

ORIGINAL

UNITED STATES
NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

DOCKET NO: 50-424 OL
50-425 OL

GEORGIA POWER COMPANY, et al.

(Vogtle Generating Plant,
Units 1 and 2)

LOCATION: WAYNESBORO, GEORGIA

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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 In the Matter of: :
 : Docket No. 50-424 OL
 GEORGIA POWER COMPANY, et al. : 50-425 OL
 :
 (Vogtle Generating Plant, :
 Units 1 and 2) :
 :
 -----X

Burke County Office Park
Auditorium
West 6th Street
Waynesboro, Georgia 30830

Wednesday, March 12, 1986

The hearing in the above-entitled matter convened at
9:30 a.m.

BEFORE:

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

JUDGE GUSTAVE A. LINENBERGER, JR., Member
Atomic Safety and Licensing Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

JUDGE OSCAR H. PARIS, Member
Atomic Safety and Licensing Board Panel
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

1 APPEARANCES:

2 On behalf of Applicant:

3 BRUCE W. CHURCHILL, ESQ.
4 DAVID R.A. LEWIS, ESQ.
5 Shaw, Pittman, Potts & Trowbridge
6 1800 M Street, N.W.
7 Washington, D.C. 200568 CHARLES W. WHITNEY, ESQ.
9 HUGH M. DAVENPORT, ESQ.
10 Troutman, Sanders, Lockerman & Ashmore
11 1400 Candler Building
12 Atlanta, Georgia 3004313 On behalf of the Nuclear Regulatory
14 Commission Staff:15 BERNARD M. BORDENICK, ESQ.
16 LEE DEWEY, ESQ.
17 Office of the Executive Legal Director
18 U.S. Nuclear Regulatory Commission
19 Washington, D.C. 20555

20 On behalf of Intervenors:

21 RAYMOND TINGLE
22 WILLIAM F. LAWLESS
23 Georgians Against Nuclear Power
24 1253 Lenox Circle
25 Atlanta, Georgia 30306

C O N T E N T SWITNESSDIRECTCROSSREDIRECTRECROSSEXAM

(OPEN APPEARANCES)

Clifford R. Farrell

Thomas W. Crosby

Lewis R. West

and

Sravros S. Papadopoulos

by Mr. Lawless

444 (Resumed)

by Judge Paris

450

by Mr. Lawless

456 (Cont.)

P R O C E E D I N G S

1
2 JUDGE MARGULIES: Will you please come to order.
3 Good morning, ladies and gentlemen. This morning we will
4 take limited appearances from the public on the applications
5 filed on behalf of Georgia Power Company, Municipal Electric
6 Authority of Georgia, Oglethorpe Power Corporation, and the
7 City of Dalton, Georgia for licenses to operate the Vogtle
8 Electric Generating Plant, Units 1 and 2, located in Burke
9 County, Georgia.

10 The limited appearances can be in two forms: One
11 an oral limited appearance which will be limited in time to
12 10 minutes, or a written limited appearance; the written
13 statement can be of unlimited duration. Both types of
14 limited appearances will become part of the record in this
15 proceeding. They are not given under oath and they are not
16 considered as evidence.

17 We will have Mr. Ray Delaigle, chairman of the
18 Burke County Board of Commissioners make the first limited
19 appearance this morning.

20 MR. DELAIGLE: Thank you for the opportunity to be
21 present. Today I come as three persons; I'm Ray Delaigle,
22 chairman of the County Commissioners of Burke County,
23 Georgia; I'm a farmer; and thirdly -- I come as three persons
24 -- as a sportsman.

25 I viewed the Plant Vogtle from the ground level

1 up. I visit it on several occasions each year. I have had
2 conversations with the craftsmen and the workmen that are
3 performing their duties there. I have yet to meet one to say
4 that that's not a safe plant.

5 Of course, it could have been built cheaper, but
6 the safety would have not been built in it. So, I assure my
7 residents of Burke County, we have no fear of the safety of
8 Plant Vogtle.

9 As far as the surface water, it's no problem.
10 I've fished the streams and rivers of this state, and some of
11 the United States, and they are polluted but certainly not by
12 nuclear waste. It's from chemicals being poured out the back
13 doors of plants, and there's none to be poured out down
14 there. To generate electricity, we would have to have the
15 source of coal or petroleum products, and there is waste and
16 pollution.

17 As a farmer, the industrial waste of this country
18 has threatened our soil by being acid. It costs about \$25 an
19 acre to supplement sulfur -- per acre -- that the pollutants
20 have taken out of the atmosphere, taken it out of our soil.
21 So, therefore, you add another \$45, \$50 to put lime out there
22 to get your sulfur back.

23 I have no objections of nuclear power being
24 generated in this atmosphere here. It's certainly clean.

25 We appreciate the honor of having you have the

1 hearings in Burke County. We are glad to host you. You have
2 warmed our hearts by being here. We hope we warmed your
3 heart.

4 Thank you.

5 JUDGE MARGULIES: Thank you.

6 Mr. Teper is not here today representing GANE. Do
7 we have another representative for the organization?

8 MR. TINGLE: Yes, sir. I'm Raymond Tingle; I'm a
9 member of GANE and my address is -- do you need that? 7168
10 Sir Galahad Way, Jonesboro, Georgia, 30236.

11 JUDGE MARGULIES: Are you a member of the bar,
12 Mr. Tingle?

13 MR. TINGLE: No.

14 JUDGE MARGULIES: We will continue with the
15 limited appearances. The next person is Herman Lodge.

16 MR. LODGE: Gentlemen, thank you for the
17 opportunity to speak to you on behalf of the citizens of
18 Burke County which I represent as a county commissioner. We
19 are grateful and proud for Plant Vogtle because of its large
20 construction -- it is the largest construction project ever
21 to locate in Burke County and the State of Georgia, therefore
22 we believe the most stringent safety standards and procedures
23 have been implemented to ensure the safety of our citizens in
24 this area.

25 It is the duty and responsibility of the Burke

1 County Board of Commissioners to protect the lives and the
2 property of the citizens of Burke County. Locally we have
3 been involved in the emergency planning for Burke County,
4 especially in the area we call the 10-mile buffer zone. We
5 have built an emergency management agency building with the
6 latest communications equipment. We are constantly improving
7 our equipment. We are hiring and training personnel. We
8 have hired an individual in nuclear protection, who has a
9 tremendous amount of experience in this area.

10 We also reserve the right to have bragging
11 rights. Again, I repeat, we also have the right to have
12 bragging rights. We feel that Plant Vogtle and the Burke
13 County management agency building and plan will be used as a
14 model for the construction and planning of future
15 nuclear-fueled plants and the emergency management agencies
16 in the United States and the world.

