

Washington Public Power Supply System

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REGION V

July 16, 1982
G01-82-0437

Nuclear Regulatory Commission
Region V
1450 Maria Lane, Suite 210
Walnut Creek, California 94596

Attention: R. H. Faulkenberry
Chief, Reactor Construction
Projects Branch

Subject: NUCLEAR PROJECTS 1 AND 4
DOCKET NOS. 50-460 AND 50-513
POTENTIALLY REPORTABLE CONDITION
10CFR50.55(e) SKEWED WELD JOINTS

- Reference:
- 1) Telecon ME Rodin, Supply System to PP Narbut, Region V Nuclear Regulatory Commission dated November 6, 1981.
 - 2) G01-81-414, DW Mazur to RH Faulkenberry, dated December 12, 1981.
 - 3) G01-82-0066, DW Mazur to RH Faulkenberry, dated March 10, 1982.

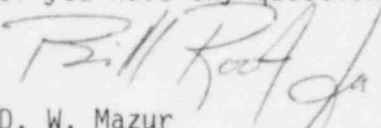
In reference 1) the Supply System informed your office of a potential reportable deficiency under 10CFR50.55(e) and references 2) and 3) were interim reports on the subject condition.

In reference 2) the Supply System committed to providing quarterly updates on the status of the subject deficiency. In keeping with that commitment, Attachment A includes a restatement of the condition and narrative on the current status of each of the affected contracts. A final determination as to the reportability of the subject condition has yet to be made for six (6) of the fourteen (14) contracts originally reported because of the limited amount of information currently available. This report provides a final status of the subject deficiency for all contracts except 207A, 211, 216, 218, 253 and 257. With the construction slowdown at WNP-1 much of the review for these contracts will not be performed for approximately one year or until more as built information is available. Therefore, we will defer our quarterly updates to a yearly basis or more frequently as new information is available.

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If you have any questions or desire further information, please advise.


D. W. Mazur
Acting Program Director

DWM:JMS:lm

Attachment

cc: CR Bryant, BPA (399)
JP Laspa, Bechtel (860)
V. Mani, UE&C (897)
A. Toth, NRC
V. Stello, Director of Inspection, NRC
FDCC (899)

ATTACHMENT A

WNP-1/4

DOCKET NOS. 50-460 & 50-513

POTENTIAL REPORTABLE CONDITION 10CFR50.55(e) SKEWED TEE JOINT WELD SIZE INTERIM REPORT

BACKGROUND

Apparent undersize fillet welds on skewed tee joints with obtuse angles were identified during a routine inspection by the WNP-1/4 resident NRC inspector, Mr. A. Toth. This created a question of whether or not the design criteria for increased weld size to obtain the required effective throat for skewed tee joints was properly implemented. In accordance with AWS D1.1 skewed tee joints are defined as having a dihedral angle of not less than 60 degrees nor more than 135 degrees.

The design criteria for the weld size of a skewed tee joint is based on an equivalent sized 90 degree tee joint fillet size. The fillet weld leg length is increased to provide an effective throat for obtuse angle tee joints which is equivalent to a 90 degree tee joint weld. Fillet welds on acute angle tee joints inherently results in an increased weld leg length which provides an effective throat greater than an equivalent sized 90 degree tee joint weld.

DESCRIPTION OF POTENTIAL DEFICIENCY

All obtuse skewed fillet welds detailed by UE&C on the drawings used by the contractors have been sized based on a 90 degree tee joint fillet.

UE&C considered it the responsibility of the contractors to recognize the need for increased leg lengths on obtuse angle skewed tee joints for angles up to 135 degrees. However, it appears the contractors assumed that the weld size specified on the detail drawings provided by UE&C were correctly sized and no adjustment in leg length was necessary for the skewed tee joints. With weld sizes applied as detailed, a condition of inadequate effective weld throat could result for obtuse angle tee joints.

Sample analysis performed by UE&C has indicated that an inadequate effective throat could result if the weld size was not increased for the skewed tee joint fillet welds. In any event, not following the criteria for skewed joints would result in undersized welds. Whether or not an inadequate effective throat exists depends upon the applied loads and the degree of conservatism in the design.

