UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	:	
	:	
	:	DOCKET NUMBERS
GEORGIA POWER COMPANY, et al.	:	50-424 and 50-425
	:	
	:	
(Vogtle Electric Generating Plant, Units 1 and 2)	:	

AFFIDAVIT OF NELSON BROOKS

COUNTY OF BURKE

STATE OF GEORGIA

Before the undersigned officer duly authorized to administer oaths did appear Nelson Brooks, who after being duly sworn, did state as follows:

1. My name is Nelson Brooks. My business address is: Vogtle Electric Generating Plant, Route 2, Waynesboro, Georgia 30830. I am employed by Georgia Power Company (GPC) as Civil Discipline Manager. In that position, my primary responsibility has been the direction of GPC Civil Engineering Section. I have worked on the construction of VEGP since 1977. A summary of professional qualifications is attached as Attachment "5A."

2. I make this affidavit in support of Applicants' Motion for Summary Disposition of Joint Intervenors' Contention No. 8 (Quality Assurance). I have personal knowledge of the matters stated herein and I believe them to be true and correct. First, I will describe the concrete procedures used at VEGP; with that description I will discuss the organizational responsibilities for concrete work, the procurement of concrete materials, and the documentation of placement, testing and preparation of concrete quality records. Second, I will discuss Intervenors' allegations regarding embeds in the Auxiliary Building. Third, I will discuss Intervenors' contention regarding alleged inadequate fine aggregate test sieves. Finally, I will discuss Intervenors' contention regarding alleged inadequate cadweld test procedures.

CONCRETE PROCEDURES

Organization and Responsibility

3. Georgia Power Company is responsible for the concrete design, procurement, and construction at VEGP. The Western Power Division of Bechtel is contracted by GPC to provide architect/engineering (A/E) services. Bechtel is responsible for the design of all Category 1 structures with Southern Company Services (SCS) participating in the engineering and design activities of certain nonsafety-related structures under the technical direction of Bechtel.

4. GPC employs Walsh Construction Company ("Walsh") as the general civil contractor and the batch plant contractor. Georgia Power directs and maintains technical control of the work through three departments working under the General Manager Vogtle Nuclear Construction: Field Construction Operations (coordination), Civil Engineering Section, and the Civil Quality Control Section. The administrative and schedule/budget sections also interface with the contractors but do not directly affect the quality of the work.

5. The Field Construction Operations Coordination Group directs work at Plant Vogtle and ensures work is completed in a timely manner. It interfaces with the site contractors to facilitate work flow. The lower tier coordination groups help bring field conflicts and problems to the attention of the area engineers and inform Quality Control when inspection hold points are reached. It maintains a watch for productivity and quality problems. The Site Coordination Group is responsible for survey and layout work on the project.

6. The Georgia Power Company Civil Engineering Section provides technical direction and material support for contractors performing civil work.

7. The Civil Quality Control Section implements the GPC field quality control program to verify quality compliance of field construction activities. The Civil

Quality Control ("Civil QC") Section assists the GPC Civil Engineering Section in developing and implementing procedures and instructions and verifing that field construction, erection and installation conform to approved specifications, drawings, codes, and other requirements. Civil QC personnel assist in the development of the forms, checklists, and other quality documents necessary to control activities and to demonstrate compliance with specified requirements.

8. The Civil QC inspectors inspect in accordance with established quality control procedures required by the Vogtle project quality assurance program. This includes inspection of the work documentation to verify the results.

9. Walsh performs concrete, reinforcing steel, and cadweld work in the power block structures under the controls of the GPC QA program. Walsh works with the Civil Engineering Section to resolve construction problems and to initiate change requests for drawings and specifications. They coordinate with Quality Control on work completion, acceptance, and resolution of deficiencies before the placing of concrete. Walsh receives their work sequence and direction from the coordination group.

10. Walsh is responsible for the management and supervision of the work processes to ensure compliance

with the design drawings, specifications, procedures, and schedule requirements as outlined and directed by GPC.

11. Walsh Construction Company uses the pour card to indicate the completion of each installation activity and that each activity has been performed in accordance with specifications, procedures, and design drawing requirements.

12. Between to August 1980 and April 1985, Fundamental Materials, a subsidiary of Sherman Industries, operated the two concrete batch plants at Plant Vogtle. Walsh now operates the batch plant.

Procurement of Concrete Materials

13. The component materials for reinforced concrete are procured through a series of specifications written and controlled by Bechtel These specifications are project specific for VEGP, written by Bechtel project personnel, incorporating licensing commitments and are organized to suit anticipated supplier arrangements. GPC is the purchasing agent for materials used in the construction of reinforced concrete structures and supplies these materials to tne contractors.

14. Vendor documentation requirements for each of the reinforced concrete component materials were established by Bechtel and comply with 10 C.F.R. 50 Appendix B criteria, which require that documented evidence of material and equipment conformance to the procurement

requirements be available at the site prior to installation or use of the item. The VEGP is committed to meeting the requirements of ANSI N45.2.13-76, and to Regulatory Guide 1.123, to the extent stated in Section 1.9.123 of the FSAR. In general, this takes the form of a certificate of conformance or certified mill test report.