17 Nothing in nature or society is without risks.
18 The task, as it relates to the nuclear-fueled plants, is to
19 reduce this danger to extremely low levels of actual risk.

20 When we leave to go to work in our cars or when we
21 fly in an aircraft, we are at risk. I believe that more
22 lives have been lost on Burke County roads from driving under
23 the influence than have been lost in the nuclear-fueled
24 plants in the United States or in the world.

25 By 1990 the demands for electricity will require

1 more than 40 percent of the nation's overall energy. Much of
2 the energy which our nation's economy, security, standard of
3 living depends on, will come from the electricity generated
4 by nuclear-powered plants. Therefore, we need and we want
5 Plant Vogtle.

6 Thank you for listening.

7 JUDGE MARGULIES: Thank you, Mr. Lodge.

8 There's a tan Ford Fiesta in the parking lot with
9 license plate GCE589 Fulton, with its lights on.

10 The next speaker will be C.W. Hopper, Jr.

11 MR. HOPPER: Thank you for the opportunity to make
12 this statement. My name is C.W. Hopper, Jr. I'm employed by
13 Burke County in the position of county administrator and have
14 served in this capacity since November of 1973. Prior to
15 this time I was employed as city administrator for the city
16 of Waynesboro for 8-1/2 years.

17 I'm a native of Burke County and have lived here
18 all of my life, only being absent to attend Davidson College
19 where I received a degree in business administration, and for
20 military service.

21 Having served in the capacity of city
22 administrator or county administrator since 1965, I have had
23 the opportunity of being involved in Plant Vogtle since the
24 early days of locating a site for the facility. I can
25 remember being on-site when the early soil borings were being

1 done. Since that time, because of the position in which I
2 serve, I have had the opportunity to meet and work with the
3 management of Georgia Power and its partners, to work with
4 project managers on the construction site and construction
5 companies working on-site almost daily. I have been greatly
6 impressed and have the highest degree of confidence in the
7 construction and safety of this plant.

8 As a native of the county I know and have talked
9 to people who work at the plant in positions that range from
10 common labor to skilled construction workers to future
11 operating personnel to management. I have never heard any of
12 these persons make any type of negative remark about the
13 construction and safety of this plant.

14 I have had the opportunity to talk with
15 construction workers who have served -- who have moved into
16 the area from other construction jobs and have heard only
17 positive statements concerning the plant -- the construction
18 of this plant. I have no reservations about the operation of
19 Plant Vogtle.

20 Georgia Power and its partners have been a
21 tremendous asset to Burke County. It has been a pleasure to
22 work with them during these years of construction and Burke
23 County is looking forward to working with them when Plant
24 Vogtle goes on line in 1987. Thank you.

25 JUDGE MARGULIES: Thank you, Mr. Hopper.

1 William H. Craven?

2 MR. CRAVEN: I'm William H. Craven, Jr., county
3 agent for Burke County. I have been in this position for 15
4 years, having been a resident -- not a resident but a native
5 of South Carolina and county agent in South Carolina for 17
6 years. I will apologize to the distinguished panelists for
7 any redundancy that I might have this morning, but it
8 certainly is for emphasis, rather than being redundant. That
9 is, some of the things Mr. Hopper said, I was here when the
10 first plans for Plant Vogtle were announced. We were
11 on-site. We were there when they were drilling and from that
12 moment to this moment I have seen a tremendous amount of
13 pride among the workers who -- local workers and those who
14 have come in from afar.

15 I have seen the farm people of Burke County who
16 have had to leave the farm because of the tremendous
17 financial woes that agriculture faces today, not only here
18 but across the face of America. I have seen those people go
19 to Plant Vogtle, come back home in the afternoon and be proud
20 of what they have done at Plant Vogtle.

21 If a facility can be built today with sure
22 construction, good engineering, positive craftsmanship, I
23 feel as a resident of this county that Plant Vogtle
24 epitomizes that type construction; and as a resident and a
25 citizen of this county for the rest of my days, I have no

1 fear for my safety nor the safety of my family that lives
2 here.

3 Thank you.

4 JUDGE MARGULIES: Thank you, Mr. Craven.

5 Tat Thompson?

6 MR. THOMPSON: I'm Tat Thompson; I'm a banker in
7 this area. I am currently serving on the city council in the
8 city of Waynesboro. I guess more important than any of that
9 is that I have been, with the exception of going to college
10 and some banking in Atlanta, a lifelong resident of Burke
11 County.

12 Like all the people that have spoken before me, I
13 care a great deal about this county and the people in this
14 county.

15 In reading the paper this morning I had seen where
16 one of the Intervenors had called this hearing a sham. I'm
17 here to tell you I appreciate the opportunity that you all
18 are giving us to come and share our views with you.

19 Much like I imagine you heard yesterday and today
20 from many of the citizens, I have had the opportunity to
21 watch Vogtle come from the ground up. I have had the
22 opportunity to meet an awful lot of the individuals involved,
23 both from Georgia Power and the subcontractors; and over the
24 last many years I have read a great deal in the paper
25 questioning the corporate integrity of Georgia Power, the

1 Southern Company and many of the individuals that have been
2 very instrumental in this project.

3 I'm here to tell you that the ones that I have
4 been privileged to meet in all phases, be they construction
5 workers or management, folks coming down from Atlanta, have
6 all been very professional, highly skilled people who take an
7 awful lot of pride in what they are doing.

8 I have never once heard any of the construction
9 workers or subcontractors have any derogatory remarks
10 concerning the quality of workmanship out at Vogtle.

11 If I've heard anything, I have heard that there
12 may be cost overruns due to inspections that have been
13 inspected, and I think that that is probably a problem with
14 nuclear energy in the United States today. The question of
15 safety really hadn't come up among the citizens of Burke
16 County, Georgia, and I know that you all probably heard a lot
17 over these last few days that the citizens of Burke County,
18 due to the economic impact of Vogtle, have been bought off.

19 Well, people in Burke County are like people
20 anywhere. We care about the citizens of Burke County, our
21 children, and in -- money is not the issue here. I think
22 that safety is important but safety has never really been the
23 issue in Burke County. People aren't concerned with the
24 safety. They feel comfortable with what is being built out
25 on the Savannah River.

1 I think that, like most Georgians, the major topic
2 of discussion has been cost, and I think cost has been
3 directly related to the safety mechanisms that have been put
4 in, but also just due to the regulations that handicap the
5 nuclear industry in America.

6 As far as the Georgia Power Company, I think that
7 they have had a very clear mission of providing and meeting
8 the energy needs for Georgia and the southeast, and the
9 future energy needs. I think Vogtle is a step in the right
10 direction and I appreciate you all taking you alls time to be
11 in Burke County, Georgia, and giving us the opportunity to
12 voice our opinions.

