Washington Public Power Supply System
A JOINT OPERATING AGENCY

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Nuclear Regulatory Commission
Region V
Suite 202, Walnut Creek Plaza
1990 N. California Boulevard
Walnut Creek, California 94596

Attention: Mr. G. S. Spencer,
Chief Reactor Construction and
Engineering Suppc 't Branch

Subject: WPPSS NUCLEAR PROJECTS NOS. 1 & 4
TRANSMITTAL OF REQUESTED INTERIM REPORT
AWSH REINFORCING STEEL

Reference: Telephone conversation between G.S. Spencer and T.J. Houchins on September 20, 1979

As requested during the referenced telephone conversation, the attached AWSH Reinforcing Steel Interim Report is submitted.

If you have any questions or comments, please advise.

Very truly yours,

D L Renberger

D. L. Renberger
Assistant Director, Technology

Attachment

cc: CR Bryant - BPA
SB Barnes - UE&C, Phil.
BD Redd - UE&C, Phil.
J. Freeman - UE&C, Phil.

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ATTACHMENT A

INTERIM REPORT

OMISSION OF REINFORCING STEEL

I. INTRODUCTION

During a July 31, 1979 project meeting involving Project Engineering, Project Quality Assurance and Atkinson-Wright-Schuchart-Harbor (AWSH) Quality Assurance, a problem was identified regarding the omission of reinforcing steel from several concrete placements. It was further noted, during the meeting, that the apparent cause of the problem was inconsistencies between the reinforcing steel placing drawings and the UE&C design drawings.

An inquiry has been initiated in order to determine the extent of the omitted reinforcement and identify those actions required to alleviate the condition. Based upon the initial portion of the inquiry, the condition was identified as being potentially reportable under the provisions of 10CFR50.55(e). The condition is still under evaluation in order to ascertain its reportability status. This report is submitted in the interim to provide insight and information on the condition which has been gathered to date and to identify those actions taken by the Supply System and AWSH to properly control the placement of reinforcing steel.

During the inquiry, four (4) factors have been identified which influence the omission of reinforcing steel:

- Klinger Steel (9779-136) placing drawings are not updated to indicate the latest approved configuration as depicted on the design drawings. (i.e. Klinger, the rebar detail and supply contractor, has completed his work. The detail drawings are no longer updated).

- Failure of AWSH to perform an adequate comparison between the UE&C design drawings and the placing drawings, developed by Klinger and AWSH, to assure compatible detailing.

- AWSH inspection personnel utilizing placing drawings, both Klinger and AWSH, for the performance of their inspections. (Specification requirements dictate that both the placing and the design drawings are to be utilized for inspections.)

- Errors in transposing the design details to the placing drawings. (minimal)

II. EXTENT OF OMITTED REINFORCING STEEL

The determination of the extent of the missing reinforcing steel is continuing to be performed. As evidenced in section III of this report, the control effort being conducted is dependent upon the applicable

II. EXTENT OF OMITTED REINFORCING STEEL (Con't'd)

AWSH contracts (i.e. 9779-253, Containment, ASME Section III Division 2; 9779-253, Containment, Non-ASME Section III Division 2 and 9779-254, General Service Building, Non-code). To date, there have been 218 placements made for 9779-253 and 851 for 9779-254.

A. 9779-253; ASME Section III Division 2 - Containment

The Project ASME organization was made aware of the potential for missing reinforcing steel in ASME work based upon the condition identified in the area of AWSH non-code concrete placements. The ASME organization initiated a random comparison of design and placing drawings. The comparison resulted in the identification of two (2) instances where reinforcing steel (#6) diagonal trim steel required around penetrations) was nearly omitted in concrete placements. However, prior to the concrete placements, Field Change Notices (FCNs) were initiated and AWSH fabricated and installed the required additional reinforcing steel.

B. 9779-253; Non-ASME Section III Division 2 - Containment

For that portion of the 9779-253 contract which is non-code related, from July 1978 to the present, there have been four (4) instances identifying the omission of reinforcing steel. The bars varied in size from number eight (#8) to number [illegible]en (#14) and in quantity of bars from four (4) number eights (#8's) to fourteen (14) number elevens (#11's). Each of the four (4) instances have been dispositioned by Engineering and the applicable disposition achieved. (e.g. detailing, fabricating and installing additional bars; use-as-is for non-critical reinforcement or adjusting in-place reinforcing steel). Attachment 1 lists the Contractor initiated Nonconformance reports (CNCRs) and associated data.

