CENTRAL FILES

NIAGARA MOHAWK

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July 10, 1979

Office of Inspection and Enforcement
Region I
Attn: Mr. Boyce H. Grier, Director
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Mr. Grier:

Re: Nine Mile Point Unit 2
Docket No. 50-410

Your March 8, 1979 I. E. Bulletin 79-02 described deficiencies in certain base plate designs using concrete anchor bolts. The following information for Nine Mile Point Unit 2 is provided in response to the Bulletin.

Request 1

Verify that pipe support base plate flexibility was accounted for in the calculation of anchor bolt loads. In lieu of supporting analysis justifying the assumption of rigidity, the base plates should be considered flexible if the unstiffened distance between the member welded to the plate and the edge of the base plate is greater than twice the thickness of the plate. If the base plate is determined to be flexible, then recalculate the bolt loads using an appropriate analysis which will account for the effects of shear - tension interaction, minimum edge distance and proper bolt spacing. This is to be done prior to testing of anchor bolts. These calculated bolt loads are referred to hereafter as the bolt design loads.

Response 1

Unit 2 design procedures include accounting for pipe support base plate flexibility in calculating anchor bolt tension loads. The load factors for drilled-in-concrete expansion bolts were developed from a finite element analysis of the base plates which consider the effects of base plate flexibility. The effects of shear - tension interaction, minimum edge distance, and proper bolt spacing are taken into account in the analysis.

The description of the analytical model requested in Revision 1 to I. E. Bulletin 79-02 will be provided by August 15, 1979.

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Request 2

Verify that the concrete expansion anchor bolts have the following minimum factor of safety between the bolt design load and the bolt ultimate capacity determined from static load tests (e.g. anchor bolt manufacturers) which simulate the actual conditions of installation (i.e. type of concrete and its strength properties):

a. Four - For wedge and sleeve type anchor bolts

b. Five - For shell type anchor bolts.

Response 2

a. Unit 2 design procedures and specifications for drilled-in anchors describe the design loads, purchase requirements, and installation for wedge-type anchor bolts. The average ultimate bolt strength is a minimum of four times the design value described in the design procedure.

This minimum safety factor of four is based on the average ultimate capacity determined from static load tests conducted in 3000 psi concrete by the manufacturers.

No sleeve type anchor bolts are planned to be used. However, if they are used, the appropriate requirements discussed in the Bulletins will be used.

b. No shell type anchor bolts are planned to be used. However, if they are used, the appropriate requirements discussed in the Bulletin will be used.

Request 3

Describe the design requirements if applicable for anchor bolts to withstand cyclic loads (e.g. seismic loads and high cycle operating loads).

Response 3

The conclusions of the Fast Flux Test Facility report on Drilled-In Expansion Bolts Under Static and Alternating Load BR-5853-C-4, January, 1975, indicate that properly installed anchors perform satisfactorily under cyclic loads without additional design requirements. The requirements of the installation specification will ensure proper bolt installation.

Request 4

Verify from existing QC documentation that design requirements have been met for each anchor bolt in the following areas:

(a) Cyclic loads have been considered (e.g. anchor bolt preload is equal to or greater than bolt design load). In the case of the shell type, assure that it is not in contact with the back of the support plate prior to preload testing.

(b) Specified design size and type is correctly installed (e.g., proper embedment depth).

If sufficient documentation does not exist, then initiate a testing program that will assure that minimum design requirements have been met with respect to sub-items (a) and (b) above. A sampling technique is acceptable. One acceptable technique is to randomly select and test one anchor bolt in each base plate (i.e. some supports may have more than one base plate). The test should provide verification of sub-items (a) and (b) above. If the test fails, all other bolts on that base plate should be similarly tested. In any event, the test program should assure that each Seismic Category 1 system will perform its intended function.

Response 4

Sufficient information is available to document design requirements as discussed below.

(a) An onsite test program has been performed by the bolt manufacturer to determine a test torque which Field Quality Control personnel can use on this project. These torque values give a preload equal to or larger than the specified allowable design loads (1/4 ultimate capacity).

(b) The project has adopted a marking system developed by the bolt manufacturer which will permit Field Quality Control personnel to determine that the proper bolt length has been installed. The marks indicating the bolt length will be visible after bolt installation.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

Gerald K. Rhode
Vice President
System Project Management