Receipt of Materials

15. Warehouse personnel, who are part of the Construction Department, perform receipt functions. Receipt of concrete materials is governed by written procedures. The primary function of the warehouse personnel is to verify the quantities of civil material received.

16. Inspection of received materials is performed in accordance with written procedure. Concrete bulk materials, reinforcing steel, and cadweld materials are received by GPC as Q-Class (safety related) items and are used in both Q and non-Q (non-safety related) applications.

Documentation of Placement, Testing and Preparation of Quality Records

Reinforcing Steel

17. Upon receipt, GPC Civil QC inspects the reinforcing steel for acceptance. After release by Civil QC, the reinforcing steel is turned over to Walsh which either stores it in one of the designated lay down areas or forwards it for fabrication and installation.

18. The on site fabrication process is controlled by a Georgia Power Release (GPR) initiated by Walsh. Each GPR is assigned a sequential number and is logged. GPR numbers reference release numbers from design drawings which reference a particular bar list. From this Bechtel bar list the dimensions, size, and type bends of the reinforcement are obtained. The GPR is sent to the Walsh ironworker yard superintendent, who takes from stock-length bars, the needed size and length designated on the bar list and GPR.

19. Once the design bars are fabricated, a copy of the GPR is sent to Georgia Power Civil Engineering Field Office for tracking quantities and another is sent to Walsh so that the log may be closed on that particular GPR. Since the GPR program is an on-going process, it is monitored daily by the Civil QC Rebar Section. This inspection is performed and documented to ensure that reinforcing steel fabricated on site is in compliance to CRSI and Bechtel Bar List requirements.

20. Upon completion of the on site fabrication process, the reinforcing steel is identified with an identification tag bearing the size, length or mark number, as applicable.

21. The reinforcing steel is installed by Walsh in accordance with Bechtel placement drawings; GPC procedure CD-T-06 (Rebar and Cadweld Quality Control Section QC,

Placement and Inspection of Reinforcing Steel); and construction specification X2AP01 C3.4 (Placing Reinforcing Steel - Section 6, Field Operations for Placement, Splicing, and Field Bending).

22. After the installation of the reinforcing steel is complete, the Walsh craft superintendent (reinforcing steel) informs Walsh rebar engineering that the contractor's verification may be made. A reinforcing steel release is submitted to the Civil QC rebar section through GPC coordination. If the release is returned unsigned with a punch list of discrepancies, Walsh initiates rework in accordance with applicable written procedures.

23. Once the placement of all reinforcing steel has been verified by a Walsh engineer, he signs the concrete pour card. In a similar manner, the Civil QC inspector performs his final inspection to ensure that the contractor has installed the reinforcing steel in accordance with the construction specifications, site procedures, and design drawings. After he is satisfied with the installation he signs the pour card indicating acceptance of the placement.

24. The pour package, which contains all the documentation for the rebar inspection, is reviewed by the inspection supervisor, or his designee, and forwarded to the document review vault to be filed by placement number.

Cadwelds

Cadweld Installation and Testing of Cadwelds

25. The Erico cadweld splicing process is the accepted method of mechanically splicing reinforcing steel in Category 1 concrete structures. Walsh installs cadwelds in accordance with the governing procedures, specifications, codes, manufacturer's recommended practices, and Bechtel design drawings.

26. GPC site Procedure CD-T-06 governs Rebar and Cadweld Quality Control. This procedure describes the requirements for the qualification of cadweld operators; issuance of cadweld sleeves, powder, and material other than powder and sleeves; the splicing operation; and cadweld repair.

27. GPC Civil QC receipt inspectors ensure cadweld sleeves and powder are stored properly and that material is not issued until a Documentation Acceptance Report (DAR) program number is assigned.

28. The installation process is started with release of cadweld sleeves and powder to the craft by GPC Civil QC receipt inspectors. The craft store and maintain the cadweld sleeves and powder in weatherproof boxes, portable storage buildings, or enclosed trailers. This material is stored and maintained in compliance with site procedure CD-T-06. These storage areas are controlled by Walsh.

29. GPC Civil QC must be notified before the cadwelding process begins. The initial step in the cadwelding process is to cut the bar ends to be cadwelded to a planeness within 1/8" of square. The bar ends are then heated with a soot-free torch to remove any moisture and cleaned with a wire brush. Reference marks are added at equal distances from the ends. The cadweld sleeve is then checked by the operator for cleanness and is heated to remove moisture. The GPC Civil QC cadweld inspector then inspects the sleeve and bar ends for proper preparation prior to the sleeve being placed on the bar.

30. The next step in the installation process is to set the sleeve and the equipment for the ignition. The graphite equipment used (e.g., pouring basin, crucible) is also cleaned and heated to remove moisture.

31. After Civil QC Inspector accepts the equipment mounted on the sleeve, the operator checks the splice prior to casting to see if the setup is cool to the touch. If the splice has cooled, the operator reheats the entire area to ensure the absence of moisture. The removal of moisture prior to casting is related to both quality and personal safety.

32. When QC accepts the final preparations of sleeve and crucible, the filler material is placed in the crucible and ignited in the presence of the inspector.

