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Docket Nos. 50-522/523

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Docket Nos: 50-522
and 50-523

Mr. Frank Spangenberg
Assistant Project Manager - Nuclear
Northwest Energy Services Company
2820 Northup Way
Bellevue, Washington 98004

Dear Mr. Spangenberg:

Subject: Request for Additional Information - Skagit/Hanford
Nuclear Project

In order that we may continue our review of your application for permits to construct the Skagit/Hanford Nuclear Project, Units 1 and 2, your response to the enclosed request for additional information is required.

To maintain our licensing review schedule we require a completely adequate response to the enclosure by March 23, 1982. Please inform us within 7 days after receipt of this letter whether or not you will be able to respond by March 23, 1982.

Please contact the licensing project manager, Mike Mallory, at (301) 492-4449 if you desire additional discussion or clarification of the information requested.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosure:
Request for Additional Information

cc: See next page

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OFFICE	DL:LB #4	LA:DL:LB #4	DL:LB #4				
SURNAME	MMallory/hmc	MDuncan	EAdensam				
DATE	3/10/82	3/11/82	3/11/82				

SKAGIT

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Request for Additional Information - Geotechnical Engineering
Skagit/Hanford Nuclear Project, Units 1 and 2
Docket No. 50-522

0241.1
(2.5.4)

In Amendment 23, section 2.5.4 to the PSAR, the applicant has proposed to support the common foundation mat for the seismic Category I structures about 20 ft below existing (and final) ground surface (plant grade) at elevation 507 (El 507), on Missoula sediments that occur between about El 520 and El 495. Plant grade is at El 527.

The Missoula sediments are described as medium dense to dense, clean medium sand, gray to black. Field tests in these soils showed Standard Penetration Test (SPT) values ranging from about 10 to 40 blows/ft (PSAR Fig. 2QA-1 through 37 and Table 2QB-1). Below El 507 the SPT values were generally greater than 20 blows/ft.

The underlying Pre-Missoula sediments, between about El 495 and El 480 are described as very dense, silty fine sand, dark yellowish-brown to olive gray. The SPT values in the Pre-Missoula sediment were generally on the order of 100 blows/ft. These soils are underlain by dense to very dense sand and gravel (SPT values greater than 45 blows/ft).

Based on our review of the applicant's submittals, it is our opinion that the Missoula sands in their present condition are not suitable for the direct support of seismic Category structures because the in-place densities are variable and, in some cases, too low to assure satisfactory structural support. Additionally, the proposed foundation support conditions are significantly inferior to the conditions adopted (and found by the staff to be acceptable) at the nearby Washington Public Power Supply System Unit 2 (WNP-2). The factors supporting our conclusion are as follows.

1. The lower SPT values recorded below proposed foundation level (17 to 23 blows/ft near Unit 1, 13 to 22 blows/ft near Unit 2) correlate to relative densities near or below 60% (PSAR Figs. 2QA-38 and 39). The in-place relative densities may, in fact, be near or below 50% according to recent studies by the Waterways Experiment Station (ASCE Journal, GT-11, November 1977, page 1295).
2. The applicant determined in-place relative densities of 9% to 53% in the exploratory trenches (PSAR Table 2QB-6). The applicant suggested that the tests were not representative because of soil layering. We believe that they are also indicative of loose, unsuitable in situ soil conditions.

At the WNP-2 site, shallow sands having STP values generally in the range of 15 to 40 blows/ft were judged to have relative densities in the range of 30 to 50% (WNP-2 FSAR, App. 2.5F, Figs. 4 and A-3 through A-7). These soils were excavated to a depth of about 40 ft below grade and recompactd to about 80% relative density in order to provide suitable foundation support.

Based on the applicant's submittals and a telephone discussion between the staff and the applicant on March 2, 1982, we understand that the applicant concluded that the Missoula sands are suitable for foundation support based on the following factors.

1. The average SPT values of 25 to 30 blows/ft and corresponding relative densities of 75% to 80% are within ranges that will provide suitable foundation support and that the large, thick foundation mats will distribute structural loads over local, loose pockets.
2. The plate load tests in the exploratory trenches show relatively high elastic modulus values for the Missoula sands (10,000 psi to 20,000 psi) so that calculated settlements of structures under static loads are small.
3. The geophysical studies show relatively high shear wave velocities (900 ft/sec) in the Missoula sands so that calculated settlements of structures under earthquake loads are small.
4. The applicant believes that removing and recompactd the Missoula sands may not produce improved densities in the bearing soils.

We find that the applicant's information and evaluation does not resolve our concern for the suitability of the in-place Missoula sand as a foundation bearing material. Thus, we ask that the applicant submit an alternative to the presently proposed plan that has seismic Category I foundations supported directly in the in situ Missoula sand. For guidance, the applicant should refer to the WNP-2 foundation construction wherein medium dense to dense sands were excavated to a depth of about 40 ft (down to dense sand) and foundation elevations were re-established by use of structural backfill. The staff found this procedure to be acceptable for the WNP-2.

Q241.2
(App 2L)

Table 2L-5 shows "P" wave and "S" wave values and calculated Poisson's ratio values that appear to be inconsistent. Provide a discussion of the bases for the acceptability of these design values.

Q241.3
(2.5.4.5)

Provide a description of the anticipated bearing conditions and bedding details for soil-supported seismic Category I pipes and conduits. Provide a summary of the specifications for bedding and backfilling.

- Q241.4
(2.5.4.5) Provide a correlation between the seismic Category I structures listed under "B. Other Structures" on Sheet 22 of Table 3.2-1 and the numerical listing on Figure 1.2-1. Identify the proposed foundation elevations and conditions of any seismic Category I structures that are not shown on Figure 2.5-15.
- Q241.5
(2.5.4.5) Provide a commitment to notify the NRR staff in advance of the completion of foundation excavations so that the staff may inspect the excavations.
- Q241.6
(2.5.4.5) Provide a description of the procedures that will be adopted to protect and maintain temporary soil slopes and to provide adequate drainage around structures so as to assure that foundation soils will not be damaged by local heavy rains and erosion during construction. Include a description of the periodic inspection procedures that will assure proper maintenance of temporary slopes and drainage facilities.
- Q241.7
(2.5.4.5) Discuss the efficacy of using the Proctor method (ASTM D-1557) for field density control of the clean sands in view of the testing difficulties encountered during the exploration, as described on page 2QB-4. Propose alternatives for field control of backfill.
- Q241.8
(2.5.4.5) Specify the gradation limits that will be acceptable for structural backfill material. Also describe how the excavated soils that are used for backfilling will be mixed and blended to provide homogeneity; that is, describe how problems with obtaining relative density values in compacted fill will be avoided in view of the problems encountered with determining relative density in the exploratory test trenches (see page 2Q-11, page 2Q-14 and Table 2QB-6).