

# Washington Public Power Supply System

Box 1223 Elma, Washington 98541 (206) 482-4428

Docket No. 50-508

December 10, 1982  
G03-82-1276

U. S. Nuclear Regulatory Commission, Region V  
Office of Inspection and Enforcement  
1450 Maria Lane, Suite 260  
Walnut Creek, California 94596-5368

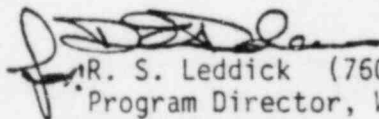
Attention: Mr. D. M. Sternberg  
Chief, Reactor Projects Branch No. 1

Subject: NRC INSPECTION AT WNP-3  
DEVIATION (50-508/82-10)  
MASONRY BLOCK WALL - FAILURE TO CONSTRUCT  
IN ACCORDANCE WITH QUALITY CLASS I

Reference: G03-82-1199, Letter, R. S. Leddick to D. M. Sternberg,  
NRC Inspection at Washington Nuclear Project No. 3  
(WNP-3), dated November 24, 1982.

The referenced letter reported that the subject Deviation could not be resolved at the time because the evaluation required to determine the scope of the problem and resultant corrective actions had not been completed. This evaluation has subsequently been completed. A report of corrective steps taken/planned, results achieved and the date when corrective actions will be completed is attached.

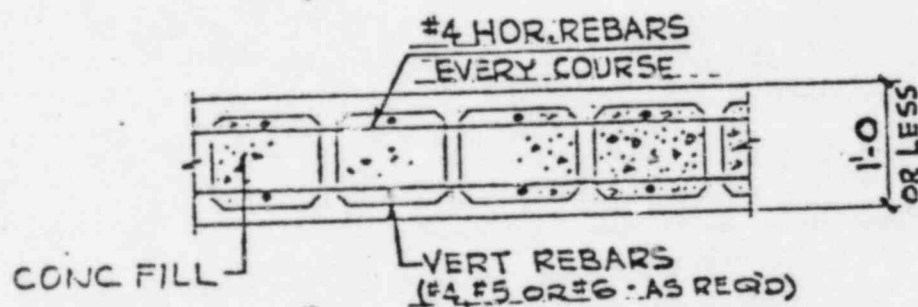
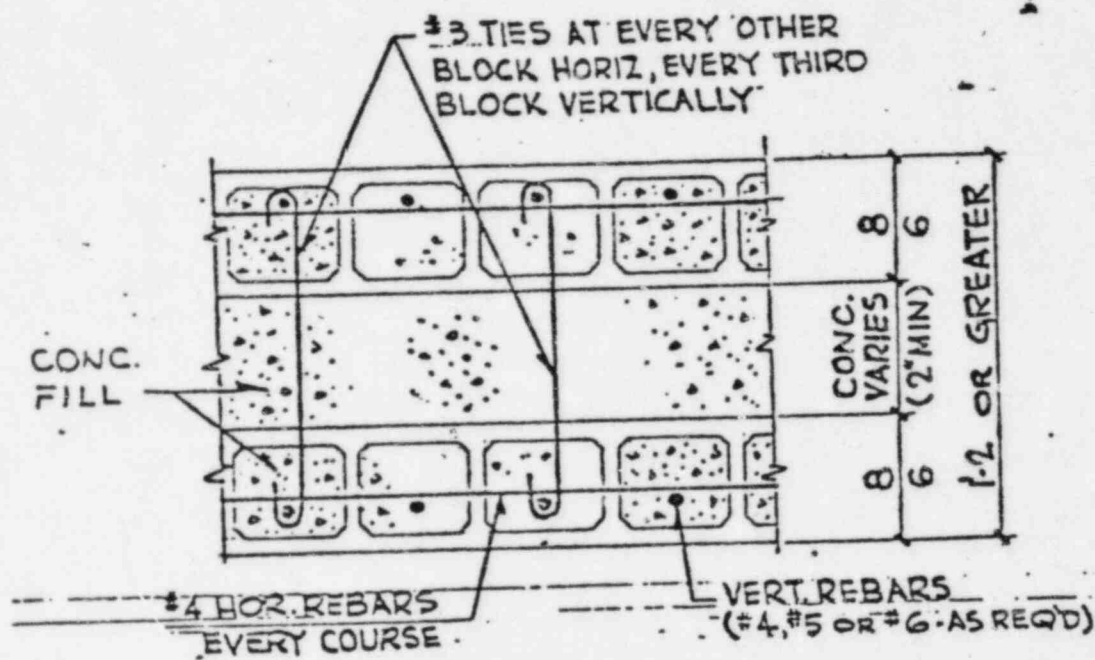
Should you have any questions or desire further information, please contact me directly.