13 Thank you.

14 JUDGE MARGULIES: Thank you, Mr. Thompson.
15 James D. Smith?

16 MR. SMITH: Thank you. I'm James D. Smith,
17 superintendent of public schools in Burke County. As
18 administrator of those schools we cover the county, and
19 certainly we have vital concern for the safety of our
20 children.

21 I have worked very closely with the Georgia Power
22 Company in association with this plant and I am thoroughly
23 convinced that our children are safe in Burke County with the
24 construction of this plant. I have no questions about the
25 safety of this plant.

1 We are also cooperating with them in providing,
2 with the management system, facilities in use if there is an
3 emergency. Some of our facilities that we have now have been
4 designated. We are also constructing a new school that will
5 have some very good places for, not only this, if anything
6 happened at the plant, but other places. And that has been
7 designated as the number one place to be used when this is
8 completed.

9 I have been in Burke County 22 years. I have been
10 superintendent of schools, this is my 14th year. And I have
11 always found that the Georgia Power Company, who is the prime
12 contractor in charge of this plant, has been very cooperative
13 with us, been very dependable. I have never had any reason
14 to question their integrity and I think, if there's a safe
15 plant being built in the world, it's Plant Vogtle.

16 I remember when I was a young man that I saw on
17 the side of a Georgia Power truck, they used to have this
18 sign that says, "A citizen, wherever we serve." And I
19 certainly think they still live up to that slogan and I
20 certainly think they would not want to do anything that would
21 endanger the citizens in Burke County, and considering the
22 safety of all concerned in Burke County and especially the
23 children that I deal with, I have no questions about the
24 safety of this plant; and I think it will be an asset, not
25 only to Burke County but the state of Georgia, because we

1 need this energy and we don't need to be dependent on people
2 that can blackmail us at times when they see fit. And I hope
3 that we will continue to support and we'll get this plant on
4 line in time to produce this energy that we need for our
5 growth.

6 I appreciate the opportunity of coming to speak
7 before you. Thank you very much.

8 JUDGE MARGULIES: Thank you, Mr. Smith.
9 Harvey Sapp?

10 MR. SAPP: My name is Harvey Sapp. I'm a native
11 of Waynesboro, a member of the city council serving in my
12 fourth term. I'm proud of that time I was employed by the
13 Georgia Power Company, for some 32 years.

14 I don't know anything about -- at all about -- or
15 much about the technology involved in the construction of
16 this plant. All I know about an atom could be contained in
17 one. But I do have some knowledge of people. I know the
18 people of this company. I have known them for years, from
19 the top management on down. I know of no one in that company
20 who wants to build anything that's unsafe. I know no one in
21 that company management who wants to face the stockholders if
22 they come up with a bummer. I know of no one in that company
23 that wants to price themselves out of the market because
24 they'd be pricing themselves out of a job.

25 I do know the people that are constructing that

1 plant. They live here. I go to church with them, and Sunday
2 school. Their children are here. I'm associated with them
3 in civic affairs and social affairs. And I don't know any of
4 them that want to see our children and wives incinerated or
5 contaminated. I certainly do not want mine that way.

6 I have no fear of this plant because I know
7 people. I'm looking forward to seeing it licensed, fueled
8 and generating electricity for all the people in the state of
9 Georgia. Thank you for letting me come before you.

10 JUDGE MARGULIES: Thank you, Mr. Sapp.

11 George R. Gudger?

12 MR. GUDGER: My name is George Gudger; I'm the
13 business manager for the Laborers International Union of
14 North America, AFL-CIO, which employed some 1300 at the peak
15 period in 1981-82; those periods we had approximately 1300
16 people working on the Plant Vogtle project.

17 95 to 96 percent of those people are from the
18 surrounding areas, areas like Richmond County, Burke County,
19 and the other surrounding areas in this area. We had about 7
20 percent of these people who came out of the South Carolina
21 area.

22 But these people are going -- they live in this
23 area, they are going to be living in this area. They worked
24 on there and they were made very sure that the Georgia Power
25 plant was as safe as possible, and Georgia Power gave them a

1 vehicle or mechanism to do that. They gave -- made it
2 possible that if an employee felt that there were any faulty
3 works being done, that they had a way that they could report
4 this and the company assured them that there would be no
5 retaliation against the employee for this. And we have had
6 some employees who have felt that some things were not
7 exactly right and they reported it and Georgia Power checked
8 it out and checked it thoroughly and came back to the
9 employee to give them an answer on what they felt was right
10 and satisfied the employee's concern.

11 All of the employees that we have working down
12 there now, and have had working there, they have no concern
13 about safety because they know that they built it, they
14 worked on this facility from the start up until this period
15 now, and they are not going to do anything that is going to
16 cause harm to their children, their families and the families
17 of their children that haven't been born yet.

18 We have no doubt that this is the safest nuclear
19 power plant that has been ever built. The reason why we feel
20 that is because our team did it.

21 Thank you very much.

22 JUDGE MARGULIES: Thank you, Mr. Gudger.

23 Dennis Hoffarth?

24 MR. HOFFARTH: Good morning. I'm Dennis Hoffarth,
25 with the Georgia Conservancy. Can you hear me?

1 JUDGE MARGULIES: Yes, we can.

2 MR. HOFFARTH: The Georgia Conservancy represents
3 about 4000 members, mostly in the State of Georgia. First I
4 want to thank you for the opportunity to express our views
5 this morning. I'd also like to thank the City of Waynesboro
6 and the County of Burke for your hospitality while we are
7 staying here.

8 We are testifying at this hearing because we
9 continue to be concerned about nuclear safety and nuclear
10 waste disposal. We have expressed our views on these
11 subjects over the year to state and federal, elected and
12 regulatory bodies and other parties. We are not
13 anti-electricity and we encourage economic development that
14 is well planned and sensitive to health and safety and life.
15 support resources.

16 Today we have some specific comments relating to
17 the licensing of Plant Vogtle for operation. First of all,
18 we would like to commend this Board for delving into the
19 questions of valve safety and protection of the Tuscaloosa
20 aquifer in detail at these hearings.

21 With regard to the environmental qualification of
22 the valves, I don't think we need to tell the Board how
23 important it is that all doubt be resolved about the ability
24 of these safety devices to operate under critical
25 conditions. We hope you and/or the NRC Staff will insist on

1 detailed technical answers to the questions raised before an
2 operating license is issued.

3 The Tuscaloosa aquifer is something of particular
4 -- and greatly valid as an irreplaceable and precious
5 resource in Georgia and surrounding states. We are
6 particularly concerned about the fact that thousands of
7 agricultural wells draw their water from the Tuscaloosa
8 aquifer, as do the cities of Savannah and Garden City and
9 other communities, for their drinking water needs and for
10 industrial process water, including food processing
11 industries.

