plant (B31.1-1955) and the latest edition of B31.1. This action will provide for a more standard approach to code use and simplify the determination of code requirements for Plant repairs, replacements and modifications. Such reconciliation will be documented in Plant administrative design control procedures as appropriate. Upon completion of the code reconciliation, the FSAR will be updated as appropriate to identify codes and standards and their application to Plant design. In addition, the periodic training program developed as a result of Violations 2a and 2b will also address such a reconciliation. This action supersedes that identified as "long-term" in our August 10, 1989 submittal related to this open item.

Date When Full Compliance Will Be Achieved

The original (August 10, 1989) dates for full compliance were as follows: The reconciliation of construction codes will be completed and implemented into Plant design control procedures as appropriate by January 1, 1990. Training on these procedural revisions will also be completed by January 1, 1990. The periodic training program will be in place by March 1, 1990. The FSAR will be updated in the next revision following January 1, 1990.

Following initial planning and evaluation of the code reconciliation, it has become clear that a January 1, 1990 completion date is unrealistic. Due to the extensive nature of the reconciliation planned for Palisades, our intent is to complete the project by March 1, 1990. The update of the FSAR will be included in the next revision following completion of the reconciliation, however, the work itself will be completed by the original March 1, 1990 date. The revision of appropriate administrative design procedures and addition of the code reconciliation into the periodic training program will take place following completion of the reconciliation itself. The FSAR will be updated in the revisions following March 1, 1990.

NRC Unresolved 255/89007-06: SC-89-072 (Deviation Report D-PAL-89-043). [Refer to page 32 of NRC Report 50-255/89007 (DRS).]

Example

The second concern pertains to the generic aspect of the problem. The licensee appeared to recognize the programmatic weakness which contributed to the problem by revising the RIC form to include the specific weld size. However, there appeared to be no corrective actions directed toward reviewing previously made socket fillet welds for compliance with code requirements. Based on the added complication that the sizes of fillet welds in general apparently have not been verified under the licensee's program, reviews of past work may not be necessarily limited to socket welded fittings. Pending a review of the licensee's justification as to why additional inspection of previous fillet welds is not required, this is considered an Unresolved Item (255/89007-06).

Consumers Power Company Response

Originally, Consumers Power Company acknowledged that no corrective actions had been directed towards reviewing previously made socket welds for compliance with code requirements. Consumers Power Company plans were to select an appropriate sample of as-built welds and inspect the welds during the 1989 Maintenance Outage. The purpose of the inspection would be to verify that weld characteristics were in compliance with the requirements set forth in the RIC and/or applicable construction code. These field verifications and resulting report were to be completed by December 1, 1989.

An initial search of closed work order packages from the past two years identified 80 work orders on Class 1, 2 or 3 which required socket welds. A sample of 14 work orders which included 65 welds revealed 9 welds which did not meet original construction code requirements for required weld leg length. Only one weld failed to meet the requirements of the 1986 Edition of the construction code. Based on the results of the first sample, a second sample was selected for evaluation. Additionally, a repair was initiated to the one undersized weld discovered in the first sample.

The second sample of welds was made up of 15 work orders consisting of 51 welds. Six of the 51 did not meet original construction code leg length requirements, however, only one weld failed to meet the leg length requirements of the 1986 Edition of the construction code. This weld was also repaired.

In conclusion, of the 116 total socket welds examined, two welds were found undersized using the 1986 ANSI B31.1 leg length requirement. This represents 1.7 percent of the total population of welds examined. Using this total sample as a baseline it is possible more socket welds may be undersized. However, the magnitude of observed undersizing (1/16 inch), assuming all other weld dimensions (ie, circumference and concavity) meet the design code, has a small effect on weld strength and factor of safety.