33. It is the operator's responsibility to stencil (stamp) the cadweld he has prepared, set up, and ignited. After the operator stencils the cadweld, the Civil QC inspector visually inspects the cadweld to criteria prescribed in procedure CD-T-06 and ANSI standards and manufacturer's instructions.

34. Prior to placing of concrete, a Walsh engineer signs and dates the concrete pour card to indicate his acceptance of cadwelds in that placement. A GPC Civil QC rebar/cadweld inspector (Level II) must also sign and date the pour card indicating his acceptance of cadwelds in that placement.

Testing of Cadweld Operators

35. The contractor uses trained and certified cadweld operators. To ensure that the operator continues to demonstrate ability to perform the cadweld process, a sampling test frequency method is used.

36. A cutting torch is used to remove the test sample. The production test splice is not removed from the main body of the bar until QC has been notified. The test splice (production or sister) is then sent to the QC Laboratory.

37. The cadweld inspector records the unique sequence number of the splice taken as a test and the kind of test splice it was (production or sister) on the Cadweld Inspection Report. Upon delivery of the test splices to

the lab, the inspector logs the unique number on the Cadweld Tensile-Test Report. The cadwelds are tensile tested on a Forney Model LT 1000 testing machine by Lab QC inspectors. The results are recorded on the Cadweld Tensile Test Report and forwarded to the rebar inspection supervisor within 24 hours after delivery to the lab. This report is filed by date in the Document Review vault.

38. The Cadweld Tensile Test Evaluation is maintained by the Level II inspector in the rebar/embeds/cadweld section as a record of the running average of each operator. Information included on the report form is the test unique sequence number, date, load applied to the splice, and the average of the last 15 splices. This running average provides a method of evaluating the cadweld operators. After the report is completed, it is forwarded to the QA Records Vault where it is filed by size and position.

Batch Plant

Procedure

39. On site concrete production equipment is operated and maintained by Walsh. The site has two batch plants, each capable of producing 250 cubic yards of concrete per hour. The plants operate independently of one another with each plant having its own aggregate stockpiles, ice plant, and equipment necessary to produce quality concrete. Each plant is certified to the National

Readi-Mix Concrete Association (NRMCA) specifications every other year.

40. The mix designs are calculated by Soil and Material Engineering, Inc., to Bechtel specifications. These specifications require the selected proportion of concrete mix materials be based on trial batch results. A copy of the mix design is sent to Walsh and to GPC QC.

41. The order to batch concrete comes in two ways. The placement inspector notifies the batch plant inspector of placement release, mix required, and placement dimensions so temperature requirements can be determined. When Walsh is ready for the concrete, they notify the batch plant operator to begin batching and to batch loads at a certain interval or to wait for the field to release each load.

42. The batch plant operator enters the moisture measurements into the computer where the mix designs are stored and uses these values to calculate the desired weights for each ingredient. The computer then controls the weighing of each ingredient.

43. The batch plant computer values for each mix ingredient are compared with the weights calculated by QC to verify batching tolerances are met. During production, QC verifies the mix quantities on each batch ticket and signs the ticket.

44. When the initial load for a placement is mixed, the batch plant operator waits until the test results are received before mixing another load. Adjustments are made for temperature, slump, and air entrainment.

45. During the day a second moisture check is taken; the mix is adjusted to reflect changes in moisture content. The plant inspector can require additional moisture content if conditions warrant.

46. All concrete is batched as near 50°F as possible but not over 80°F during hot weather. During cold weather the size of the pour governs the temperature requirements.

47. The computer controls all weighing operations. Once items are weighed, the ingredients are discharged into the mixer. The sand, stone, and ice enter the mixer by conveyor belt. Water, cement, flyash, and admixtures enter the mixer directly from pipes. The ingredients are mixed for a minimum of 60 seconds. This time is verified to be adequate by the ASTM C-94 mixer uniformity tests. Once the mixing is complete, the concrete is discharged into a truck.

48. Plant Vogtle also has concrete mix designs containing a superplasticizing agent (Melment L10A). Superplasticized concrete was used in the placement of thin, heavily reinforced sections.

Batch Plant Inspections

49. Batch plant inspectors are trained and certified. Prior to producing concrete, the batch plant inspector for each shift conducts a walk down inspection of the plant area and documents the results on the batch plant inspection checklist. When the walk down inspection is complete, the inspector notes on the form the time the plant was ready for production. In addition, the batch plant inspector documents that aggregates have been tested for moisture to establish initial conditions and computer parameters have been entered properly.

50. If concrete production is shifted from one plant to another during a shift, the second plant is also inspected before batching. If production is ongoing during a shift change, the inspector coming on duty performs his walk down inspection before relieving the working inspector.

51. During concrete production, the concrete inspector monitors the batching operation for the current aggregate and sand moisture contents and batch size, calculates the required mix proportions and tolerance limits, and compares the calculated values to every batch ticket. If the concrete is acceptable, he signs the ticket and gives it to the truck driver who transfers it to the inspector logging trucks at the field testing station. If the concrete is not within specified

tolerances, the inspector rejects the batch which is then sent to be wasted or to be used in some non-plant area such as dunnage logs. The inspector notes the reason for rejection on the batch ticket.

