UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
SOUTH CAROLINA ELECTRIC & GAS COMPANY, et al.	)	Docket No. 50-395 OL
	)	
(Virgil C. Summer Nuclear Station)	)	

AFFIDAVIT OF MICHAEL D. QUINTON
REGARDING THE V. C. SUMMER NUCLEAR STATION
STEAM GENERATORS

Michael D. Quinton, being first duly sworn according to law comes forward and states:

My name is Michael D. Quinton. I am employed by South Carolina Electric & Gas Company as Director of Mechanical Engineering within the Nuclear Engineering Department. In this position I have been assigned specific responsibility to monitor technical developments relative to steam generator tube wear problems associated with Westinghouse Model D steam generators and particularly Model D-3, which is the model of steam generators installed in the Summer Station three loop unit. I possess a degree in mechanical engineering, received from the University of South Carolina in 1973. I am a registered professional engineer in the State of South Carolina and I have been involved in the operation, design and construction of nuclear power plants for over 12 years. (Before entering college I was a qualified reactor operator/reactor technician in the U. S. Navy.)

I have read the "Petition to Intervene and Request for Hearings" dated April 9, 1982 and filed by Fairfield United Action in this docket. The purpose of my Affidavit is to assess the significance of safety questions which FUA seeks to raise. I have concluded the issues raised by them in their petition do not present a significant risk to the health and safety of the public. I will describe the Applicants' involvement with this problem and with utility and vendor efforts to identify the cause and develop an effective remedy. I shall also describe Applicants' commitments relative to interim operation of the Virgil C. Summer Nuclear Station and evaluation of proposed modifications leading to installation of an effective and approved "fix."

Through industry publications, information from Westinghouse, and information exchange systems such as NUCLEAR NOTEPAD, we became aware of Westinghouse designed steam generator operating problems at Ringhals (Sweden) and Almaraz (Spain) (which both utilize Model D3 steam generators). However, it was not until late December, 1981 that we were advised that these problems had direct application to the Summer Plant (also having Model D3 steam generators).

Upon being so informed, we initiated an information gathering and evaluation effort involving frequent contact with Westinghouse as well as other utilities similarly affected to discuss the nature of the mechanisms observed, interim protective measures, and the possible remedies.

By letter dated January 20, 1982 the Director of the Division of Licensing of NRC's Office of Nuclear Reactor Regulation (NRR) requested that we provide them with our

plans to address the problem as it relates to the Summer Plant. By a letter of the same date, the NRC Staff gave notification to the ASLB of the problem.

By letter dated February 19, 1982, Applicants responded to the request for our position on the matter. This letter was sent to all parties in this proceeding. In that letter, we committed to an interim operating program for the Summer Plant with the objective of precluding any significant steam generator tube wear pending permanent modification. Our response outlined our plans to proceed with initial core loading, low power testing, and escalation up to and continued operation at the 50% level (or a higher level if justified by the information available at the time). Additionally, we committed to shut down after approximately two months of operation at the escalated level and inspect (eddy current testing) tube rows 47, 48, and 49 for indications of tube wear. At the time of that response, there were no plans for providing internal or external instrumentation as installed at some of the other plants with similar problems. However, since that time we have committed to install internal instrumentation in two tubes in one steam generator. This commitment is contained in a Nichols to Denton letter dated April 14, 1982, which has been sent to all parties. Westinghouse has indicated that a modification to correct the tube wear problem may be available by late summer, 1982. It is estimated that implementation of the modification in

all three (3) steam generators will take approximately three to four months.

It is my opinion that the operation of the V.C. Summer Nuclear Station Unit No. 1 under the conditions set forth in the Nichols to Denton letter of February 19, 1982 as supplemented by the instrumentation commitment in the Nichols to Denton letter of April 14, 1982 presents no significant risk to the health and safety of the public. This is based upon the results to date of the Westinghouse analysis and test programs at the two operating foreign reactors and Duke Power Company's McGuire unit as well as other Westinghouse studies. (See Fletcher Affidavit.) In addition to health and safety considerations, which are of primary concern, the economic incentive for Applicants to avoid operations at power levels posing any significant risk of steam generator damage with the cost penalties attendant to such damage provides every reason for us to adhere to the monitoring and testing programs outlined in our February 19, 1982 letter.

To address FUA's proposed Contentions (B1 and B2) specifically, I note first that an underlying premise in those contentions is that the Summer unit will be operated at a power level at which flow-induced vibrations in the preheater region will act to cause tube wear. This premise is incorrect. The Applicants' commitment is to limit operation of the unit to 50% power (or to an appropriate level of power above 50%) which precludes significant tube damage.