12 We are very aware that contamination of an aquifer
13 can be devastating in view of the long time it takes for an
14 aquifer to cleanse itself. We are therefore adamant that
15 every safe precaution be taken to prevent penetration of
16 the aquifer by leakage, spills, or other forms of
17 contamination.

18 In reviewing the environmental impact statement
19 for this plant we note that a justification of need for the
20 plant was required by the NRC initially. We understand the
21 reason for this to be that nuclear plants can have major
22 environmental consequences and that the NRC does not wish to
23 approve the risks involved if the plant is not necessary to
24 meet energy needs.

25 We believe that this should be -- that there

1 should be a procedure for reevaluating that need as time
2 passes and conditions change. We all have seen that
3 conditions do change with regard to electricity demand and
4 production of electricity by other means. Certainly,
5 utilities around the country have found that plants were
6 unneeded after having received construction licenses, and we
7 suggest that the NRC should continue to share responsibility
8 for evaluating need throughout the project's development; not
9 just for Plant Vogtle but for all nuclear plants.

10 With specific regard for safety at the plant, we
11 are very interested in resolution of the complaints by plant
12 workers on safety issues. Even if only a small percentage of
13 the complaints turn out to have substance, the safety
14 implications are so great that every allegation must be
15 greeted with an extremely serious response.

16 Thank you, once again, for taking the time to hear
17 our comments.

18 JUDGE MARGULIES: Thank you, Mr. Hoffarth.

19 Louis Abbott?

20 MR. ABBOTT: Thank you, Mr. Chairman, for the
21 opportunity to speak to this distinguished group. I'm a
22 private businessman in Wayne County. Having lived here for
23 the entire 61 years of my life with the exception of three
24 years in the military service, and being obviously vitally
25 concerned about the environmental impact of anything going on

1 in Burke County, nuclear or otherwise -- and at my age
2 obviously not desiring to leave a home, a family, two
3 children living here with grandchildren, we are vitally
4 concerned with Georgia Power and its other owners and what
5 they are doing with Plant Vogtle.

6 And we have, since its beginning, had the
7 opportunity to observe what they are doing. We have had many
8 opportunities to discuss with individuals who were working on
9 the site, and this would be hourly employees as well as
10 others. We have heard nothing that would lead us to think
11 that we should prepare ourselves to evacuate Burke County.
12 We think the plant is being built as well as it could
13 possibly be. We are convinced of it. We think Georgia Power
14 is not spending \$8.5 billions of dollars, it and its other
15 owners, just to say they built a nuclear plant in Burke
16 County. We think they are doing it for the future of
17 Georgia.

18 We are convinced that they want to operate the
19 plant. We are convinced that they want the plant to be a
20 money maker as well as a server for the people of Georgia for
21 electrical power in the future. And, as a private
22 businessman and as a citizen, we are proud it's here and we
23 have no hesitation whatsoever in remaining here as a citizen
24 and we hope they do likewise.

25 Thank you, Mr. Chairman.

1 JUDGE MARGULIES: Thank you, Mr. Abbott. Jayne F.
2 Brinson?

3 MS. BRINSON: First, thank you, gentlemen, for
4 allowing me to speak this morning and listening to my
5 comments.

6 My name is Jayne Brinson; I'm a native daughter of
7 Waynesboro, Burke County, Georgia. Upon completion of high
8 school I moved from Burke County to Jenkins County for 16
9 years. I returned to Waynesboro six years ago and in 1982 I
10 began my career as executive vice-president for the Burke
11 County Chamber of Commerce.

12 Like most chamber executives I wear many hats. I
13 am also the cultural/historical director for Burke County, as
14 well as public information officer for the Burke County
15 emergency management agency. I am married and the mother of
16 two sons.

17 I have closely observed the construction and
18 activities at Plant Vogtle since I began my job five years
19 ago. Because of the services my office provides, many
20 employees of Plant Vogtle have passed through the office or
21 written for information pertaining to Burke County. I have
22 made it a point to meet and talk with as many of these people
23 as possible. I am confident that these people are competent
24 and capable, and proud of what they are doing on that job
25 site.

1 The Georgia Power Company has kept the leadership
2 informed about the happenings and activities occurring at
3 Plant Vogtle. They hold periodic meetings, several a year as
4 a matter of fact, to provide the leadership with updated
5 information concerning the Vogtle project. They always
6 invited our questions and answered them adequately and
7 continue to do so, and without evasion.

8 I have visited and toured the site at least once a
9 year for the past five years. I am confident Plant Vogtle is
10 the safest nuclear facility yet to be built. The Vogtle
11 project is necessary for the state of Georgia. Energy is the
12 major key to open the doors for better health care, quality
13 education, new and expanding industry, more jobs, better
14 housing and a brighter future for all Georgians.

15 Safety for Plant Vogtle is vital and I believe
16 Georgia Power Company has gone beyond the necessary
17 requirements to assure us of a safe, productive nuclear plant
18 that Burke County and the state of Georgia can be proud of.

19 Gentlemen, if I could retire at night, confident
20 that my people and my children were as -- excuse me -- that
21 they were as safe from drugs and crime as they are from any
22 hazards at Plant Vogtle, I could sleep many restful nights.

23 Thank you for hearing me.

24 JUDGE MARGULIES: Thank you, Mrs. Brinson.

25 That completes the list of people who have signed

1 up for limited appearances. Is there anyone else who wants
2 to be heard at this time?

3 We have set aside until 11:30 this morning the
4 time for taking limited appearances. From time to time I
5 will ask if there is anyone in the audience who wants to make
6 a limited appearance.

7 Our schedule for this morning is to go ahead with
8 Contention 7. Is Mr. Lawless here?

9 MR. TINGLE: Yes. He just arrived. He'll be here
10 momentarily.

11 Briefly, while he's getting his things together,
12 we have a problem, it's really a peculiar type thing.

13 Yesterday one of our members was approached by
14 someone from the plant with what appears to be a major
15 complaint.

16 What I'm asking is, I need the Board's direction
17 as to what to do with this complaint? Do we go through
18 channels and the Board look at it, or should the Board look
19 at it and while they are on-site -- I mean this came up
20 yesterday. I have a loosely written sworn statement here.
21 Would the Board be interested in seeing it?

22 The worker that came forward was -- I mean it
23 wasn't solicited -- wanted to remain anonymous. So what we
24 have is hearsay. If the Board is interested. Or should we
25 file it?

1 It's really -- as I heard the lawyers say -- on
2 the horns of a dilemma, but we certainly don't want to
3 withhold anything. At the same time all we want to do is do
4 what the Board wants us to do.