52. The inspector monitors the scales to ensure the return tare is within the allowed tolerances. The batch plant inspector assures that moisture samples and gradation samples are taken as required. The gradation tests are run once daily if less than 200 cubic yards of concrete are produced, or twice daily if more than 200 cubic yards of concrete are produced. The batch plant inspector notifies lab personnel when production is beginning and when the second gradation is required. The moisture contents are taken before production starts. If a containment shell placement is being made, the lab is notified of the need for a second moisture test. When the results of the test are received, they are reported to the batch plant operator who enters them into the computer. The inspector also modifies his inspection card with the new batching tolerances. The batch plant inspector may request a moisture test when field testing indicates a need.

53. The batch plant inspector responds to field testing results by working with the plant operator to adjust temperature, slump, and air entrainment to preclude

field-rejected concrete. The batch plant inspector ensures requirements for use of Melment are met.

54. At the end of the shift, the batch plant inspector completes the Daily Production Report. This report notes which pours were batched, the mix used, the amount of rejected concrete, where the concrete was rejected (plant or field), which plant produced the concrete and it identifies the inspector. These records are forwarded to the document review vault for filing.

Preplacement

55. Preplacement activities include the setup of the placement (i.e., running pump lines, obtaining pour buckets, etc.,) and the cleaning of the placement. The Walsh area superintendent notifies the concrete foreman that the placement is ready to be set up. The Walsh concrete foreman supervises installation of the pump line.

56. The contractor provides weather protection when needed. A wall placement may be covered with a plastic roof to protect the top of the pour. A portable metal shed may be used to cover the pump to protect the hopper.

57. When these preparations are complete, Walsh begins the final cleanout. This cleanout is normally accomplished with compressed air and water blowing trash and dirt out through cleanout ports in the bottom of the forms. A construction joint may require washing to remove detrimental material.

58. Construction joints are normally inspected by a Civil QC inspector prior to the installation of reinforcing steel and forms. He notifies the area coordinator if additional work is needed. Preliminary joint acceptance may be noted on the back of the pour card. The final acceptance is noted by signing the pour card in the designated block.

59. During the erection of forms, where there are large blockouts and rebar congestions, a Civil QC inspector works with the Walsh superintendent and GPC coordinator to ensure that necessary pour pockets are installed. The Civil QC inspector may request additional vibration ports as well as plexiglass panels.

60. When the contractor signs the pour card, Civil QC begins the preplacement final inspection. Civil QC is responsible for inspection of foundation preparation, reinforcing steel, cadweld, and embeds. Foundation preparation is signed by a civil soils inspector when the placement is on backfill, by a civil structural inspector when it is placed on Q-decking, or a civil concrete inspector when it is placed on conventional forming or a mud mat (a mud mat is a non-Q concrete work surface which is poured to separate the Q concrete from a dirt base.).

61. The Civil QC inspector inspects the forms to ensure they are clean and tight and verifies that holes are patched. He inspects the water stop for cleanness,

continuity, proper embedment, punctures, and clearance from rebar. He ensures all reinforcing steel and other embedded items are properly secured to prevent movement during placement. The inspector gives final approval of the construction joint and inspects the placement set up at this time.

62. The final inspection is for placement cleanout. After work and adjustment is complete, the inspector ensures that debris such as mud, sawdust, wire, and water have been removed and all rebar and embed surfaces are cleaned of material which could adversely affect the bond. This final clean out is accomplished with compressed air and water.

63. The preplacement inspection by Civil QC must be verified if the placement is not started within 24 hours of sign off. Before placement of concrete may begin, the inspector must sign the pour card to signify that the pre-placement inspection is complete and accepted. The inspector also enters, below his signature, the procedure number and the revision that governs the inspection.

Placement

64. The placement inspector releases the concrete for batching after the area engineer signs the pour card, the testing station is in place, and inspectors are available to man the pour. The placement inspector notifies the

batch plant inspector to release the placement for batching.

65. Batched concrete is transferred to trucks for delivery to the placement. VEGP uses non-mixing trucks. Removable covers can be attached to the truck for rain protection.

66. The Civil QC inspectors for placement inspection are qualified and certified. Their duties are outlined in procedure CD-T-02.

67. Before placing begins, and when weather conditions so dictate, the temperature of the placement is verified. During cold weather placement, the inspector ensures that the temperature of surfaces contacting concrete is at least 35° and rising. When necessary, the contractor heats the placement. During hot weather placement, the inspector ensures the temperature of surfaces contacting concrete does not exceed 120°. When necessary, the contractor sprays the placement with water before placing begins and continues as necessary until the placement is complete. The guides for determining hot weather conditions are in ACI 305 and guide for cold weather conditions are in ACI 306. The switch from cold weather concreting to hot weather concreting, and vice versa, is made when conditions as described in ACI standards are met.

68. Placement inspection is conducted in two phases: testing fresh concrete and witnessing its placement. When

trucks arrive from the batch plant, the Civil QC inspector receives the batch ticket from the driver, checks the ticket for the proper pour number and mix, and ensures that the truck is bearing a card on its bumper that designates the proper concrete strength; e.g., 4000, 5000, 6000 psi. The inspector then logs the load on the Concrete Placement Pour Log. Concrete may be taken from the truck for testing.