The mechanism for the inducement of tube wear in the Model D steam generator cited by FUA is in agreement with our current information on the subject. FUA has referenced the Chesnut to Youngblood Memorandum statement that the increased turbulence is experienced at feed flow rates of approximately 50% in Model D3 steam generators. Our commitment to limit operation to 50% at this time is consistent with the NRC memorandum. Based on available information, operation at this level precludes the tube wear problem.

Since the accelerated tube wear problem will not arise during interim operation (or after a permanent modification is made to preclude the problem), there is no basis to postulate, as FUA does, tube rupture or multiple tube rupture, possibly in combination with PORV failure or possibly leading to LOCA events, as a consequence of accelerated tube wear. Nevertheless, a few comments are in order on those matters to correct the impression that might otherwise be left by FUA's statements.

Westinghouse has performed analyses for postulated double end steam generator tube rupture events for all Westinghouse designed nuclear steam supply system plants. (See Fletcher Affidavit, page 6.) While FUA properly points out that the FSAR (5.2-16) gives the design basis tube failure as a double ended rupture of single tube, it is also true that this accident will result in a transient which is no more severe than that associated with a reactor trip from full power and thus requires no special treatment insofar as fatigue evaluation is concerned. (Id.)

FUA's discussion of potential problems with the Power

Operated Relief Valve (PORV) on the pressurizer is misplaced. The PORVs at the Summer Plant are of the specific model tested by the Electric Power Research Institute (EPRI). The results of those tests conclusively demonstrate the PORV's operability ("EPRI PWR Safety and Relief Valve Test Program, Safety and Relief Valve Test Report, April 7, 1982). The "anomalies" in safety valve (not PORV) performance referred to in the Nichols to Denton letter are in no way related to PORV operability.

Applicants are well aware of the potential for premature tube wear problems in Westinghouse Model D steam generators. We recognize the need for corrective action and are working with the vendor and the NRC to develop, verify and install a suitable modification to eliminate the problem. Based upon our understanding of the mechanisms involved, we have developed and committed to an interim operating program to insure significant steam generator tube wear does not occur. By virtue of our actions in this matter, operation of the V.C. Summer Nuclear Station does not present undue risk to the public health and safety.

Michael D. Quinton

Michael D. Quinton

SWORN to before this

23rd day of April, 1982

Darlene G. Stowe (L.S.)

Notary Public for South Carolina

My Commission expires: 12-22-87

SOUTH CAROLINA ELECTRIC & GAS COMPANY
POST OFFICE BOX 764
COLUMBIA, SOUTH CAROLINA 29218

T. C. NICHOLS, JR.
VICE PRESIDENT AND GROUP EXECUTIVE
NUCLEAR OPERATIONS

ATTACHMENT H

April 27, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395
Steam Generator Modification

Dear Mr. Denton:

Recently, the NRC requested certain information regarding modifications to the Virgil C. Summer Nuclear Station steam generators for the tube vibration problem. Specifically requested were (a) an estimate of the total time to make the modifications, (b) an estimate of the radiation field where personnel will be working, and (c) an estimate of the total radiation exposure to personnel for the modification work.

Recognizing that the modifications being considered by Westinghouse are in the design stage, information regarding any aspect can only be considered preliminary or best estimates. With that understanding, SCE&G contacted Westinghouse to obtain the information requested.

For the purpose of this analysis three assumptions were made. These assumptions are an operating history of 50% power for one year, the modification to be performed with the primary system filled and the secondary system empty, and 0% failed fuel.

With these assumptions the best estimates at this time are:

a) Approximately three to four months required to complete the modifications, with a modification design potentially available in the latter part of 1982.

b) Radiation environment estimated to be:

1) 5 - 15 mrem/hr. general background.
2) 1.5 - 4 rem/hr. internal to the steam generator.
3) 600 mrem/hr. inside the steam generator main feed water nozzle at the impingement plate.

c) Approximately 150 to 175 person-rem total radiation exposure per steam generator estimated. Specific ALARA considerations currently being investigated in an effort to reduce total exposures include in-depth pre-job planning and assessment, training of individuals utilizing full scale mock-ups, ALARA design reviews, use of automated welding equipment in high exposure areas and the development of additional techniques and tooling to reduce job specific exposures. Westinghouse estimates a potential reduction of 25 - 50 person-rem/generator through these efforts.

