A-89
12/8/83

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DUKE POWER COMPANY, et al.	)	Docket Nos. 50-413
	)	50-414
(Catawba Nuclear Station, Units 1 and 2)	)	

TESTIMONY OF MICHAEL C. GREEN

Q. STATE YOUR NAME.

A. Michael C. Green

Q. BY WHOM ARE YOU EMPLOYED?

A. Duke Power Company, 422 South Church Street, Charlotte, North Carolina 28242.

Q. WHAT IS YOUR POSITION WITH THE COMPANY?

A. I am Supervising Design Engineer with the Design Engineering Department. A copy of my resume is included as Attachment A.

Q. DESCRIBE THE NATURE OF YOUR JOB.

A. I supervise a group of engineers responsible for analyses and designs of various buildings and structures at Catawba.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the differences in design and characteristics between the current Catawba spent fuel pools and the original spent fuel pools as described in the PSAR.

Q. WHICH BUILDING AND STRUCTURES AT CATAWBA COME WITHIN YOUR RESPONSIBILITY?

A. Auxiliary Building, Diesel Generator Buildings, New and Spent Fuel Pool Buildings, Auxiliary Service Building, Main Steam Doghouse Structures, Upper Head Injection Buildings, Steam Generator Drain Building.

Q. PLEASE DESCRIBE THE PERTINENT CHARACTERISTICS OF THE ORIGINAL SPENT FUEL POOLS AS SET FORTH IN THE PSAR.

A. Originally, the fuel pools were each to be "L" shaped with a 12'-10" width on the west end and a 20'-1" width on the east end. The overall length of each pool was to be 56'-3½". The bottom elevation of each pool was to be at elevation 558+6" with the top of the water under normal operating conditions to be at elevation 598+4 3/4". The original pool layouts would have accommodated 281 spent fuel assemblies in each pool. The spent fuel assemblies would have been spaced 21" center to center. The original design of the spent fuel pool is depicted on the attached PSAR figure 9.1.1.-2.

Q. DID YOU SUBSEQUENTLY MODIFY THE STORAGE CAPACITY OF THE SPENT FUEL POOLS?

A. Yes. The storage capacity of the spent fuel pools has been modified twice since originally designed. First, the spacing of the spent fuel assemblies was modified from 21" to 13½" center to center. This spacing, using the originally sized spent fuel pools, but different storage racks (i.e., more closely spaced racks) would have accommodated 664 assemblies per pool. Subsequently, when the overall size of the spent fuel pools was increased, the storage capacity of the spent fuel pools was correspondingly increased to 1418 assemblies per pool. The spacing of the assemblies remains 13½" center to center.

Q. HAS THE SIZE OF THE ORIGINAL SPENT FUEL POOLS BEEN MODIFIED?

A. Yes. The final layout of the spent fuel pools is shown on FSAR figures 9.1.2-2 and 9.1.2-3. The basic shape of the fuel pools remains "L" shaped, with the overall length of the pools increased.

While the overall length of the pools as originally designed was approximately 56', the current pools have an overall length of slightly over 119' each.

The widths of each pool vary only slightly from the original concept. The current pools are 12'-9" wide on the west end and 21'-6" wide on the east end (compared to original concept widths of 12'-10" and 20'-1").

The bottom elevation of each pool remained at elevation 558+6 as originally planned and the water elevation in the final layout remained at 598+4 3/4". Thus the depth of the pool remains the same.

Q. DO THE ANALYSES PERFORMED ON THE SPENT FUEL POOLS, WHICH ARE SET FORTH IN THE FINAL SAFETY ANALYSIS REPORT (FSAR), UTILIZE THE ENLARGED DESIGN (I.E., 1418 ASSEMBLIES PER POOL)?

A. Yes. All analyses and designs pertaining to the buildings and storage racks set forth in the FSAR utilize the expanded building size and closer rack spacings.