69. The slump test is performed in accordance with ASTM C-143. The acceptance criteria are shown in specification X2AP01 C3.6, Table II. The air content test is performed in accordance with ASTM C-231 using a type B meter. Temperature is checked to ensure that concrete does not become excessively hot because of hydration during hot weather or lack heat for strength development during cold weather.

70. The first truck for each placement has the slump, air entrainment, and temperature tests performed by the fresh concrete testing crew. The fresh concrete testing inspector notifies the batch plant inspector of the results, verifies the mix, and logs the results on the Concrete Pour Log. These three tests are performed for every 50 cubic yards of concrete placed and recorded on the Concrete Pour Log. If any test shows the concrete fails to meet the applicable requirements, the truck load

is rejected, the reason for rejection noted on the Concrete Pour Log, and the batch plant inspector notified. After the required tests are performed, the fresh concrete testing inspector signs the batch ticket, notes the reason for any rejection, and retains the ticket.

71. The fresh concrete testing inspector visually inspects each truck load as it is being discharged. If the concrete appears to be questionable, the inspector requires it to be tested. The QC fresh testing inspector obtains and sends samples of concrete to the laboratory for the casting of cylinders and compression tests for each 100 cubic yards of concrete placed.

72. Bechtel specifications require sampling at the point of pump line discharge unless a correlation test is in effect. Such correlation tests have been used at VEGP since September 1980. The fresh testing inspector performs concrete correlation tests on placements where pump lines are used. Correlation tests measure physical changes that occur due to the effects of pumping.

73. A correlation test is performed at the beginning of the placement so that the results of tests taken at the truck discharge and the results of tests taken at the pump line discharges may be compared. Concrete normally loses slump and air content during pumping. The correlation test enables an appropriate adjustment of working and rejection limits.

74. Correlation results must be verified for every 200 cubic yards of concrete placed. If the original limits are exceeded at the placement point, correlation strength tests are performed every 100 cubic yards until the concrete at the placement is within tolerances. The correlation strength tests involve taking correlation test and compression test samples at the truck discharge and tne pump line discharge. Temperature readings are also recorded during correlation testing.

75. The placement inspector verifies proper placing and consolidation of concrete. If the inspector notes discrepancies during a placement, he brings them to the attention of the craft foreman who makes corrections. The inspector has the authority to stop work or issue a Deviation Report.

76. The placement inspector verifies that finishers apply the specified finish. The inspector documents acceptance of the finish on the Concrete Post-Placement Report.

Post-Placement

77. Concrete is finished in accordance with Procedure CD-T-02, drawing AX2D94V019, and the various finish schedules for each building. The most common finishes for interior slabs are steel trowel and bristle brush. Outside slabs most often receive wood float finishes. The concrete finishers slope the concrete to the drains.

78. Civil QC inspectors who conduct post placement inspections are qualified and certified. Their duties are governed by procedure CD-T-02, Sections VII and VIII.

79. The post-placement inspection activities are started after the concrete finish is applied and continue until repairs are complete, forms are removed, and curing is complete. When a placement is complete, the inspector prepares a Concrete Post-Placement Report which tracks and documents the post placement activities and specifies the curing method and repairs. Reports for each placement number are maintained by the civil QC concrete section until completed and transferred to the QA Records Vault.

80. The Civil QC inspector signs the Form Release before form-work is removed from a placement and ensures that removal of forms is in accordance with written specifications.

81. The inspector ensures that the curing method used is in accordance with procedure CD-T-02, and specification X2AP01 C3.2. The water curing method or the Symons liquid curing compound is acceptable except in the Containment Building where only water curing is used.

82. The inspector verifies the curing conditions each day and records general weather conditions, the average ambient temperature, and, during cold weather, the concrete surface temperature. When water curing is used, he ensures the placement is kept wet for seven days. When

curing compound is used, he notes the date of application on the inspection form. During cold weather the temperature of the concrete is monitored for a minimum of three days.

83. The post-placement inspection determines whether repairs are necessary. The inspector ensures that imperfections and voids are identified and repaired in accordance with specification X2AP01 C3.2.and procedure CD-T-02.

Laboratory Inspection and Testing

84. Tests and inspections of concrete and its constituent materials are performed in the laboratory by GPC civil lab inspectors or by independent laboratories contracted by GPC.

85. The Civil QC inspectors who conduct laboratory functions are qualified and certified. Their duties are governed by procedure CD-T-02, Sections V and VIII along with specification X2AP01 C3.6. Testing methods contained in Procedure CD-T-02 are derived from ASTM. Laboratory personnel receive, inspect, and sample aggregate, cement, flyash, and admixtures. They review the test reports from the independent laboratories and verify conformance to the specification and generate Deviation Reports on any nonconforming material. A Level II inspector reviews all test reports for acceptance and generates Deviation Reports for deviating conditions.

86. ..e laboratory inspectors receive fresh concrete samples from the placement which are tagged with the pour number, batch, sampling point, and mix. The lab inspectors make four compressive strength test cylinders in accordance with ASTM C 31 for each 100 cubic yards of concrete placed. One cylinder is made for a seven day break, two cylinders are made for the acceptance test (28 or 91 days), and one for a spare. Cylinders are stripped and numbered for record keeping with an identifier for batch plant, mix, and sequence.