5 MR. BORDENICK: Judge Margulies, we have people
6 present from the NRC Region. If the person wants to be
7 anonymous -- I suspect if he goes before the Board he'd lose
8 the anonymity.

9 Staff would be, through the Region, would be
10 perfectly willing to speak with the gentleman --

11 MR. TINGLE: I don't think this person wants to
12 appear before the Board at this time. I don't know. All I
13 know is the information that I have been given. All I can do
14 is give you that and go from there.

15 The person who he approached was Mr. Johnson, and
16 he has signed this. So I'm in the position of presenting
17 it.

18 MR. BORDENICK: We'd be delighted to speak with
19 Mr. Johnson, if that's agreeable, and the Board can speak
20 with him at the hearing.

21 JUDGE MARGULIES: This is not something that the
22 Board would take up. It's not a matter pending before the
23 Board and it's not a matter to be heard by the Board.

24 Mr. Bordenick has suggested that there are
25 channels which this individual may pursue within the Region.

1 I would suggest that that procedure be followed.

2 MR. TINGLE: I guess our thinking was down the
3 line if this was important or major, we didn't, certainly,
4 want to hold onto it. You can see our position? It's not
5 something that we are designed to deal with.

6 JUDGE MARGULIES: Mr. Bordenick indicates that
7 there are people available from the Commission Staff that can
8 deal with something of that type. It is not something for
9 the Board to deal with at a hearing of this type.

10 MR. TINGLE: Yes, sir.

11 MR. CHURCHILL: Your Honor, may I add, I agree
12 that that is the appropriate way to go. I would also like
13 to, perhaps, tell GANE that the Georgia Power Company does
14 have a quality concerns program at the site, which is
15 designed because they want to find out these things so they
16 can look into it and correct it. They want to know about
17 them and they do have a mechanism for protecting the
18 anonymity of the person with the concern. I would just urge
19 GANE to do what it can, if it so desires, to let the company
20 know he's under protected circumstances, if you desire, so
21 that we can look into it.

22 MR. TINGLE: Excuse me.

23 Well, as I understand it, the person has been to
24 the power company and to NRC and has gotten no results. As I
25 said, we are not talking about something small here. It's a

1 major contention. So I don't know. Again, it's really
2 hearsay on my part. Mr. Johnson is the one that they talked
3 to.

4 The main reason, I guess, to -- not the main
5 reason but one of the reasons we brought it up is that there
6 will be an on-site investigation, and if the Board would care
7 to make themselves knowledgeable of this, it may be something
8 of an appearance nature that would be apparent. And, also
9 this is a time that you would have an assembly of quite a few
10 experts from all the different fields.

11 JUDGE MARGULIES: Is this something to do with one
12 of the contentions that we are hearing today?

13 MR. TINGLE: No. I'd be glad to show you
14 Mr. Johnson's copy if the Board would care to look at it. I
15 don't want to read this into the record but I'd be happy to
16 give you a copy.

17 JUDGE MARGULIES: From the limited amount you have
18 told me, there may be the situation where the individual is
19 dissatisfied with what has happened in Region 2. If he feels
20 that way, I know of nothing that would preclude him from
21 bringing his information directly to the Commission in
22 Washington and --

23 MR. TINGLE: You know, while that might sound okay
24 as far as procedure -- well, again, I'm getting into
25 something that I'm not really qualified for and I'm making

1 some assumptions that I don't even know. All I know is that
2 I have the papers -- I mean the shuttle is worn out -- if
3 this kind of thing had happened -- as long as the shuttle
4 went up and was fine everything is fine, but if this sort of
5 thing would happen I sure wouldn't want to be left holding
6 this on my conscience. That's why I felt we should ask for
7 the Board to look at it. That's basically all I'm asking.

8 We can go through the proper channels. That's no
9 problem.

10 JUDGE PARIS: The problem, Mr. Tingle, is we are
11 not an investigative arm of the Commission. We are -- we are
12 litigators. It is incumbent upon us to -- well,
13 adjudicators, excuse me. It is incumbent upon us to see that
14 all the parties have a fair opportunity to respond -- be made
15 aware of allegations and develop a response to them. That's
16 why we admit contentions and there are interrogatories
17 exchanged and so on.

18 MR. TINGLE: I understand. I stated this was a
19 peculiar situation. You know, I don't want to belabor it.
20 But, again, we can go through proper channels. I'm not an
21 attorney. I don't think we have an attorney, which is our
22 fault.

23 JUDGE MARGULIES: Well, you have been given three
24 avenues, or told about three avenues. You can go through the
25 Region, or if you think it's that important to bypass the

1 Region you can go directly to the Commission in Washington;
2 or, as Mr. Churchill suggested, you can operate through the
3 Applicants.

4 MR. TINGLE: He mentioned someone here. Who is
5 the person here to see on that?

6 MR. WHITNEY: Your Honor, if they'll give the
7 complaint to me if they want to process it through Georgia
8 Power Company I'll make sure that it's processed as of this
9 morning.

10 MR. TINGLE: No. I'm talking about with the NRC.

11 MR. BORDENICK: He can see Mr. Bradley Jones, in
12 the seat right here. He's regional counsel. We have members
13 of the regional staff, including the resident inspector, here
14 today.

15 MR. TINGLE: We are not trying to create something
16 that's not there. We are just trying to -- like I say, it's
17 a peculiar situation.

18 JUDGE MARGULIES: We understand that. You have
19 been given certain information. You want to pass it on.

20 Are the parties ready to proceed with Contention
21 7?

22 MR. CHURCHILL: Yes, your Honor. Could we have
23 about a two-minute break to get our witnesses up and their
24 papers organized?

25 JUDGE MARGULIES: Certainly.

1 (Discussion off the record.)

2 Whereupon,

3 THOMAS W. CROSBY

4 CLIFFORD R. FARRELL

5 LEWIS R. WEST

6 and

7 STAVROS S. PAPADOPULOS

8 resumed the stand and, having been previously duly sworn,
9 were examined and testified further as follows:

10 JUDGE MARGULIES: Back on the record. You may
11 proceed, Mr. Lawless.

12 CROSS-EXAMINATION (Resumed)

13 BY MR. LAWLESS:

14 Q We had been talking about the groundwater divides
15 yesterday. However, I would like to back up for just a
16 moment to the discussion we had on low permeability. This
17 was page 14; the range of the data from low permeability to
18 impermeability, 10 to the minus 9 centimeters per second.
19 Let's start at that point, page 14.

20 In the values that were given, I presume
21 Applicant's scientists did what I did when I went home last
22 night, that is run a real quick means and calculated standard
23 deviation, and I calculated a means of 1.72 times 10 to the
24 minus 6 centimeters per second; is that correct? Did you
25 make that calculation?