Q. WHAT EFFECTS DO THE ENLARGED POOL AND CLOSER SPACING HAVE ON THE STRUCTURAL INTEGRITY OF THE SPENT FUEL POOL BUILDINGS?

A. The height of the building, and depth of water contained therein, has not changed from the original concept. Therefore, the bearing pressure on the concrete foundation and rock below which results from the water depth is not any greater with the expanded design than what would have existed with the original concept.

The closer fuel spacings will increase bearing pressure on the foundation. However, the effect on the foundation is insignificant.

The total weight of one of our existing storage racks loaded with assemblies is 119,135 lbs. (This assumes use of heavier B&W fuel. The total weight of a loaded rack would be 115,571 lbs. if full of Westinghouse assemblies.) Each rack has four legs, so the weight on each leg is approximately 30,000 lbs. (This is dry weight, so the figure is conservative.) This 30,000 pounds results in a maximum shear stress on the foundation of 24 pounds/square inch. If similar racks were used with 21" spacing center to center, the approximate shear stress on the concrete foundation would be 11 pounds/square inch. The capacity of the 4 foot thick foundation is 109 pounds/square inch. Thus the increase in shear stress is insignificant.

I hereby certify that I have read and understand this document, and believe it to be my true, accurate and complete testimony.

Michael C. Green

Sworn to and subscribed before me
this 29th day of September, 1983.

Margaret D. Henderson
Notary Public

Commission Expires April 26, 1988

Attachment A

MICHAEL CHARLES GREEN

PERSONAL: Home Address: 6019-104 Lake Forest Drive
Charlotte, NC 28212
Telephone: (704) 535-0654 (Home)
(704) 373-7119 (Office)
Age: 33 Height: 6'-0" Weight: 205 lbs.

FORMAL EDUCATION: University of Tennessee: BSCE, 1972

PROFESSIONAL ACTIVITY:
Registered P.E. in North Carolina - #7993
Member ASCE
President Elect - N.C. Section of ASCE 1982-1983
Vice President - N.C. Section of ASCE 1981-1982
President - Southern Branch of N.C. Section of ASCE 1980-1981
Vice President - Southern Branch of N.C. Section of ASCE 1979-1980
Chairman of Membership Committee - Southern Branch 1978-1979
Chairman of Seminar on Hydro Electric Pump Storage - Joint Power Generation Conference - St. Louis 1981

ADDITIONAL TRAINING:

TECHNICAL

1) Various STRUDL/DYNAL Seminars
2) Foundation Engineering Seminars
3) Geotechnical Seminars
4) ACI Code Seminars
5) Tornado Missile Impact Seminars (ASCE Structural Convention)
6) Engineering Economics Seminars

MANAGEMENT SEMINARS

1) Aberrant Behavior Training
2) Controlling Absenteeism
3) Effective Interviewing
4) Effective Management
5) Management Development
6) Advanced Management Development
7) Productivity Seminars
8) Time Management
9) Space Allocation
10) Interviewing Techniques

WORK EXPERIENCE: (All with Duke Power)

FROM	TO	TITLE	PROGRAM
6/76	Present	Assistant Design Engineer (6/76 to 6/78) Supervising Design Engineer (6/78 to Present)	Oconee Nuclear Station Catawba Nuclear Station Bad Creek Project

In charge of engineering subgroup responsible for the structural analysis and design of various aspects of the Oconee Nuclear Station, Catawba Nuclear Station, and the Bad Creek Pumped Storage Facility.

Oconee

In responsible charge of the intial analysis and design of the Standby Shutdown Facility. The responsibilities included the preparation of the excavation

FROM	TO	TITLE	PROGRAM

6/76 Present (continued)

specification (which included blasting near the operating Reactor Building) as well as the static and dynamic analyses of the structure itself.

