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Vogtle Project

July 10, 1986

Director of Nuclear Reactor Regulation
Attention: Mr. B. J. Youngblood
PWR Project Directorate #4
Division of PWR Licensing A
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

File: X7BC35
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NRC DOCKET NUMBERS 50-424 AND 50-425
CONSTRUCTION PERMIT NUMBERS CPPR-108 AND CPPR-109
VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 AND 2
SER OPEN ITEM 18: COMPLIANCE WITH REGULATORY GUIDE 1.94

Dear Mr. Denton:

Pursuant to our telephone conversations with your staff on June 19-20, 1986, I am attaching responses to questions raised regarding ANSI N45.2.5-1978. These responses expand the clarification presented in FSAR paragraph 1.9.94.2, items 2, 3, 4 and 8.

If your staff requires any additional information, please do not hesitate to contact me.

Sincerely,

J. A. Bailey

J. A. Bailey
Project Licensing Manager

JAB/caa
Attachment
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FSAR 1.9.94.2 ITEM 2

GRAIN SIZE TESTING

ANSI N45.2.5-1978, Table B, requires one grain size test in accordance with ASTM D-422 (hydrometer or sieve as appropriate) for each compaction test or 10,000 YD^3. VEGP specifications require one grain size test per ASTM D-422, using the sieve analysis without the hydrometer portion of the test, for every 26,250 YD^3 (every five compaction tests) of backfill placed. A minimum of one test in accordance with ASTM D-1140, which determines the percent passing the No. 200 sieve, is also performed for every field density test (every 741 YD^3).

In addition to testing for grain size at the time of compaction, borrow areas at VEGP are investigated prior to excavation to determine the location of the sand and silty sand materials that meet the requirements of the VEGP specification. Both the hydrometer and sieve analysis portions of ASTM D-422 are performed at this time. The hydrometer portion is required to determine the grain size distribution of particles passing the No. 200 sieve. As Category 1 backfill material is excavated from the borrow areas, a minimum of one ASTM D-422 sieve analysis test is performed for every 25,000 YD^3 and a minimum of one test in accordance with ASTM D-1140 for every 5000 YD^3.

Thus, the acceptability of the fill gradation is evaluated at VEGP three separate times. It is evaluated during selection of the borrow areas, during excavation from borrow areas, and finally when the material is placed in the fill. This approach is more likely to achieve conformity to gradation requirements than when the material is only tested after placement in the fill.

Because the VEGP Category 1 backfill soils are limited by specification requirements to sands and silty sands with less than 25 percent fines, one of the most important factors regarding the VEGP soils is the percent fines (the only significant grain size factor affecting ease of compaction for VEGP soils is the fines content, i.e. the percent passing the No. 200 sieve size.) For this reason, this key parameter is determined in accordance with ASTM D1140 at least once for every 741 YD^3 of material placed. Therefore, the most pertinent information regarding the grain size of the VEGP soils is collected at a much higher rate than is required by the ANSI standard. It should be noted that the plasticity index test, ASTM D-424, which is included in the ANSI standard, is not applicable to VEGP soils since they are non-plastic. This test is performed during the borrow investigations to identify unsuitable materials to be wasted.

FSAR 1.9.94.2 ITEM 3

BORROW AREA MOISTURE CONTENT

ANSI N45.2.5-1978, Table B, requires one borrow moisture test per ASTM D-1556, 2167, 3017, or 2937 for each soil type, before each work shift and when moisture content changes or is questionable. VEGP specifications require fill to be within an acceptable range of optimum moisture at the time of placement. Testing is per ASTM D-2216 or a rapid method correlated to ASTM D-2216, and is performed each time a loose lift has been placed and is ready to be compacted. Materials are moisture conditioned as far as practicable in the stockpile and borrow areas, but final moisture conditioning is carried out on the fill.

Moisture conditioning and thus moisture testing in a borrow area is a technique more commonly associated with clayey soils where considerable work may be required to properly moisture condition the soil and where the water will be more easily retained in the soil. In many cases this method may also be more economical. In the specific case of VEGP where sands and silty sands are specified, and where moisture is not as readily retained by the soil, final moisture conditioning and testing are performed on the fill just prior to compaction. In both cases, the objective is to provide a moisture content at the time of compaction which is within the required range of optimum moisture where the desired degree of compaction can be achieved. At VEGP the average optimum moisture content is determined from not less than 20 ASTM D-1557 tests performed on representative soil samples taken from the borrow or stockpile areas prior to hauling materials for backfilling. This average optimum moisture content is periodically updated.

ASTM D-1556, 2167, and 2937 are methods of determining in-place soil densities approved by ANSI N45.2.5-1978. All three standards reference ASTM D-2216 as the method of determining moisture content. ASTM D-3017 is an alternate method of determining moisture content acceptable by ANSI N45.2.5-1978. ASTM D-1556, in discussing moisture content, notes the use of rapid methods to be verified by ASTM D-2216. VEGP uses a special procedure to continuously correlate the rapid method used with ASTM D-2216.

FSAR 1.9.94.2 ITEM 4

FIELD DENSITY TEST

ANSI N45.2.5-1978, Table B, requires field density tests per ASTM D-1556, 2167, 2922, or 2937 as specified at a minimum of every 10,000 ft^2. VEGP specifications require one test per ASTM D-1556 for every 20,000 ft^2 per foot of depth.

VEGP specifications provide specific compaction procedures based upon test fills constructed prior to the start of backfilling. Density testing for these test fills was carried out at a much greater frequency than is required by the ANSI standard. The compaction procedures, which include the exact type of compaction machinery used, roller speed, number of passes made by the roller, lift thickness, range of moisture content, etc., assure that the required compaction criteria will be met. With these test fill-based criteria, which are not directly specified by the ANSI document, the VEGP specifications meet the intent of the testing frequency given in ANSI N45.2.5-1978.

The field testing frequency of a minimum of one test per 20,000 ft^2 per foot of depth was agreed to in a meeting held with the NRC on July 22, 1977 and confirmed in a letter from W. E. Ehrensperger to Steven A. Varga dated July 25, 1977.

ASTM D-1556 is an in-place test method for determining the density of soil by the sand cone method. It is the standard method for this type of application and is approved by the ANSI documents. ASTM D-2167, D-3017, and D-2937 are alternate types of in-place density tests also approved by ANSI 45.2.5-1978.

FSAR 1.9.94.2 ITEM 8

MECHANICAL (CADWELD) SPLICE TESTING

ANSI N45.2.5-1978, paragraph 6.12.4, Item 2.C, requires that one splice, either production or sister splice, be tested for the next and subsequent units of 33 splices. VEGP specifications require three test splices for the next and subsequent units of 100 splices.

VEGP specifications and Quality Control (QC) procedures meet the VEGP commitment to Regulatory Guide 1.10, Revision 1 and meet the intent of ANSI N45.2.5-1978. Specifically, VEGP QC procedures for inspection and documentation of cadweld activities require the following:

A quality control inspector, who monitors 100 percent of the cadweld operations, assigns each cadweld splice a unique number. A senior inspector subsequently chooses those splices which are to be tested from among each set of numbered splices. The senior inspector is remotely located from the site of the cadwelding activities to insure his independence when the splices are chosen. The procedures also require that this senior inspector choose the splices for testing in a random manner. The numbers of the splices identified for testing are noted in a test splice tracking log whose purpose is to document the randomness of the inspector's sampling.