1 A (Papadopoulos) I didn't make that calculation.

2 Q You haven't made the calculation.

3 MR. DEWEY: Staff's witness, Mr. Gonzales did, and
4 he agrees with that calculation.

5 BY MR. LAWLESS:

6 Q And a standard deviation of 2.42 times 10 to the
7 minus 6; is that correct?

8 MR. CHURCHILL: He just said he didn't make the
9 calculation, your Honor.

10 MR. LAWLESS: The Staff did.

11 MR. CHURCHILL: Staff is not being cross-examined.

12 BY MR. LAWLESS:

13 Q Okay. Then my calculations of the data --

14 MR. CHURCHILL: Your Honor, I have to object to
15 his testifying as to his calculations of the data on standard
16 deviations. He's not testifying.

17 MR. LAWLESS: I think it's a preface to the
18 question. If you can hold the objection for one minute, I'll
19 get the question out. My calculations show a mean of 1.72
20 times 10 to the minus 6 centimeters per second and a standard
21 deviation of 2.42 times 10 to the minus 6. The witnesses
22 yesterday had said that the data was skewed towards the
23 higher end. In effect, in actuality it looks like it is
24 skewed toward the lower end.

25 Would the witnesses agree with that?

1 MR. CHURCHILL: Your Honor, I object to the
2 mischaracterization of the testimony. There was some
3 confusion as to the words high and low. We asked for
4 clarification from Mr. Lawless, the examiner, as to what he
5 meant by high and what he meant by low, and I object to the
6 question because I believe it to be a mischaracterization.

7 JUDGE PARIS: Mr. Lawless, yesterday in that bit
8 of confusion I asked some questions also and the witnesses
9 did clarify it, I think. I don't think you need to go back
10 over it now.

11 MR. LAWLESS: Well, I did want to raise one
12 question in addition. The standard deviation of 2.42 is much
13 larger than the means.

14 BY MR. LAWLESS:

15 Q Could you tell me what you think of that sort of
16 variability in the data?

17 A (Papadopoulos) As the data indicate, this is a
18 nonhomogeneous medium, and we have permeabilities which range
19 over three orders of magnitude. Therefore, having large
20 standard deviations is not surprising. However, the meaning
21 of this type of statistical analysis is not very clear to me;
22 what the statistical analysis does to the data.

23 This type of analysis is not something that's
24 customary in groundwater hydrology. We have varying
25 permeabilities and these varying permeabilities have to be

1 taken into account when one makes calculations using this
2 data.

3 However, statistical analyses of the type that you
4 are talking about are not usual things to be done with this
5 type of data.

6 MR. LAWLESS: Could I make an exception to that?
7 Make a statement? Wait for a summary? How do I respond to
8 that without drawing an objection from the attorney?

9 MR. CHURCHILL: If you are asking me, you are not
10 to respond to it. You are to ask questions.

11 MR. LAWLESS: Can I summarize --

12 MR. CHURCHILL: Your Honor, he knows he can't
13 summarize.

14 MR. LAWLESS: I'm asking the Board. Can I
15 summarize after the questions I put to the scientists? Can I
16 summarize my own conclusions?

17 JUDGE MARGULIES: In terms of summarizing or the
18 conclusions you reach, that's a matter for brief, in terms of
19 briefing this area or in terms of the testimony you are about
20 to give. But in terms of your summarizing or giving an
21 argument as to why you think you are correct, it is totally
22 improper at this time.

23 MR. LAWLESS: In a board of inquiry, that may be
24 appropriate. But in a question of scientific importance, how
25 does the Board get a rejoinder or response from myself to

1 find out the range of possible expressions that could be
2 annotated to their comments?

3 JUDGE LINENBERGER: Dr. Lawless -- or which is
4 it? I'm sorry.

5 MR. LAWLESS: Mister.

6 JUDGE LINENBERGER: Let me just say this is not a
7 very complicated subject that we are dealing with, and I
8 think you can probably safely rely on the Board to follow
9 whatever briefs are ultimately filed on this matter and I
10 don't think you really need concern yourself too much about
11 explaining these things to us right now.

12 MR. LAWLESS: I again would have to take issue
13 with that. The Board, for instance, did not understand in
14 earlier discussions what the effect of the sinking of the
15 Vogtle power block would have on capped and grouted wells
16 beneath the plant and dismissed the contention because they
17 did not understand it.

18 So I think it is not a good idea to leave matters
19 up to the Board to induce their own conclusions that come
20 from the presentation.

21 If, on the other hand, I am allowed when I give my
22 own presentation to make a summary, that might at that point
23 suffice quite well.

24 JUDGE MARGULIES: Mr. Lawless, if you want to
25 develop those figures from the panel, you can ask them to

1 develop those figures or give those figures. And then once
2 it's in the record, you can take those figures and use them
3 on brief or you can -- I don't know if it's in your prefiled
4 testimony or not.

5 MR. LAWLESS: No, it's not. Not the information
6 we are developing today and yesterday.

7 JUDGE MARGULIES: Okay. You may develop the
8 figures from the witnesses and then use it on brief, in terms
9 of arguing to the Board. But there is no polemic between you
10 and the Board in terms of what you think is correct.

11 MR. LAWLESS: I was not hoping to get into a
12 polemic, but I was at least hoping to at least summarize the
13 comments that their scientists have made. I think that's
14 important.

15 MR. CHURCHILL: Your Honor --

16 JUDGE MARGULIES: The points that these witnesses
17 have made are in the record. If you want to draw upon that,
18 you draw upon that at the correct time, which is not during
19 the period of cross-examination of these witnesses.

20 JUDGE PARIS: Mr. Lawless, I have one question
21 about permeability testing which I think if we got into the
22 record right here might clarify things a little bit. Would
23 you mind if I interrupted you to ask Dr. Papadopoulos a
24 question?

25 MR. LAWLESS: Please.

EXAMINATION

BY JUDGE PARIS:

1
2
3 Q Dr. Papadopoulos, in permeability testing, through
4 how much material is the test conducted? Do you understand
5 what I mean? Through how much substrate, distance-wise, is
6 the test conducted? And also would you answer the same
7 question with regard to the in-laboratory test on
8 permeability.

9 A (Papadopoulos) Yes, sir. The size of the material
10 that you are testing depends on the type of the test.

11 Q Can you answer with respect to the tests that were
12 done at Vogtle?

13 A In an aquifer, for example, one would put a well
14 which is open to the entire aquifer so we can obtain the
15 entire permeability over the entire thickness of the
16 aquifer.

17 In this particular instance, in the marl, the type
18 of tests that were conducted in situ, in the marl, have
19 spanned intervals of 5 to 10 feet. In other words, an
20 interval of 10 feet was isolated from both sides and water
21 was injected into that interval under pressure.