A third sample of 36 fillet welds was also inspected with no further deviations noted. These welds were made up entirely of hanger welds to further round out the sample. Additional sampling will continue on a programmatic basis in the

future. To provide further assurance that a significant problem does not exist, the 40-Year Master Inservice Inspection Plan will be augmented to require fillet weld length verification on all Class 1 socket welds which are nondestructively examined in the program (refer to Consumers Power Company response to Violations 2A and 2B).

A final verification report has been completed in the form of Event Report E-PAL-89-030-0 and is on file at the Palisades site.

NRC Unresolved Item 5: Consumers Power Company Drawing M-101 Sheet 5113, Revision 0, "Piping Isometric, Auxiliary Feedwater Control Valve CV-0736A and CV-0737A Bypass Piping." [Refer to page 14 of NRC Report 50-255/89007 (DRS).]

NRC Identified Discrepancy

A further concern associated with the piping installation drawing pertains to the attachment weld for a bypass piping fitting onto the existing run pipe. For this situation, the drawing did not specify the type of joint nor the weld reinforcement required. However, the specified fitting is a "Weldolet" and as such has an existing weld prep on it and requires no additional design work. Also, the size of the fillet weld cover is specified in the welding procedure for this type of full penetration branch line connection. The problem arose during the review of the RIC forms for the four branch connection welds. Although these are full penetration single bevel groove welds, with fillet weld reinforcement, the RIC form labels these welds as "F.W." indicating a fillet weld. For Gap Thickness, the RIC form specifies "NA" which would be appropriate for a fillet weld but not for a full penetration weld. Since this attachment must be a full penetration weld, there was no documentation available to assure that the proper penetration has been achieved using the specified fillet weld. Additional review by the inspector of the NDT Examination Reports revealed another deficiency. According to liquid penetrant (PT) examination report sheet No MKV-01, welds No 2 and No 13 on line EBC-3-1 1/2 did not receive a PT examination as required by Technical Specification M-152(Q) "Field Fabrication and Installation of ASME Section XI Piping Modification in a Nuclear Power Plant," Revision 14, September 30, 1986, paragraph 9.1.1. Pending 1) verification that all four branch attachment welds are full penetration welds and 2) resolution of the PT deficiencies, this is considered an Unresolved Item (255/89007-05).

Consumers Power Company Response

Verification Of Branch Connection Welds

Originally, Consumers Power Company planned to verify that the branch connection welds in question are full penetration welds during the 89 Maintenance Outage. Initial evaluation, however, has indicated that the only method for such a verification is to gain access to the piping and visually verify weld geometry. To gain the required access it is necessary to either cut existing piping or disassemble valves to allow remote boroscopic examination. This emergent work was not originally planned and posed a possible threat to the existing outage critical path schedule, therefore, this work was postponed. The four branch connection welds will be verified in an outage of appropriate length no later than the 90 Refueling Outage.

Resolution Of PT Deficiencies

NRC Unresolved Item 255/89007-05 states that Weld Nos 2 and 13 from completed Work Order 24804972 did not receive a PT examination as required by Technical Specification M-152 (0) "Field Fabrication and Installation of ASME Section XI Piping Modification in a Nuclear Plant," Revision 14, September 30, 1986, paragraph 9.1.1.

The welds in question are butt welds and were visually inspected and radiographed during the completion of this work order. M-152 (Q), paragraph 9.1.1 requires that exams required by ANSI/ASME B31.1, Chapter VI be completed, plus any additional exams required by M-152 (Q), sub-paragraphs 9.1.1.1 and 9.1.1.2. Since Weld Nos 2 and 13 are 1.5 inch butt welds in a system with a design temperature of 120°F, B31.1 only requires a visual examination (Table 136.4, 1986 Edition of B31.1).

Additionally, M-152 (Q), sub-paragraphs 9.1.1.1 and 9.1.1.2 do not impose any dye penetrant examinations since the welds in question are not fillet, socket, attachment or branch connection welds. The radiographs performed were over and above the requirements of B31.1 and M-152 (Q). Since all of the requirements of B31.1 and M-152 (Q) were completely satisfied, Consumers Power Company does not believe there were any PT deficiencies and considers this item closed (refer to response to NRC Violations 2A and 2B).