C. 9779-254; Non-Code - General Service Building

From July 1978 to present, of the 851 concrete placements made there have been twenty-six (26) instances in which reinforcing steel has been omitted. The omitted steel varies in size from number four (4) to number eleven (#11) and in quantity of bars from one (1) number eight (#8) to thirty-three (33) number elevens (#11's). Attachment 2 lists the CNCR's and associated data.

Each of these conditions are being or have been evaluated on a case by case basis to determine the safety implications and the applicable disposition. (e.g. chipping out affected area of placement and fabricating and placing required reinforcing steel; drill and grout required resteel in place, etc.)

III. ACTIONS TO CONTROL ON-GOING CONSTRUCTION ACTIVITIES

As indicated in section II above, the efforts for the control of the day to day construction activities is based upon the particular contract or portion thereof. In addition, factors such as the incidence of omitted reinforcing steel, the rate of construction activities and the degree of the use of standard reinforcing steel configurations regulate the need and intensity of a special control program.

A. 9779-253; ASME Section III Division 2 - Containment

The general design configuration of the code concrete placements utilize, for the most part, a standard detail of reinforcing steel. The omission of reinforcing steel from the standard array is easily identifiable.

The only instances of missing reinforcement identified were corrected prior to placement; therefore, no special control system has beeninitiated. However, both project Code QA and AWSH personnel have been made aware of the identified problem. Section VI of this report, outlines the actions initiated to effectively control the placement of reinforcing steel.

B. 9779-253; Non-ASME Section III Division 2 - Containment (Cont'd)

The complexity of the design for the non-code portion of the containment is such that the design drawings must be continually reviewed, thus reducing the possibility of omitting reinforcing steel.

The non-code preplacement inspections by AWSH are being monitored through Project Quality Assurance surveillance. The project surveillance personnel and the AWSH inspection personnel have been made aware of the identified problem. Again, Section VI of this report, outlines the actions initiated to effectively control the placement of reinforcing steel.

C. 9779-254; Non-Code - General Service Building

It can be noted that the majority of missing reinforcing steel has been identified in the 9779-254 General Service Building placements. Therefore, a more attentive control program has been initiated in that area.

The program consists of a special QA task force assigned to assure compliance to the design drawings. This task force consists of Project Quality Assurance Engineers, highly qualified in the civil discipline, and certified as level II Surveillance Engineers

III. ACTIONS TO CONTROL ON-GOING CONSTRUCTION ACTIVITIES (Cont'd)

C. 9779-254; Non-Code - General Service Building (Cont'd)

in accordance with ANSI N45.2.6. Member(s) of the task force accompany the AWSH Quality Control inspectors during their daily preplacement inspections. During these "in concert" inspections, assurances are made that reinforcing steel has been properly placed prior to the initiation of the concrete placement.

This effort will continue until a level of confidence can be obtained in the contractor's reinforcing steel placement effort and the drawing inconsistency problem resolved. (See section VI of this report.)

IV. ACTIONS TO ASSURE PROPER INSTALLATION OF RESTEEL IN PREVIOUS PLACEMENTS

One of the functions during the control program inspections by the aforementioned special QA task force is to examine previous placements to assure that reinforcing steel required to protrude into adjacent placements is in place. If it is found to be omitted, the circumstances are researched (i.e. a review is performed of design change documents to see if steel was deleted by design change) and if no evidence of design changes exist AWSH or Project QA personnel initiate a nonconformance report for Engineering disposition.

In addition to the special QA inspection task force, a second task force was organized for the purpose of reviewing design drawings and reinforcing steel placing drawings for owner-furnished reinforcing steel, supplied by Klinger.

The second task force was comprised of qualified personnel in the civil discipline from Project Engineering, Construction Management and Quality Assurance. The task force compared design drawings to placing drawings and assessed any differences. When differences were identified research was conducted to assure that the proper design change documents were on file indicating that the required changes were conveyed to the contractor.

The drawing comparison and assessment was performed for all owner furnished reinforcing steel detail and design drawings for Contracts 9779-253 and 9779-254 for both Unit 3 and Unit 4.

The drawing comparison and assessment effort was completed on September 14, 1979.

Reinforcing steel furnished and detailed by AWSH is governed by AWSH detail drawings. As such, AWSH has been directed to verify that UE&C design and AWSH detail drawings are consistent.

This effort was initiated by AWSH for both 9779-253 and 254 on September 10, 1979, and is scheduled for completion on November 9, 1979.