22 As in most of these tests, there was no water
23 intake. In other words, during the period of the test they
24 couldn't inject any water into the marl. Although that did
25 not directly yield some values of permeability, it puts --

1 gives us an indication of what the range of permeability
2 would be. For this particular test, intake of water would
3 indicate that there is a permeability which is less than 10
4 to the minus 7 centimeters per second.

5 Now, this can be also evaluated by other
6 approaches to the system, in terms of how much water would
7 such a permeability allow to pass through the marl. A
8 permeability of 10 to the minus 7 centimeters per second, for
9 example, would allow about 2 inches, 1-1/2 to 2 inches of
10 water to go through the marl.

11 When one compares that to the total recharge that
12 is available into the water table aquifer, about 15 inches,
13 one can see that this is a reasonable estimate of the
14 permeability.

15 If the permeability was one order higher, for
16 example, 10 to the minus 6, that would indicate about 20
17 inches of flow through the marl, which is not available. We
18 have only 15 inches of recharge; if, indeed, we had a
19 permeability of that order of magnitude, wouldn't we have a
20 water table aquifer on top of the marl? All the water would
21 have gone through it.

22 Now, the laboratory samples of the marl are small
23 samples, about 4 or 5 inches long and 2 to 4 inches in
24 diameter.

25 Q Taken from different places?

1 A From different places at different depths within
2 the marl. The laboratory analyses were primarily conducted
3 also for geotechnical reference, part of the geotechnical
4 evaluation of the properties of the marl in terms of the
5 construction of the plant. They were taken from depths
6 ranging from 90 feet or more below land surface.

7 The test in the laboratory was done at a pressure
8 of 4 psi, which would correspond to a depth below land
9 surface. In other words, the lab tests were not done under
10 conditions in which that marl would exist in-ground at a
11 depth of 90 feet or 100 feet. So, from that point of view,
12 the lab test would normally yield much larger values, and
13 there are other problems associated with laboratory analysis
14 of samples.

15 First, the sample is very small. It's not
16 representative of -- a representative sample of the marl.
17 Second, you have other problems: There's no such a thing as
18 being able to get an undisturbed sample. It's always
19 disturbed.

20 The decompression that you subjected the sample
21 to, by taking it from a depth where it was staying at 90 psi
22 pressure and bringing it to the surface and testing it at 4
23 psi, could cause fractures in the sample which would indicate
24 a higher permeability which would not be -- exist when it is
25 in place. And there is always a problem of potential leakage

1 through the sample -- through the test parameters --
2 instruments that you are using.

3 So, while they give us some measure of
4 permeability, they are not really the type of values that one
5 uses in making an analysis of groundwater flow in the natural
6 -- under natural conditions.

7 JUDGE PARIS: Okay. Thank you. I have another
8 question or so about the figures that we are talking about
9 now, but I wonder if the Staff plans to cross-examine on
10 this? If so, I'll wait until after you do so.

11 MR. DEWEY: We weren't planning on cross-examining
12 on it.

13 JUDGE PARIS: All right. I'll go ahead,
14 Dr. Papadopoulos, if I may.

15 BY JUDGE PARIS:

16 Q Do you have a copy of yesterday's transcript?

17 A (Papadopoulos) No, sir.

18 Q Do you have that list of permeability values that
19 you read into the record?

20 A That's correct.

21 Q I'm looking at that in the transcript, page 390,
22 and I see that -- this was apparent yesterday -- most of the
23 values are either 10 to the minus 6 or 10 to the minus 7.
24 There is one 7.8 times 10 to the minus 8, and then there's
25 one that's 5 times 10 to the minus 9.

1 Would those, 10 to the minus 8 and 10 to the minus
2 9 values, along with all the rest of the 10 to the minus 7
3 and 10 to the minus 6 values, tend to drive your variance or
4 standard deviation very high? A single value or two that's
5 out of the range, say, of most of the others?

6 A It apparently does. Mr. Lawless apparently has
7 calculated it and shows that the standard deviation is higher
8 than the mean.

9 But my point is that making an arithmetic mean of
10 this data, or in calculating the standard deviation, is not
11 really the appropriate way to approach what the effective
12 permeability of that marl is going to be.

13 If we were indeed going to use this data in terms
14 of saying what the effective permeability of the marl is, we
15 have to look at the harmonic mean.

16 Q I understand your position on that but I'm just
17 addressing the other matter.

18 A As I said, I didn't make this kind of calculation
19 but it is apparent that a couple of small values caused it.

20 Q Are you familiar with the statistical term
21 "maverick observation"?

22 A I am not.

23 JUDGE PARIS: Is anybody on the panel familiar
24 with a maverick observation? All right, I'll drop it. Thank
25 you.

1 MR. LAWLESS: I understand what you are talking
2 about and I might refer to Bower, which is a reference that
3 they cited from. It suggests that the -- that you take a
4 sufficient number of data points so that you do not get to
5 exceed 20 percent --

6 MR. CHURCHILL: Your Honor, I object.

7 MR. LAWLESS: -- so the standard deviation does
8 not exceed 20 percent of the means. It has here -- in fact,
9 the standard deviation here has exceeded these.

10 JUDGE MARGULIES: Your statements --

11 THE WITNESS: (Papadopoulos) May I give one more
12 explanation?

13 JUDGE MARGULIES: Your independent statements add
14 nothing to the record, counsel. They have to come from the
15 witness under oath, and these comments that you make serve no
16 purpose.

17 MR. LAWLESS: Well, I'm sorry. Yesterday I began
18 to feel more like an attorney and less like a scientist, and
19 it's a position that I don't like being in. These are
20 matters -- these are scientific questions and I am laboring
21 under those kind of restrictions.

22 JUDGE MARGULIES: Matters of scientific inquiry
23 have been the subject of hearings, certainly before the AEC
24 and NRC, since their very existence. And the hearings are
25 held and conclusions are reached. Because they are

1 scientific does not mean that they cannot be handled under
2 the normal rules of law.

3 MR. LAWLESS: I did not say they couldn't. I just
4 said that I myself was laboring under that.

5 JUDGE PARIS: Mr. Lawless, we scientists have
6 difficulty not trying to act like lawyers when we are
7 surrounded with them like this.

8 MR. LAWLESS: Thank you. I will do my best to
9 follow that restriction.

10 CROSS-EXAMINATION (Continued)

11 BY MR. LAWLESS:

12 Q In the February '86 document, page 17, in the
13 first paragraph you address wells 42-A, B, C and D.

14 Were these wells created before excavation?

15 A (Farrell) On page 17? Yes: It states in the
16 first paragraph, "the observation wells were constructed in
17 1971."