87. The cylinders are placed in the moisture curing room controlled by the laboratory inspector and cured in accordance with ASTM C-31. The temperature and humidity of the room is monitored daily. These conditions are documented on the Moisture Curing Room Monthly Report. The inspector checks the specimens daily to verify they are moist. The lab inspector performs the compressive test for concrete cylinder specimens. When the concrete is 7 days old, one test cylinder is removed from the moisture room, capped in accordance with ASTM C-470, and tested in accordance with ASTM C-39. The acceptance criteria are determined by Bechtel in specification X2AP01 C3. These tests are recorded on the appropriate QC form. Any concrete test specimens which do not meet the acceptance criteria are reported on a Deviation Report. The one extra cylinder from each test batch of four is

discarded if the concrete has met design strength. It is held for disposition of the Deviation Report if the concrete breaks below the acceptance strength level.

88. The lab inspector prepares a daily unit weight test for each mix design batched, in accordance with ASTM C-138.

89. The lab inspection supervisor sends a weekly report on the concrete cylinder strength breaks to GPC Engineering in Atlanta where a monthly Concrete Strength Statistical Analysis Report is prepared. The report is prepared and evaluated in accordance with ACI 214, Recommended Practice for Evaluation of Strength Test Results of Concrete. This report is reviewed by the batch plant civil area engineers who take any necessary corrective action and forward the report to the QA Records Vault for filing by title and date.

90. The laboratory is also responsible for moisture tests on the aggregate. At the beginning of the day QC inspectors obtain samples of both sand and stone from the conveyor belts leading to the plant storage bins. Stone moistures are first determined using a pan-dry test (to give quick results) and then an oven-dry test. Sand moistures are initially determined using a Chapman flask and then by an oven-dry test. The moisture test is performed according to ASTM C-566. The test is performed

twice daily as required by procedure CD-T-02 for containment shell pours. On other placements, it is required once a day or twice a day if more than 200 cubic yards of concrete are produced. The moistures are recorded on the appropriate QC form. The inspector notifies the batch plant inspector of the test results from the stone pan-dry test and the sand Chapman flask test. The oven-dry test results for stone and sand are correlated with the pan-dry test and Chapman flask results for accuracy.

91. Gradation tests are also run on the sand and stone samples in accordance with ASTM C-136, Standard Method for Sieve Analysis of Fine and Coarse Aggregate.

92. The fineness modulus is calculated for fine aggregate samples and checked using ASTM C-33 and specification X2AE02. These tests are recorded on the appropriate QC form. The fineness modulus results are also recorded.

93. The inspectors perform tests daily for aggregate material finer than No. 200 sieve (wash 200 test) in accordance with ASTM C-117 and verify test results with the acceptance criteria in ASTM C-33. An organic impurities test is run daily on aggregate in accordance with the method and acceptance criteria in ASTM C-40. A specific gravity and absorption test is run monthly in accordance with A8SM C-127 for coarse aggregate (stone) and C-128 for fine aggregate (sand) and results are

verified with the acceptance criteria in specifications X2AE02 and X2AE03. If aggregate fails any of these tests, a Deviation Report is written.

94. The lab inspector also tests mechanical splices (cadwelds). The cadweld inspectors forward the splices to the lab for testing. The inspector uses a Forney Model LT1000 testing machine to tensile test cadweld splices, documents the test results on the Cadweld Tensile-Test Report, and returns the report to the rebar inspection supervisor within 24 hours. The rebar inspector verifies the test results with the minimum tensile strength requirements outlined in procedure CD-T-06, Section V.G.14 through 16. Failures are reported to the GPC field Civil Engineering Section and the splicing operation is stopped until an evaluation is made for the cause of failure.

EMBED ASSEMBLIES IN THE AUXILIARY BUILDING

95. Intervenors challenge various aspects of the embed assemblies in the auxiliary building and the control building. This is a situation which first became known as a result of VEGP QC inspections. This was not a violation identified by NRC inspections, and no deviation or violation has ever been found by the NRC with regard to this situation.

96. The problem alleged by Intervenors with regard to embed assemblies has now been resolved. To understand the problem, it must be understood that an embed assembly is a

metal plate which has bolts or studs on the back which are embedded in the concrete. The embed is placed into the concrete wall with the face of the metal plate exposed. The purpose of the embed is to allow welding of supports or miscellaneous steel to it. The nuts and washers which are referred to in the description of the deficiency are located on the studs on the back of the plates, and they are embedded into the concrete to serve as load-bearing members of the embed Plate. In order for the nut to be considered fully engaged, a minimum number of threads must be incorporated by the nut. The bolts and the washers must be tack-welded in place so that they do not move during concrete placement. The washer in combination with the nut serves as an anchor to the stud which holds the embed into the concrete wall. During installation, the bolts or studs on the back of the embed plate occasionally must be bent to avoid interference with reinforcing steel. The stud is not to be bent beyond a certain specified angle.

97. The problem concerning embeds was first identified by Georgia Power Company quality control inspection personnel who noted the problems on deviation reports. Pursuant to standard procedure, these were sent to Bechtel for disposition and justification.

