PUBLIC
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INDIANA

S. W. Shields
Senior Vice President -
Nuclear Division

June 1, 1984
SVP-0146-84

Mr. J. G. Keppler
Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Docket Nos. STN 50-546
STN 50-547
Construction Permit Nos.
CPPR-170
CPPR-171

SUBJECT: Marble Hill Nuclear Generating Station, Units 1 and 2

Dear Mr. Keppler::

On January 9 through March 30, 1984, a routine safety inspection of activities at Marble Hill Nuclear Generating Station was conducted by Messrs. J. F. Schapker and H. F. Bundy of your office. The Inspection Report, number 50-546/84-01(DPRP) and 50-547/84-01(DPRP) identified areas examined during the course of this inspection. One of the identified areas was the review of an allegation concerning insufficient aggregate in the containment building walls (ATS NOS. RIII-84-A-0027). While it is understood from your inspection report that the allegation may be reviewed if construction is resumed at Marble Hill, Public Service Company of Indiana, Inc. (PSI) offers the following information for your use in closing the item should you care to do so.

Allegation Concerning Insufficient Aggregate in the Containment Building Walls

At a public hearing on the emergency rate case in Terre Haute, Indiana on February 16, 1984, a person who gave his name as Larry Day made an allegation about construction at Marble Hill.

Mr. Day claimed to have retired in either 1981 or 1982 (he used each of these years as his retirement date in different points of his testimony) as a state building inspector. He claimed that he was part of a 27-man State of Indiana inspection team sent to Marble Hill to inspect construction after the 1979 Safety-Related suspension of construction activities. He indicated that this visit was made either in the fall of 1979 or 1980.

Apparently, Mr. Day's complaint was that there was not enough aggregate in the walls of the containment building for the amount of reinforcement bars being used. He claimed that the rust spots were there because of protruding reinforcement bars. To the best of our knowledge, this statement relied on visual observation made from the ground and is unsubstantiated by any test data whatsoever. Public Service Indiana therefore considers that the allegation made by Mr. Day is unsubstantiated for the following reasons.

Response to Allegation Concerning Insufficient Aggregate in the Containment Building Walls

At the time of the 1979 Safety-Related shut down of construction activities, the exterior concrete for the Unit I containment building had been completed to elevation 514.02 feet. During the shut down, the exposed reinforcement bars extending above the horizontal construction joint for the Unit I containment building exterior walls and the carbon steel containment liner plate developed minor rusting which was carried by rainwater and stained the surface of the wall below the construction joint. Prior to proceeding with concrete placements above this elevation after construction was resumed, all reinforcing bars that had been exposed to the elements were inspected for deterioration due to rusting, and the liner plate itself sufficiently cleaned. These inspections were performed in accordance with PSI approved site civil contractor procedures and all documentation associated with these inspections are maintained in the concrete data packages for the subject concrete pours. The results of the inspection determined the exposed reinforcing bars to be acceptable.

The concrete mix design for the containment buildings was developed utilizing the guidelines as established in the American Concrete Institute's standards ACI 211.1, "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete" and ACI 301, "Specification for Structural Concrete for Buildings."

The mixtures for concrete and grout for the containment structures were designed to achieve 5500 psi compressive strength at 91 days. The compressive strength of 20 concrete test reports selected at random averaged 5893 psi, while the compressive strength of 10 test reports for grout averaged 9432 psi.

On March 25, 1980, the Nuclear Regulatory Commission (NRC) committed to have independent engineering consultants evaluate the concrete

construction issues associated with the 1979 Safety-Related suspension of construction activities. Subsequently, under an NRC contract, Parameter Inc., Hamm Engineers, Inc., of San Diego, California, was established as the independent consultant. The consultants' final report titled, "Review of the Evaluation of Concrete at Marble Hill Nuclear Generating Station, Units 1 and 2", supported the actions taken by the NRC in its graduated rescission of the August 15, 1979 order confirming suspension of construction.

The consultants' effort involved the review of the methods used to locate voids and discontinuities in the concrete of safety-related structures and to determine if significant deficiencies had been detected. These methods included coring, pulse echo, and through transmission investigative techniques. The repair procedures and the repairs, made as a result of the findings of the investigation, were also reviewed for adequacy.

Based on the review of strength and quality control information, the consultants were able to conclude that the concrete placed in safety-related structures at the Marble Hill Nuclear Plant was of good to excellent quality and had strengths higher than required. The homogeneity of the concrete as ascertained by nondestructive testing, combined with the results of the 91-day cylinder tests and unit weights obtained, gave assurance that the quality of concrete provides adequate structural strength and biological shielding.

The identification, evaluation and repair of surface concrete defects was covered under the Construction Verification Program and controlled by Special Project Procedure SPP-5, "Category I Concrete Surface Irregularities." The program was reviewed by the consultants and found to involve an extensive and thorough documented visual inspection and evaluation of all visible concrete surfaces. The repair procedures were reviewed and found to be consistent with good construction practice. Additionally, the NRC performed a review of the Construction Verification Program SPP-5 final report and found it acceptable. The acceptance of the Construction Verification final report was one of the key prerequisites for the lifting of the Order Confirming Suspension of Construction.

In summary, the relationship between the density and clear cover of the reinforcing bars is closely defined in American Concrete Institute guidelines, and the concrete mixes at Marble Hill reflected these criteria. The independent engineering consultants' report and the Construction Verification Program final report both

attest to the acceptability of Safety-Related concrete structures. The rust stains on the exterior concrete surface of the Unit 1 Containment Building were caused by rusting of exposed reinforcing bars and the liner plate above the top construction joint. The allegation that the rust stains on the exterior surface were from protruding reinforcing bars is inappropriate at this time and PSI considers this item closed. Please advise if you have questions or require additional information.

Sincerely,

for

S. W. SHIELDS

SWS:bmh

cc: Director of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

J. E. Konklin
J. F. Schapker
P. W. O'Conner