

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-546/81-23; 50-547/81-23

Docket No. 50-546; 50-547

License No. CPPR-170; CPPR-171

Licensee: Public Service of Indiana
Post Office Box 190
New Washington, IN 47162

Facility Name: Marble Hill Nuclear Generating Station, Units 1 and 2

Inspection At: Marble Hill Site, Jefferson County, IN

Inspection Conducted: December 8-10, 1981

FCH
Inspector: F. C. Hawkins

1/4/82

C.C. Williams
Approved By: C. C. Williams, Acting Chief
Engineering Inspection Branch

1/4/82

Inspection Summary

Inspection on December 8-10, 1981 (Report No. 50-546/81-23; 50-547/81-23)

Areas Inspected: Investigation of allegations concerning concrete aggregate being supplied Marble Hill for construction activities. The inspection involved a total of twenty inspector-hours by one NRC inspector.

Results: No items of noncompliance or deviations were identified.

DETAILS

Persons Contacted

Public Service of Indiana (PSI)

- *L. Ramsett, Executive Director - Nuclear Quality Assurance
- *W. Petro, Executive Director - Nuclear Project Management
- *G. Warner, Civil Construction Engineering Supervisor
 - C. Beckham, Quality Engineering Manager
- *S. Brewer, Nuclear Safety and Licensing Manager
- *C. Togni, Chief Civil Engineer
 - L. Worley, Quality Engineer

G. K. Newberg Construction Company (N-MH)

- D. Stegemoller, Vice President - Power Construction
- D. Maxwell, Project Engineering Manager

Scott County Stone Company

- E. Voyles, Vice-President
- J. Smith, Quality Assurance Manager
- F. Owens, Superintendent

*Denotes those attending the exit interview.

Functional or Program Areas Inspected

The purpose of this inspection was to investigate allegations relating to civil construction activities at Marble Hill. The allegations were received by RIII on November 25, 1981 from NRC HQ personnel. They were contacted on November 24, 1981 by an individual who expressed concern about the quality of coarse aggregate obtained from Scott County Stone Company's quarry at Blocher, Indiana. The basis for the individual's concerns stemmed from his knowledge of unacceptable test results on aggregate supplied to the State of Indiana by the Blocher quarry. The tests, referred to by the individual, were conducted by an accredited materials and testing laboratory representing the State of Indiana and showed the material to be unacceptable. The quarry also supplies aggregate to Marble Hill for construction purposes.

During telephone conversations with the individual on November 30, December 2 and 8, 1981, he stated that certain coarse aggregate test results had failed to meet State specification requirements. The individual further stated that, based on hearsay, the coarse aggregate which had failed to meet State requirements had later been supplied to Marble Hill. He would not furnish the names of individuals possessing first hand knowledge of the incident nor could he refer specifically to the tests which had failed to meet specification requirements.

The State laboratory was visited on December 8, 1981, by the Region III inspector. Summaries of quality aggregate test results for the period December 13, 1976 through October 26, 1981 were obtained. The results of testing performed on gradation size nos. 5, 57, 7, and 9 were reviewed. Of the many gradations produced by the Blocher quarry, these four have the potential to be used in safety related applications at Marble Hill.

The State laboratory conducts quality aggregate testing in accordance with material testing standards published by the American Association of State Highway and Transportation Officials (AASHTO). An examination of the AASHTO test methods revealed that they are virtually identical to the Marble Hill test methods which are endorsed by the American Society for Testing and Materials (ASTM).

The results of production quality tests performed by the State laboratory for aggregate Soundness (ASTM C88, AASHTO T104), Abrasion (ASTM C131, AASHTO T96), Specific Gravity (ASTM C127, AASHTO T85), and Absorption (ASTM C127, AASHTO T84) were reviewed. The test results met all State specification requirements, except for Soundness. The test result summaries showed that, after May 1981, tests for aggregate Soundness regularly failed to meet State requirements.

The property of "Soundness" is defined by ACI 221 as the ability of an aggregate to resist large or permanent changes of volume when subjected to freezing and thawing, heating and cooling, or wetting and drying. This property is related to the porosity, absorption, and pore structure of the aggregate.

The sulfate soundness test (ASTM C88, AASHTO T104) consists of alternately immersing an aggregate sample in a solution of sodium or magnesium sulfate and drying it in an oven. The intent of the test is to simulate an increase in volume of water on freezing in the aggregate pores or cracks through the formation of salt crystals in the aggregate by the process of rehydration.

Both the American Concrete Institute (ACI) and ASTM recognize that the sulfate soundness test results do not have a high degree of precision when compared to other ASTM tests related to concrete product control. ACI 221 states that, "The sulfate soundness test has not been conspicuously successful in evaluating the resistance of aggregates to freezing and thawing in concrete."

Both Marble Hill and State requirements for aggregate soundness specify a maximum 12 percent loss after testing. The State laboratory test results appeared somewhat ununiform, as was exemplified by their variation from an observed low of 5.4 percent to a high of 17.36 percent.

State personnel indicated that in their opinion, this variation was indicative of the Blocher quarry's inability to consistently supply material which meets State requirements.

An inspection of the Scott County Stone Company quarry at Blocher was conducted on December 9, 1981. The inspection consisted of interviews with quarry personnel and observation of inprocess work activities. The segregation and traceability of stockpiles for aggregate to be supplied to different Scott County customers was discussed in detail with quarry personnel. During these discussions, the Vice-President of Scott County Stone Company stated that at no time was aggregate which failed to meet State requirements ever supplied to Marble Hill. This statement was also made independently by both the quarry QA Manager and Plant Superintendent.

Also, in conjunction with this inspection, Marble Hill site quality aggregate test records were reviewed. These tests were conducted by the U.S. Testing Company of Hoboken, N.J. in accordance with PSI's licensing commitments. U.S. Testing is not contractually affiliated with either Scott County Stone Company or N-MH, the Marble Hill general site contractor. The results of this testing therefore represent an independent evaluation of aggregate being supplied for construction use at Marble Hill.

In the Preliminary Safety Analysis Report, PSI has committed to Regulatory Guide 1.94, entitled "Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants." Regulatory Guide 1.94 in turn, endorses American National Standards Institute (ANSI) N45.2.5-1974. Table A and B of ANSI N45.2.5-1974 specify the required material qualification tests and in-process tests, respectively.

This inspection confirmed that both test results and test frequencies for coarse aggregate supplied to Marble Hill by the Scott County quarry at Blocher met the requirements of Table A and B. The results of aggregate Soundness tests, performed by U.S. Testing Company, were consistently within the 12 percent loss allowed by S&L Specification Y-2850. In each instance, the test results are uniform and appear reliable.

The site quality records of quarry surveillances were also reviewed. Records indicated that twenty-three surveillance inspections have been conducted by N-MH personnel during the period June 3, 1977 to October 8, 1981.

Conclusions:

The licensee's actions regarding the testing of coarse aggregate are consistent with Construction Permit commitments.

There appears no impropriety on behalf of either the licensee or his contractors regarding the procurement, testing, and use of coarse aggregate at Marble Hill.

The alleger's contentions, that substandard coarse aggregate was supplied for safety-related construction use at Marble Hill, could not be substantiated.

On the basis of the actions taken by Region III with regard to this matter, no further action is planned and the matter is considered closed.