98. A large number of embed plates had already been installed. In order to test the competence of the embed

assemblies, Georgia Power Company and Bechtel developed a testing method to exert a pulling force on the embed plates in order to determine whether they were capable of carrying their designated loads. Those plates which were able to carry their designated loads were accepted as is; the others were either derated or abandoned as appropriate. Depending upon the amount of design loads that it was determined they could carry, the design documents were also revised to reflect the reduced load carrying for these embeds and to indicate that they had been derated.

99. As a result of the licensee identified items regarding embeds, the NRC regional inspectors monitored the evaluations and the corrective actions. A final report was issued by Georgia Power Company to the NRC on November 21, 1979. The particular problems with the embed assemblies which were discussed in that report were resolved by corrective action. Georgia Power Company's embed plates are now in compliance with design requirements, and the quality of those embed plates is assured.

100. The second licensee identified item relating to the embeds involved the load capacity tables used for the embed plates. These were design documents that failed to include criteria for lateral loads on the embed plates. This item was initially reported to the NRC verbally by

telephone conversation in January of 1980. The first written report was submitted to the NRC on December 28, 1980. After investigation and after corrective action was taken to resolve the problem, a final report was submitted to the NRC on January 23, 1980 and the matter was closed.

101. A third licensee identified problem relating to the embeds was reported verbally to the NRC on February 22, 1982. This item dealt with the use of derated and abandoned embeds resulting from the initial evaluation. It was determined that contractors were using the derated and abandoned embeds for attachment of construction aids without appropriate approval. This first written notification was submitted to the NRC on March 25, 1982 and the final report was submitted on April 21, 1982. These reports delineate the investigations which were conducted and the corrective actions which were taken to resolve the problem. The corrective actions included regular periodic monitoring of the use of embed plates.

102. A fourth embed related licensee identified item involved the failure to adequately control the corrective action set forth on April 21, 1982. Quality control personnel failed to adequately monitor the use of derated or abandoned embeds. This was initially reported in a telephone conversation to the NRC on April 26, 1982. The first written notification was submitted on May 25, 1982 and a final report was submitted on July 1, 1983. This

report of July 1, 1983 sets forth the scope of the problem, the investigation and the corrective action planned. The most significant corrective action in this instance was to remove all abandoned embed plates from the concrete. It also required identification of all derated embed plates on the design drawings and to require design approval for the use of any derated embed plate.

103. As a result of the effective of quality control inspections and QA audits at VEGP, the problems involving embeds were identified. Proper investigation was conducted and corrective action was accomplished to assure that the embeds would safely perform their essential tasks.

FINE AGGREGATE TEST SIEVES

104. Joint Intervenors have alleged as part of their contention regarding inadequate testing procedures that "fine aggregate test sieves failed to meet the requirements" of 10 C.F.R. Part 50. This situation was identified in I&E Report 79-1 when NRC inspectors visited VEGP between January 10-12, 1979. The inspectors observed work at the concrete testing laboratory. They determined that procedure CD-T-02 (concrete quality) and the referenced ASTM standard C-136 required that sieves used for grain size analysis conform to ASTM standard E-11. Discussions with responsible engineers indicated that the sieves used for grain size analysis for fine aggregate were not verified for conformance to ASTM standard E-11.

105. A test sieve is a screening device. When concrete materials are passed through the screen, a certain percentage of materials are to be caught by each screen. The ASTM standard 11 gives the percentages that have to remain in the sieve and not pass through it and determines whether the percentage retained qualifies for ASTM standards.

106. All of the sieves used at VEGP, even those before this infraction was found, were ASTM qualified sieves. However, they were not traceable to National Bureau of Standards and VEGP did not have a documented program for periodically verifying that the sieves maintained appropriate screening capacity.

107. In response to the NRC infraction, VEGP obtained a set of test sieves from the National Bureau of Standards to use as a master. The program was adopted to periodically compare the sieves being used with the master set which have been obtained from the National Bureau of Standards. If they are still in good working order, the sieves will continue to be used. If not, they will be replaced.

108. In a subsequent inspection by the NRC on July 24, 1979, the inspectors witnessed the first set of calibration operation after GPC had received from the National Bureau of Standands the appropriate master test sieves. The first calibration showed that the sieves which had

been previously used by Georgia Power Company were, in fact, adequate to meet the ASTM standands. Based upon the corrective action which had been adopted by Georgia Power Company and the results of this recalibration, the NRC closed the infraction in I&E Report No. 79-13 issued August 8, 1979.

109. It may be noted that the underlying I&E Report 79-1 also identified a "unresolved item" relating to batch plant calibration records. Arguably, this incident is relevant to the inquiry into VEGP concrete testing and maintenance of test records. Aside from the fact that this was not a violation, but merely an unresolved item, this matter was closed in I&E Report 79-5 on April 10, 1979 when the inspector was satisfied that metering devices were calibrated at three month intervals. This was not an infraction, noncompliance or violation found by the NRC.

CALDWELD TESTING PROCEDURES

110. Intervenors challenge a prior practice of Cadweld inspections. This incident was noted by an NRC inspector in I&E Report 82-26. This followed an inspection on October 26 - 29, 1982.