Enclosure 2

Summary of Consumers Power Company's August 15, 1989 Presentation

To NRC Region III Describing

Design Control at Palisades

Palisades Design Control Program

A significant effort has been undertaken over the past four years to upgrade the design change control program for Palisades. The goal of this effort has been to adopt design change control requirements which; 1) meet industry and regulatory expectations, 2) are clearly understood by the design engineer, and 3) provide for a consistent approach to engineering and design change implementation over time. Steps towards achievement of this goal have been made primarily in the areas of design change control procedural enhancement and establishing opportunities for communication among Engineering, Operations and Systems personnel. Although our progress has been significant, we are continually striving to achieve our goal through further program enhancements.

Recent Changes In Design Authority

In the past, two independent organizations served as Design Authority (DA) for the Plant. One organization served as DA for larger scope design changes and the other organization served as DA for smaller scope changes. Each organization utilized a separate and distinctively different set of design control procedures.

Recently, the Plant Projects Engineering Department has taken on the single point accountability as overall DA for all design change work at the Plant. Projects Department effects DA by:

1. Eliminating redundant (yet distinctively dissimilar) design change control procedures and sponsoring the existing procedure used for design changes,
2. approving all individuals assigned to key tasks within the design change project,
3. conducting design reviews of all design change packages,
4. conducting administrative and closeout reviews of all design change packages, and
5. sponsorship of periodic design meetings.

After assessing the DA responsibility, the Plant engineering staff (versus an offsite engineering department) was considered the most prudent course of action. The Plant staff was reorganized in mid 1984 adopting a systems engineering capability to handle day-to-day operating systems requirements, and a projects engineering capability to deal with longer term, more complex (in terms of departmental interfaces) efforts. As a result, an organization existed (Projects Department) which was well suited to assume the DA responsibility, located in close proximity to Operations and Maintenance groups, yet separated from daily emerging items.

Finally, in order to officially sanction this assignment of responsibility, the DA and associated responsibilities were identified in our FSAR, Corporate Commitment to Quality (CPC-2A), Nuclear Operations Department Standards and working level administrative procedures by formal revision.

Recent Upgrades To Plant Administrative Design Control Procedures

Over the past four years a series of revisions to our administrative procedures have been made to enhance design controls. These revisions, significant in scope and impact, served to capture the entire design change process (from design conception, to declaring modified systems operable, and closing out the design change package) and clearly assign overall and subordinating responsibility. Further, these revisions were substantiated by QA Department findings and recommended corrective measures. These revisions were implemented in three discreet phases. The first phase was directed at the engineering aspect of design change. This phase concentrated on the translation of design input into design output. Controls were developed to assure that the engineer clearly documents: 1) the design considerations which are to be considered as requirements for the design change, and 2) the manner in which design output (eg, drawings, procedures, procurement documents, analyses, etc) is developed for each required input; thereby assuring that the as-built condition reflects the original design intent. This documentation process is required to fit a prescribed, structured format; one that has been shown effective in providing the design change reviewer an auditable path to trace the flow of design change engineering.

The second phase of procedural revision concentrated on the implementation aspects of design change. This phase consisted of providing essential requirements for design change installation and test procedures to ensure that implementation followed required task sequencing and that critical characteristics were installed and verified, to assure that approved conceptual design was realized in the field. These revisions also placed strict controls on the flow of approved design documents (eg, drawings, procedures) from engineering through construction supervision and on into the field work locations.