  
R. S. Leddick (760)  
Program Director, WNP-3

DRC:nj

Attachments

cc: J. Adams - NESCO  
D. Smithpeter - BPA  
Ebasco - New York  
WNP-3 Files - Richland



TYP. WALL SECTIONS

ERASCO SERVICES INCORPORATED  
DIV. CIVIL DES. 2  
DATE: 10/20/54  
BY: [signature]

APPROVED

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
NUCLEAR PROJECT NO. 3 & 5  
TYPICAL DETAILS OF MASONRY  
WALL REINFORCING

FIGURE 1

ATTACHMENT 12

Request for Additional Information

Enclosure 4 (Item 6)

Attachment B

DEVIATION (50-508/82-16/03)  
MASONRY BLOCK WALL - FAILURE TO CONSTRUCT  
IN ACCORDANCE WITH QUALITY CLASS I

DEVIATION

Table 1.8-1 of the WNP-3 FSAR states that the WNP-3 project complies with Regulatory Guide 1.29, Rev. 3.

Regulatory Position 2 of Regulatory Guide 1.29, Rev. 3, states, in part, that: "Those portions of structures...whose failure could reduce the functioning of any plant feature...to an unacceptable safety level... should be designed and constructed so that the SSE would not cause such failure.

Regulatory Position 4 of Regulatory Guide 1.29, states, in part, that: "The pertinent quality assurance requirements of Appendix B to 10CFR Part 50 should be applied to all activities affecting the safety-related functions of those portions of structures...covered under Regulatory Position 2..."

Contrary to the above, a masonry block wall 23 feet 1 inch high was installed approximately 6 feet from nuclear safety related Diesel Generator Control Panel "A". Failure of this wall during a seismic event may disable the "A" diesel generator. The wall was classified as WPPSS Quality Class G and therefore was installed as a non-safety related structure not subject to the requirements of the licensee's quality assurance program required by 10CFR50, Appendix B.

REVIEW FOR BLOCK WALL (NO. 41) ACCEPTABILITY

To determine the safety significance and acceptability of the wall in question, a detailed review was conducted by Ebasco. Results of the review are summarized as follows:

- All concrete block walls in the RAB have been seismically designed for the SSE using loads derived from the maximum building accelerations at the installed elevation of the block walls.
- All reinforcing steel is furnished as WPPSS Quality Class I.
- Since concrete blocks are commercially available only as manufactured standard products, they are procured as WPPSS Quality Class G with provisions for material certification that assure adequate and consistent strength as assumed in the design.
- Bonding mortar does not conform to the requirements of WPPSS Quality Class I. Mortar materials are only available as commercially manufactured products. Mixing of mortar materials is controlled by the practical considerations of workability. Of real importance is the fact that, in the case of these reinforced block walls, the mortar has little structural significance and is not even considered in the structured analysis.

REVIEW FOR BLOCK WALL ( NO. 41) ACCEPTABILITY (CONTINUED)

- Concrete block fill (grout) does not conform to all of the requirements of WPPSS Quality Class I. Even though the concrete fill material was furnished as Class I, it was not always tested as Class I at the point of discharge.
- The concrete block walls (including No. 41) have been constructed in accordance with WPPSS Quality Class G requirements, supplemented by the Engineer's visual inspection for compliance with the specification and drawings. These inspections have been documented by the use of one or more of three different record forms. For the wall in question (No. 41), the inspections were documented on five Concrete Tracking Records and three Daily Reports.
- For all block walls constructed to date, four prism test sections (without rebar) have been prepared in accordance with specification requirements. Two of the test sections are being cured and two have been tested with test results exceeding design requirements.
- Independent compressive strength tests were performed on grout and mortar with results exceeding design requirements.

It has been concluded that, even though the bonding mortar and concrete fill do not meet the requirements of Quality Class I, the wall in question is acceptable based on: 1) the available records of inspection; 2) material tests performed to date; and 3) prism tests performed and in process. In addition, it is considered that, with the exception of mortar and grout, the design and construction of all masonry block walls in the RAB are in compliance with the Supply System's response to the NRC regarding IE Bulletin 80-11 (Reference Letter G03-81-854, dated March 25, 1981).

CORRECTIVE STEPS PLANNED

To further strengthen the program for the construction and inspection of masonry block walls in the RAB, the following actions are being initiated:

- 1) Inspection by the Engineer during construction will be strengthened by issuance of a Resident Engineering Instruction that will provide more detailed inspection criteria. In addition, a standard reporting format for documenting these instructions will be adopted.
- 2) All concrete block walls previously installed in seismic zones and for which neither "Concrete Tracking Records" nor "Concrete Block Wall Construction Forms" exist (i.e., wall Nos. 45, 60, 64 and 66 at RAB EL 390) will be examined using metal detection methods to independently confirm the inclusion of reinforcing steel.