V. ACTIONS TAKEN TO CORRECT IDENTIFIED DEFICIENCIES

As deficiencies are identified through actions taken in Sections III & IV above, they are appropriately documented on a nonconformance report or requests for information (RFI) and submitted to the Engineer for disposition. Each is evaluated for safety implications on a case by case basis.

VI. PROPOSED ACTIONS TO PRECLUDE RECURRENCE

The following corrective actions have been initiated and should preclude recurrence. For those actions required of AWSH, letter UEAT-79-5416(253)/UEAW-79-5257(254) was transmitted to AWSH on September 24, 1979. AWSH was directed to take appropriate corrective action as outlined below, and to submit an action plan on or before October 10, 1979.

A. Comparison of Design and Placement Drawings

AWSH has been directed to perform a comparison of AWSH reinforcing steel placing drawings and UE&C design drawings to assure that they are consistent. Any inconsistencies noted shall be documented and resolved. This comparison will allow for;

1) Crafts to install the reinforcing steel in accordance with the latest approved design, and

2) A minimized opportunity for the contractor's inspection personnel to overlook missing reinforcing steel.

B. Performance of Inspections to Design Drawings and Placing Drawings

The contractor shall comply with specification requirements regarding the utilization of both design drawings and placing drawings for the performance of his preplacement inspections.

This practice will be further enhanced by the performance of the aforementioned drawing comparisons.

C. Performance of Meaningful Training Sessions

Both Contractor craft personnel and inspection personnel shall be subjected to meaningful training sessions covering the technical requirements involved in reinforcing steel placement.

D. Performance of Additional In-Process Inspections

AWSH Inspection techniques shall be revised to include more frequent "in-process" inspections in order to detect any suspect areas in which reinforcing steel may be in question.

VII. SUMMARY

The extent of reinforcing steel omission varies according to contract and area.

The cause of this omission can be defined as inconsistencies between placing drawings and design drawings and the performance of inspections to the placement drawings without comparison with the design drawings.

To alleviate this condition actions were taken to control the on-going construction activities, to assess the acceptability of previous placements and to correct any deficiencies identified.

Finally, corrective actions have been initiated to preclude the recurrence of the identified condition.

ATTACHMENT 1

INSTANCES OF OMITTED REINFORCING STEEL; 9779-253 NON-ASME

Instances (CNCRs)	Placement Omitting Reinforcing Steel	Additional Affected Placements*	No. of Omitted Bars	Bar Size
1-CNCR-253-323**	C-1014	C-1011	6	11
558	C-1039	C-1041,C-1006	4	8
628	CG-204	CG-204	14	11
772	C-1034,C-1034A	C-2001,C-2002		
	C-1051	C-2001,C-2002		
		C-2005,C-2008	4	14

*Note - Placements affected in some manner by the missing reinforcing steel (e.g. continuous bar required to protrude into another placement etc.)

**Note - These bars identified near completion of placement and were eventually installed but lack three (3) inch embedment length.

ATTACHMENT 2

INSTANCES OF OMITTED REINFORCING STEEL: 9779-254

Instances (CNCRs)	Placement Omitting Reinforcing Steel	Additional Affected Placements***	No. of Omitted Bars	Bar Size
1-CNCR-254-39	1914		8	6
46	1214		7	6
168	1360	1939	12	6
188	1353		4	6
233	2014		4	8
235	930A		12	6
304	3608		2	8
393	3607	3614	1	8
400	2020	2944	2	6
405	2008	2957	3	8
420	1992	2048	10	11
450	2628	2900	2	11
			2	8
455	2046	2926	4	6
463	2628	2613	1	11
	2626	2900	1	8
469	3025	Block Wall	8	5
479	3025	3857	2	5
486	3036	Curb	10	4
495	3005	3019	4	5
			2	6
			16	5
504	2900	2959	2	6
610	2903,2907,2911 2915,2919,2923		33	11
+	2927	2309A,2929C		
612	3005	3011	2	6
633	1937	2864	12	6
647	3011	3005	1	6
606	2309A	2929C	10	9
823	3025	3868	2	6
829	2020A		1	6

***Note: Placements affected in some manner by the missing reinforcing steel (e.g. continuous bar required to protrude into another placement etc.)

+Note: One (1) NCR (1-NCR-254-15) identifies 14 #14 bars missing from placements G-2854, 2854A, 2214 and 2214A. This gives a total of 27 instances.