Catawba

The responsibilities at Catawba included the structural analysis and design of the Auxiliary Building, the Spent Fuel Pool Buildings, the New Fuel Buildings, the Diesel Generator Buildings, the Upper Head Injection Buildings, the Auxiliary Service Building as well as various yard structures. Analysis requirements included both static and dynamic considerations, including earthquake, tornado missile impacts, pipe whip and jet impingements. Responsibilities at Catawba also included the analysis and design of various internals to the above mentioned buildings; i.e., Spent Fuel Storage Racks, New Fuel Storage Racks, various equipment supports, and miscellaneous platforms, etc...

Duties required by these responsibilities include the development of calculations, specifications, and drawings as appropriate. Duties also included vendor contact, interfacing with the NRC regarding the licensing effort as well as the day-to-day interfacing with Construction Department personnel.

Bad Creek

The responsibilities of the subgroup regarding the Bad Creek Project center primarily on the underground configuration of the intake, tailrace and access tunnels as well as the powerhouse chamber orientation. A "pilot" tunnel was driven to determine characteristics of the rock, with the results of these tests being used in the final design of the underground excavation.

Other duties pertaining to Bad Creek included the overall department scheduling, annual cost estimate preparation, and interfacing with the FERC in the licensing efforts.

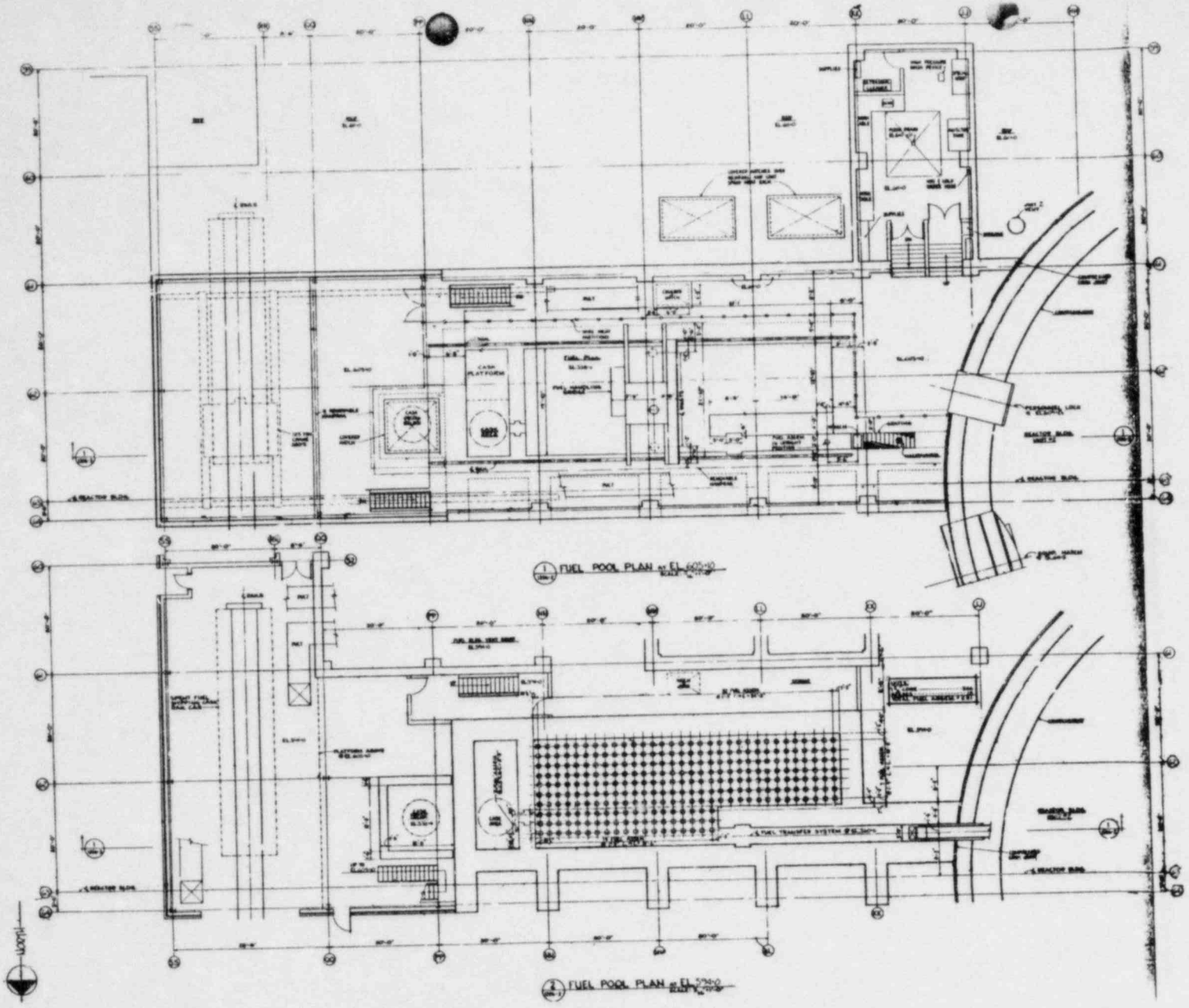
Supervise from 7 to 14 engineers in this time period.