CORRECTIVE STEPS PLANNED (CONTINUED)

- 3) Prism tests will continue to be performed and recorded as required by the construction specification to demonstrate the requisite composite strength of the concrete blocks, mortar and fill.
- 4) Independent tests will be conducted on the mortar and concrete fill (in accordance with the Uniform Building Code) at the same frequency as the prism tests. All test results will be documented.
- 5) As determined by the Engineer, core samples, when obtained during the various phases of block wall construction (e.g., in conjunction with penetration installation), will be visually examined for soundness and the results documented.

Additional corrective actions:

- 1) The FSAR will be amended to specify that mortar and concrete block fill are not furnished to Quality Class I. The FSAR change has been submitted to the Supply System for review and implementation.
- 2) The Supply System response to IE Bulletin 80-11 will be amended to address that mortar and concrete block fill are not Quality Class I materials.

DATE WHEN CORRECTIVE ACTION WILL BE COMPLETED

The program detailed above is presently being implemented. Full implementation will be achieved prior to any further erection of masonry block walls in the RAB. It is anticipated that all corrective actions will be completed by February 28, 1983.



ATTACHMENT 12

Request for Additional Information

Enclosure 4 (Item 6)

Attachment C

SEA BREEZE HOUND

100% COTTON FIBER

MADE IN U.S.A.

crack. The portions of high energy piping systems within the steam tunnel satisfy the requirements of Subsection 3.6.2.1.4 and therefore are not postulated to rupture. However, the tunnel is designed for a compartment pressure associated with a hypothetical crack in the main steam line. For additional discussion see Subsection 3.6A.2.3.2.

#### g) Concrete Block Walls

Reinforced concrete block walls are utilized in the RAB floors primarily for shielding, fire protection, partitioning, and other architectural purposes. Use of concrete block walls for support of any safety-related components such as piping, HVAC ducts, cable trays, electrical batteries, boxes, and conduits, is not permitted by the project directive. Since concrete blocks are commercially available only as manufactured standard products, they are procured in accordance with Supply System Quality Class G requirements, however, with provisions for material certification that assures adequate and consistent strength as assumed in the design. Additionally, the concrete fill, and reinforcing steel used in the block wall construction are supplied in accordance with Supply System Quality Class I requirements. Installation of these walls follows Supply System Quality Class G requirements, however, augmented by documenting the daily work activities in reference to the design requirements.

Attachments of non-safety related components are permitted only upon review and approval when the attachment loads are within the capacity of the affected block walls.

Field prism tests in accordance with the Uniform Building Code are made to ensure that the concrete blocks, concrete fill, and bonding mortar joints possess the required compressive strengths.

The concrete block walls are designed primarily in accordance with Chapter 24, Masonry, of the Uniform Building Code, 1973 edition, following the working Stress Design method specified therein. The seismic loads used in the design of the concrete block walls are based on the maximum building accelerations at various floors of interest as established by the seismic dynamic analyses of structures presented in Subsection 3.7.2.

#### 3.8.4.1.3 Dry Cooling Tower Structure

The Dry Cooling Tower Structure houses the Ultimate Heat Sink (UHS) components (Trains A and B) which provide heat rejection from the Component Cooling Water System (CCWS). The description of the UHS and CCWS are given in Subsections 9.2.5 and 9.2.2, respectively.

The Category I Structure is located to the east of the Reactor Auxiliary Building and occupies an area of 520 ft by 85 ft, having its longitudinal axis oriented in the north-south direction as shown on Figure 1.2-2. It is predominantly a reinforced concrete structure supported on a 4 ft thick foundation mat. It extends from the top of the mat at EL. 390.00 ft to the roof grating level at EL. 437.33 ft. A wind wall that extends 17 ft above the roof level is provided for each longitudinal exterior wall. Within the structure, the heat exchangers are located at EL. 417.5 ft and supported by cross walls which are spaced approximately 49 ft apart. A fan deck is located at EL. 428.50 ft.

Air flow to the tower train is from each side - the east and west sides, and the concrete labyrinth or maze type design that provides exterior missile protection by the line-of-site approach is provided for the air inlet. Air exhaust from the tower train is through the missile protection roof grating. Wind walls are provided to minimize exhaust air recirculation.



Attachment 13

REQUEST FOR ADDITIONAL INFORMATION

ENCLOSURE 4 (Item 11) SEISMIC QUALIFICATION

A staff request for additional information in this review area has been sent to a number of pending OL applicants. A copy of that request is provided as Enclosure 11 (Attachment I).

RESPONSE

The Seismic Qualification criteria are consistent with IEE Std. 344-1975 as supplemented by Regulatory Guide's 1.100 and 1.92 and Standard Review Plan Section's 3.9.2, 3.9.3 and 3.10 as discussed in the FSAR.

A compilation of the data necessary for the NRC SQRT to verify the acceptability of the Seismic and dynamic qualification of equipment will be submitted in accordance with the guidance delineated in Enclosure 11 (Attachment I).