The third phase of procedure revision concentrated on the administrative aspects of design changes. These revisions provided for proper alignment and interfacing controls for departments supporting the design change process such as: 1) the Operations and Systems Engineering Departments review of design change engineering, 2) the input of special detailed engineering tasks such as relay and breaker setting calculations by our Systems Protection Department, 3) the submittal of design engineering information to the Training Department to introduce operators to the new design, 4) the submittal of design information to procedures and data base sponsors to assure the as-built condition is accurately reflected, and 5) incorporating the services of QA Department to ensure that inspection/review plans are well developed and carried through to accurately assess design change quality.

In addition, the third phase revisions established consistency in the overall design change control program for Palisades. The Plant-sponsored design control procedures, which were originally developed to handle only "minor" changes, were broadened in scope and enhanced by additional controls to handle modifications of any size or complexity. In support of these revisions in Plant procedure scope, management directive in effect discontinued further use of the redundant set of design change control procedures originally established for "major" modifications, and sponsored by our offsite engineering

organization. Adopting this singular design change control approach established a clear expectation among design change support groups (eg, Operations, Systems, QA) allowing these groups to more clearly focus resources and extract higher quality design change task conduct and/or review.

As part of the NRC's Engineering Team Inspection, the Plant administrative design change control procedures were reviewed. As documented in Inspection Report 50-255/89007 (DRS), these procedures were judged by the NRC as good and representing a design program strength.

Recent Efforts To Open Lines Of Communication

Once design change control procedures were revised to eliminate needless redundancy and clearly establish the Design Authority, the need was felt to begin and maintain a frequent dialogue between design change engineers, design supervisors and management individuals. The purpose for such a dialogue is to assure a consistent approach over time in interpreting program requirements and in the practices to implement these requirements. In response to this need, the following was adopted and remains in effect:

1. Monthly design supervisors meetings are conducted. These meetings are attended by design engineering and supporting department supervisors both onsite and offsite (such as Construction, Testing and Quality Assurance) to emphasize attention to detail, procedural interpretation and compliance, and review of procedural refinements. Input to these meetings are day-to-day engineering activities as observed by department supervisors.

2. Design seminars are conducted semiannually. These seminars are attended by onsite and offsite design engineering staff to identify and discuss discipline design requirements, engineering group capabilities and design group interface alignment.

These design engineering meetings, in addition to projects meetings held approximately bimonthly to align onsite and offsite engineering groups relative to design change schedule, have been effective in conveying design program requirements and in promoting a team effort towards a common goal-quality design change engineering, implementation and documentation.

Response To NRC Engineering Team Inspection (ETI) Concerns

The NRC ETI uncovered a number of design control deficiencies. These deficiencies are identified in detail in Inspection Report (IR) 50-255/89007 (DRS). Based on our review of the deficiencies documented in the report, the causes of these deficiencies have been identified as:

1. Personal performance (either inattention to detail, or less than strict procedural compliance),

2. Procedure weaknesses (either a lack of clarification in the facility change procedure, or the specification change procedure lacking its "own" requirements and depending too heavily on referencing the requirements of other maintenance procedures),

3. Weld engineering (lack of clear design bases, or minimal engineering involvement), and

4. Expectation of documented engineering judgement (expectation lacks consistency, program guidance, regulatory guidance).

Deficiencies cited in IR 50-255/89007 (DRS) applied to both the Facility Change (FC) and Specification Change (SC) processes. The FC process is one involving functional change to Plant equipment and systems, is visible to the Control Room operator, and typically results in change to the licensed design basis. By contrast, the SC process invokes threshold criteria to assure that the licensing basis is not changed. Once the threshold criteria is challenged and the results indicate that the SC process is acceptable for a change, assurance is provided that the change is essentially "invisible" to the Control Room operator and Plant equipment/system function is not significantly changed. The following paragraphs discuss the ability of recent design change enhancements to have prevented the NRC-identified changes.

Deficiencies Related To The Facility Change Process

The design change program enhancements discussed in previous paragraphs of this enclosure pertained only to the facility change process. Although the NRC-identified deficiencies relating to Plant facility changes represent design change control significance, they do not represent significant as-built deficiency. Over the past three years, over 100 design changes have been controlled by the enhanced program without equipment or system loss of required design function.