12/73	6/76	Engineer Associate	Catawba

Responsible for the analysis and design of specific items pertaining to the Catawba Nuclear Station. Designs included: a) Groundwater drainage system; b) Frame analyses of the Auxiliary Building; c) Dynamic amplification factor determination from pipe whip transients; d) Miscellaneous equipment supports, stairs, platforms, etc.

6/72	12/73	Junior Engineer	Belews Creek

Responsible for various designs relating to the Belews Creek Coal Fired Station including: a) Transformer bases; b) Switchyard bases; c) Conduit Manholes; d) Sewage Treatment Structures; e) Fuel Oil Storage Area; f) Miscellaneous Equipment Supports.

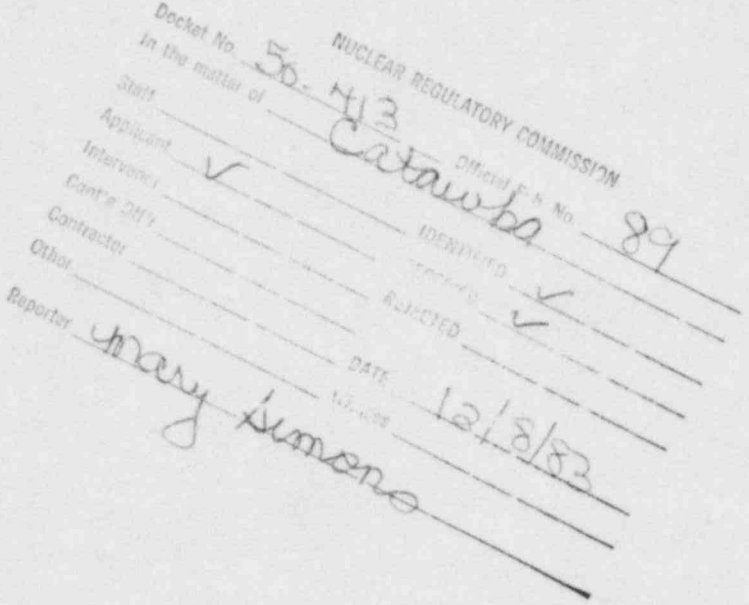


FUEL POOL GENERAL ARRANGEMENT

CATAWBA NUCLEAR STATION

PSAR Figure 9.1.1-2

Amendment 7
(NEW)


NUCLEAR REGULATORY COMMISSION
Docket No. 50-413
In the matter of Catawba
Official Exh. No. 89
Staff
Applicant ✓
Intervenor
Cont'e Off'l
Contractor
Other
IDENTIFIED ✓
RECEIVED ✓
REJECTED
DATE 12/8/83
Reporter Mary Simons