SAFETY IMPLICATIONS

For Contracts 207A, 253, 216 and 218 it has not been verified if a condition of inadequate effective weld throat exists which could have caused a failure of safety related items. This analysis will be performed during the as-built design verification review.

For Contract 211 and 257, UE&C Engineering has concluded the installed nuclear supports with skewed tee joints are acceptable and there are no safety implications or possible failure of these safety related items. The non-nuclear SRA supports have not yet been analyzed for consequential failure of a safety related item. This analysis will be performed during the as-built design verification review.

IMMEDIATE CORRECTIVE ACTION

The affected site contractors (Contracts 211, 257, 216, 207A, 218 and 253) have been issued PCPs specifically directing them to increase the weld sizes (leg length) for skewed welds shown on the detail drawings supplied them by UE&C Engineering. The contractors have or are implementing the direction provided them by way of the PCPs. In addition, Bechtel QC has conducted training sessions on the requirements and inspection for skewed tee joint welds with all the affected contractors QA representatives.

All of the Nuclear Quality Class I skewed tee joints already installed by the 211/257 contractors have been identified. From this list, UE&C Engineering has performed an analytical review of each joint where the dihedral angle is in excess of 105° to ascertain on a case-by-case basis the acceptability of the joint. Based on calculations performed by UE&C Engineering it has been concluded that for dihedral angles between 90° - 105° there is an insignificant reduction in the effective throat and therefore they need not be considered in the analytical review for any of the contracts.

For Contracts 211/257, UE&C Engineering has taken the original weld size from the detail drawing, and, using the known dihedral angle, computed what the reduction in the theoretical throat would be. This calculation is based on the assumption that the welded joints were installed per the detail drawing. Currently, there is nothing to indicate that the joints were not installed in accordance with the detail drawings. Utilizing this reduced throat size and the load data, UE&C Engineering has performed their analytical review. The analysis was made without any compromise of design guidelines or criteria. The results of this detailed analysis performed for large and small bore nuclear supports established that the supports will meet the design loads at the skewed tee joints and would not fail if subjected to the maximum design loads. Based on the results of the nuclear supports review, the design adequacy of the safety related SRA supports skewed tee connections will be performed during as-built design verification review. If isolated problems of inadequate weld capacity are identified they will be corrected by PCP direction.

For Contracts 216 and 218, UE&C Engineering has performed a random sample analysis of contractor prepared skewed connection supports using the methodology used for Contracts 211/257. This sample analysis established that the welded skewed connections have acceptable weld capacity. The allowable range of angles for skewed connections for Contracts 216 and 218 are such that a large reduction in weld capacity does not result and very few, if any, welds are expected to require rework. Therefore, the design adequacy of these skewed tee connections will be verified during as-built design verification review. If isolated problems of inadequate weld capacity are identified, they will be corrected by PCP direction.

For Contracts 207A and 253, UE&C Engineering has performed a random sample analysis of skewed connections using the methodology used for Contracts 211/257. This sample analysis established the welded skewed connections have acceptable weld capacity. Therefore very few, if any, welds are expected to require rework. For both contracts, QFPCP's have been issued to require identification of all skewed joint configurations that do not conform to the guidelines issued on design, detailing and inspection of skewed joints. Contract 207A has re-inspected the skewed connections but all the results have not yet been submitted to UE&C for review due to the construction slowdown. Contract 253 is preparing a listing of skewed connections along with a description of original weld size measurement technique which will be used by UE&C to review the connections for design adequacy. With either the conditions of re-inspection or a listing of skewed connections, UE&C will identify if any additional rework is required.

For Contract 207, a review of the shop welds revealed that fillet welded skewed joints were not utilized in the shop fabrication process. Bent plates or partial penetration groove welds were used instead of welded skewed connections.

For Contracts 217 and 262, no safety related skewed joints have been installed. The contractors have received and are implementing PCP's which clarify the requirements for welding skewed connections.

As a point of clarification, Contracts 204, 213, 243, 246 and 254 were reviewed by UE&C Engineering to ascertain whether or not these contractors are or would have been required to make fillet welded skewed joints. It was determined by Engineering that none of these contracts require(d) the use of skewed welds.