In most cases, the existing Plant procedures could have prevented the deficiency if they had been strictly followed. Seventy percent of the observed deficiencies related to structural/piping analyses and involved observations such as inadequate technical review or unsubstantial input assumption. If strict procedural adherence had been taken, these analytical-related deficiencies would not have occurred. The procedures existing at the time provided the essential requirements for treatment of inputs, for technical review, and for actions which would have prevented the other identified deficiencies. Consumers Power Company, however, acknowledges the special needs of the civil engineering discipline in that much of the analysis is computer driven and is less readily adaptable to generic analytical requirement.

Ten percent of the facility change-related deficiencies reflected minor project drawing errors. Controls, however, procedurally existed for clear drawing lay-out and technical review. Finally, 20 percent of the facility change deficiencies related to welding. The cause for these deficiencies is the lack of clear translation of code requirements to the field. These requirements related to weld installation and verification.

The corrective actions identified and committed to in our August 10, 1989 response to IR 50-255/89007 (DRS), as amended by this submittal, serve to prevent similar deficiencies in the future. These actions include detailed briefings for all design engineers, further enhancements/clarifications of

existing administrative design control procedures related to FCs (with emphasis on upgrading engineering analysis controls and specific requirements for design document technical review), completion of a construction code reconciliation for the FSAR, and the upgrade of design control procedures to acknowledge the appropriate codes and to provide specific requirement for weld engineering and field implementation verification. In addition, in response to the recent NRC inspection of our Snubber Reduction Program, we committed in our November 21, 1989 submittal to develop an engineering analytical specification dedicated to the civil discipline, thereby acknowledging the special needs of structural/piping analyses while invoking tight design control.

Deficiencies Related To The Specification Change Process

Similar to the deficiencies related to the FC process, the identified SC deficiencies represent design change control weaknesses, however do not represent significant deficiencies in as-built condition. SC controls, as they existed when these deficiencies occurred and as they exist today, are adequate to ensure that:

1. The SC process (vs FC process) is appropriately selected as the controlling process for a change,
2. the system design basis is upheld, and
3. the change is justified and controlled.

Although the existing SC controls provide the essential requirements, they are in need of refinement to extract the levels of detail currently expected from design engineers and change documentation packages. For the most part, the NRC-identified deficiencies related to SC's reflected this weakness. Sixty percent of the identified deficiencies related to inadequate documentation of technical justification. Although a procedural requirement existed and currently exists for change justification, the requirement as specified is weak in prescribing the essentials for such a justification argument. Thirty percent of the SC-related deficiencies pertained to inadequate pre-op testing. Although testing requirements exist in the SC process, the SC procedure relies too heavily on maintenance procedures by reference to invoke testing requirements. Finally, ten percent of the SC-related deficiencies related to welding; a problem discussed in the previous section related to facility changes.

The corrective actions identified and committed to in our August 10, 1989 response to IR 50-255/89007 (DRS), as amended by this submittal, serve to prevent similar deficiencies in the future. These actions include detailed briefings of the ETI results for all design engineers, and further enhancements/clarifications of existing administrative procedures related to the SC process (with emphasis on documented change justification and post-modification testing).

Summary

A major effort has been expended over the past four years to clarify the requirements of, and tighten the controls for, design change at Palisades. Although our procedures have been designed to meet ANSI requirements and align

with INPO guidelines, and have been judged "good" by the NRC, they are in need of further enhancement (as shown by the NRC Engineering Team Inspection) to extract today's expectation for personal performance. In particular, guidance providing the "how to's" to meet establish requirements is needed. This procedural enhancement, along with continued inter and intra-departmental engineering communications will serve to achieve consistent, well-documented design change engineering and implementation at Palisades. Our past efforts, in addition to our recent commitments for program upgrade, reflect our ongoing dedication to quality design change engineering.