As indicated in the Virgil C. Summer Nuclear Station Final Environmental Statement (FES) Section 4.5.2.3, the NRC staff's occupational dose estimate utilized for the analysis of impacts on the radiation work force population is 1300 person-rems/yr. averaged over the life of the plant. This estimate has been utilized realizing the unpredictable nature and frequency of required routine and special maintenance such as the subject steam generator repair. Section 12.1.6.3 of the FSAR provides an estimated total annual dose of about 400 person-rems per year associated with normal station operations. This is discussed in Section 12.4 of the NRC's Safety Evalnation Report (SER). The difference of these estimates provides guidance on the magnitude of average total person-rem associated with unpredictable major maintenance or modifications required. Thus, the SER and FES have considered an annual average non-routine dose of 900 person-rems per year in the staff assessment of the radiological impacts of station operation. The steam generator modifications currently being considered will be accomplished in accordance with ALARA requirements. Estimates of exposures are currently being refined but they indicate that considerably less than 900 person-rems will be required for this modification.

As the FES and SER have considered the impacts associated with an annual average radiation worker exposure of 1300 person-rem, this modification considering anticipated exposures is consistent with NRC operating license evaluations.

If you have additional questions, please advise us.

Very truly yours,

T. C. Nichols,
Vice-President and Group Executive
Nuclear Operations

RBC:TCN:fjc

cc: V. C. Summer
G. H. Fischer
H. N. Cyrus
T. C. Nichols, Jr.
M. B. Whitaker, Jr.
J. P. O'Reilly
H. T. Babb
D. A. Nauman
C. L. Ligon (NSRC)
W. A. Williams, Jr.
R. B. Clary
O. S. Bradham
A. R. Koon
M. N. Browne
G. J. Braddick
J. C. Ruoff
J. L. Skolds
J. B. Knotts
B. A. Bursey
NPCF
File

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
SOUTH CAROLINA	)	Docket No. 50-395 OL
ELECTRIC & GAS COMPANY	)	
(Virgil C. Summer	)	
Nuclear Station, Unit 1)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicants' Response in Opposition to Intervenor's Motion for Admission of New Contentions" were served upon the following persons by deposit in the United States mail, first class postage prepaid this 29th day of April, 1982.

Herbert Grossman, Esq.
Chairman, Atomic Safety
and Licensing Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Dr. Frank F. Hooper
School of Natural Resources
University of Michigan
Ann Arbor, Michigan 48109

Mr. Gustave A. Linenberger
Member, Atomic Safety and
Licensing Board Panel
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Chairman, Atomic Safety and
Licensing Board Panel
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

George Fischer, Esq.
Vice President and Group
Executive - Legal Affairs
South Carolina Electric &
Gas Company
Post Office Box 764
Columbia, South Carolina 29202

Steven C. Goldberg, Esq.
Office of the Executive
Legal Director
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Chairman, Atomic Safety and
Licensing Appeal Board Panel
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Richard P. Wilson, Esq.
Assistant Attorney General
South Carolina Attorney General's
Office
P.O. Box 11549
Columbia, South Carolina 29211

Mr. Brett Allen Bursey
Route 1, Box 93-C
Little Mountain, S.C. 29076

John C. Ruoff
Post Office Box 96
Jenkinsville, S.C. 29065

Robert Guild, Esq.
314 Pall Mall
Columbia, South Carolina 29201

Jeb C. Sanford
Jeb C. Sanford

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
SOUTH CAROLINA	)	Docket No. 50-395 OL
ELECTRIC & GAS COMPANY,	)	
et al. (Virgil C. Summer	)	
Nuclear Station, Unit 1)	)	

ERRATA SHEET TO APPLICANTS'
RESPONSE TO FUA PETITION TO INVERVENE

Please note the following corrections to "Applicants' Response in Opposition to 'Petition to Intervene and Request for Hearing' of Fairfield United Action" dated April 26, 1982:

Page	Correction
12	In the second line from the bottom of the text, insert a parenthesis before "including"
21	In the fourth line from the bottom, the word "plant" should be plural.
21	In the last line, the word "generators" should be singular
23	There is a dropped word on the third line from the bottom. At the end of the line, insert "year"

Respectfully submitted,

Jeb C. Sanford

Joseph B. Knotts, Jr.
Jeb C. Sanford

Debevoise & Liberman
1200 Seventeenth Street, N.W.
Washington, D.C. 20036

Attorneys for Applicants

Of Counsel:

Randolph R. Mahan
General Attorney
South Carolina Electric & Gas Company
P.O. Box 764
Columbia, South Carolina 29218