111. During that NRC inspection the inspectors noted that GPC procedures for testing Cadwelds did not identify the appropriate number of test cycles for each Cadweld crew. At the time this inspection occurred, Georgia Power

Company interpreted Reg. Guide 1.10 as requiring testing cycles for the "crew" which GPC defined all construction craft personnel performing Cadwelds under the direction of a QC inspector. Thus, each inspector was said to have a "crew" even though the individuals within the "crew" might change from day to day. The NRC inspector suggested that "crew" be defined as the five or six specific individuals who were actually doing Cadwelds in a particular area.

112. As a result of this inspection report, Georgia Power Company redefined its definition of "crew" as suggested by the NRC inspector. Georgia Power Company's corrective actions were subsequently reviewed by the NRC during I&E inspection 83-04 and the deviation was closed at that time.

113. The particular problem noted in I&E Report 82-26 was not whether the Cadwelds were proper or even whether there were appropriate number of tests being performed. The problem was merely one of redefining the cross-sectional basis for these tests. When that was accomplished, the matter was closed out. It posed no safety problem to the plant.

Further Affiant sayeth not.

NELSON BROOKS

Sworn to and subscribed before
me this 7th day of June, 1985.

Notary Public
My Commission Expires 6/2/86

L. N. Brooks
Civil Discipline Manager
Georgia Power Company
Construction - Nuclear

Affiliations

American Society of Civil Engineers
President - Augusta Branch 1983
Board of Directors - South Carolina Section 1984

American Welding Society
Certified Welding Inspector

Georgia Engineer in Training - EIT 6039

Education - Bachelor of Civil Engineering
Georgia Institute of Technology - 1975

Plant Vogtle

1985 to Present Civil Discipline Manager

Responsible for the performance of the Civil/Structural and HVAC subcontractors at the Alvin W. Vogtle Nuclear Plant. Effort consists of two major and ten to fifteen minor subcontractors.

Provide direction and technical review for GPC and subcontractor engineering personnel. Assure Civil Structural/HVAC effort meets requirements of Architect Engineers' drawings and specifications as well as governing codes and regulations. Engineering personnel are responsible for preparing work procedures to implement those requirements. Responsible for resolution of interferences/restraints encountered by subcontractor craft personnel.

Responsible for subcontractors budget and schedule performance. Approve manual/nonmanual staffing levels and overtime. Provide periodic budget and scheduling forecast to Cost/Schedule section. Devise and implement productivity improvement plans. Approve material procurement and monitor inventories to assure orderly construction within budget constraints.

1983 - 1984 Civil Project Section Supervisor

Provided engineering support required to assure subcontractors efforts were within quality, schedule and budget guidelines.

Responsible for the technical direction, support and evaluation of 45 to 80 engineers and supervisors. Primary interface with Architect Engineer for resolution of drawing and specification problems. Approved all Civil Structural and HVAC work/inspection procedures.

Prepared specification/scope definition for specialty contracts. Evaluated proposals for award. Same material procurement responsibilities as above.

Supervised the GPC Civil Engineering Section interface with all project departments.

1980 - 1983 Assistant Project Section Supervisor

Assisted the Civil Project Section Supervisor with the responsibilities described above. This position was more involved with day to day details than the Project Section Supervisor. Devoted much time to employee training, evaluation, and progressive discipline. Supervised seven engineering supervisors.

1979 - 1980 Engineering Supervisor

Supervised six to ten engineers. Engineers responsible for Containment and Turbine buildings, River Facilities, Structural and Miscellaneous Steel fabrication and erection. Wrote work/inspection procedures for Civil Structural activities.

1977 - 1979 Civil Area Engineer

Resolved all technical and coordination problems for Civil Structural subcontractors in assigned areas. Provided first line engineering support. Major areas were as described above. Generated field changes for Architect Engineer approval. Reviewed drawings for conflicts and work sequencing.

Plant Hatch

1975 - 1977 Civil Area Engineer

Duties similar as described above.

Civil Discipline Scheduler

Developed minor schedules for specific work activities of Civil subcontractors.

1970 - 1975 Georgia Tech — Numerous jobs while attending college. Wide range of assignments with varying degrees of responsibilities.

1968 - 1970 Athens High School — Winn Dixie Food Stores

Fulfillments

- Established miscellaneous steel fabrication control program in 1978 which, though repeatedly audited, is essentially unchanged today.

- Supervised resolution of major Project Expansion Anchor program deficiency. Established expansion anchor procedures which have been adopted by site subcontractors.

- As Assistant Project Section Supervisor assumed first line engineering responsibility for water proofing of Auxiliary Building north wall.

- Removed all engineering personnel who did not respond to performance enhancement methods. Transferred ten high achieving engineers to other disciplines without impacting Civil Structural effort. Five of those engineers are now supervisors. Take personal pride in employee development and performance.

- Civil Structural effort at Plant Vogtle is consistently on schedule and under budget.

- Organized the first successful consolidated engineering effort at Plant Vogtle by aligning the efforts of GPC, HVAC Contractor, and Bechtel engineers. This alignment was proceduralized and eliminates previously redundant activities.

- During 1984, by working closely with new aggressive subcontractor management, improved HVAC production rates by over 50% while reducing the unit rate by over 10%.

Personal — Born July 10, 1952, in Gainesville, Ga.; married, one baby girl; 6'-4", 210 pounds, excellent health.