18 Q But before the surface was pulled away so that the
19 wells were made at the surface themselves, at the surface of
20 the soil?

21 A The drilling of the wells was from the surface?
22 Is that what you are asking?

23 Q Yes. Yes.

24 Okay, then later on there was a construction
25 program and the soil was removed and the wells were

1 sacrificed, filled up, grouted.

2 Where were they grouted from? Were they grouted
3 from -- what level?

4 A The grouting was done from the ground's surface.
5 You mean where the personnel and equipment was located? It
6 was on the ground's surface.

7 Q Where was the ground surface at that time?

8 MR. CHURCHILL: Objection, your Honor. I believe
9 Mr. Lawless is getting into an area that has already been
10 litigated and determined in the summary disposition process.
11 This has to do with the wells as a pathway, pages 21 to 22 in
12 the Board's November 12 order.

13 MR. LAWLESS: This is just trying to get some
14 background for myself on that particular well construction.
15 I'm not looking for anything there.

16 JUDGE MARGULIES: The testimony that we are
17 dealing with on the panel deals with the wells. We will
18 permit the question.

19 MR. LAWLESS: Thank you.

20 THE WITNESS: (Farrell) I guess we'd ask for a
21 repetition of the question.

22 BY MR. LAWLESS:

23 Q Yes, at what level were the wells grouted? Were
24 they grouted from the original surface or from the cut-down
25 surface?

1 A (West) They were abandoned before excavation
2 began, so it would be the original ground surface.

3 Q And then the soil was excavated where the well
4 was?

5 A Yes.

6 Q What sort of precautions -- or how did they work
7 around the grout? This is a pillar of grout. How did they
8 work around that?

9 MR. CHURCHILL: Your Honor, objection. The
10 testimony about the wells is the fact of the existence of the
11 wells for the purpose of obtaining data. The testimony is
12 not about grouting wells, abandoning wells, and preserving
13 the abandoned wells. It is not on that at all. That is a
14 subject which was explicitly and specifically excluded by
15 this excluded by this Board in the summary disposition
16 process.

17 MR. LAWLESS: This is part of their testimony.
18 It's included in their document. I don't see that there
19 should be a problem with asking questions about their
20 document.

21 MR. CHURCHILL: It's not in the document, your
22 Honor.

23 MR. LAWLESS: On page 17 they discuss the
24 observation wells. The last couple of sentences: "The wells
25 were monitored for four years until construction required

1 their closure, at which time they were sealed."

2 JUDGE MARGULIES: The Board will permit the
3 question.

4 MR. LAWLESS: Thank you.

5 THE WITNESS: (West) Would you repeat it?

6 BY MR. LAWLESS:

7 Q Yes. The well has been grouted before the
8 construction program began and now excavation has taken
9 place. How do you handle that grouted well in the
10 excavation? How did you handle that?

11 A (West) These wells are located just outside of the
12 excavated area, right on the lip. If any of the well was in
13 the way of excavation, which would be the very few top feet,
14 then it would be excavated.

15 Q Would be? Or was?

16 A It was.

17 Q So it was excavated around the wells, then?

18 A Not around the wells, no.

19 Q Could you describe that a little bit more?

20 JUDGE MARGULIES: Why don't you ask a specific
21 question.

22 BY MR. LAWLESS:

23 Q I guess the process itself -- what does this look
24 like? Was it just standing by itself? They were excavating
25 around the wells?

1 MR. CHURCHILL: Does the witness understand the
2 question? You have a right for a specific, understandable
3 question.

4 MR. LAWLESS: Yes. There is a grouted well, an
5 excavation is going on.

6 BY MR. LAWLESS:

7 Q If the excavation did not include the wells, it
8 did not include the wells. But it says that the construction
9 of the plant required their closure, and I'm trying to
10 understand why that was so and whether or not the -- how the
11 wells themselves that were grouted -- how the excavation
12 maneuvered around the wells.

13 A (Farrell) There is no maneuvering around the
14 grouted hole. We excavate through that hole. The well is a
15 diameter of up to 6 inches. This is filled with grout.

16 Q So that's taken out?

17 A When they excavate, they will excavate that grout
18 to the depth they excavate.

19 Q So it was just taken out then?

20 A That's correct.

21 Q Was it excavated down from the soil's surface down
22 to the top of the marl, then?

23 A (West) The excavation was.

24 Q On wells 42 --

25 A (Farrell) I think, as Mr. West explained to you,

1 the location of well 42 is just outside the limits of major
2 excavation -- just outside the limits of the major
3 excavation. There was no excavation to the marl.

4 There has been excavation outside that area to
5 bring the plant site to grade. We don't know specifically
6 what the depth is that they may have excavated right there at
7 well 42, but it is not any -- would not be anything, any
8 depth to the marl which is essentially on the order of 80
9 feet.

10 JUDGE PARIS: How deeply were those wells grouted?

11 THE WITNESS: (Farrell) They were grouted to the
12 bottom of the hole, each one to a different depth.

13 JUDGE PARIS: They were fully grouted?

14 THE WITNESS: Yes. To the top of the hole.

15 JUDGE PARIS: If you bulldozed to the depth, the
16 rest was still grouted?

17 THE WITNESS: That's correct.

18 BY MR. LAWLESS:

19 Q When you bulldoze off the surface, what does that
20 do to the well? The grout?

21 A (Farrell) What does it do to the well?

22 Q When the bulldozer hits the grouted well, now
23 grouted from top to bottom, what sort of vibration, what sort
24 of deformation, what sort of displacement of that occurs?

25 A (Crosby) What it does is it breaks it off right

1 clean with the surface of the marl. The marl and cement
2 grout have roughly the same physical properties so it makes a
3 consistent clean break.

4 Q So there is a rupture right at that point, right
5 at the surface point and no plastic movement of the column at
6 all?

7 A I would not characterize it as a rupture. It's a
8 clean break at the top of the marl. And, no, it does not
9 affect the seal below that.

10 Q But the break -- let's see, the grout includes the
11 well itself. The grout runs down the well. What was the
12 well made out of? What sort of material?

13 A Would you be a little more specific?

14 Q Yes, the well material itself; what was it made
15 of?

16 A Which well?

17 Q Well 42.

18 A They are PVC casing.

19 Q PVC casing, and filled with cement. And that
20 should snap at the point of contact that the bulldozer makes
21 with the well?

22 A Right. They are sealed both inside the well and
23 outside the well so it's a solid grouted void.

24 JUDGE PARIS: Mr. Lawless, I believe you are
25 beginning to get into the area that we have considered

1 already in the motion for summary disposition on this. We
2 decide it was already attested to.

3 MR. LAWLESS: What we talked about there were the
4 grouted wells and the weight of the power block sitting on
5 top of the wells and pushing those wells down and possibly
6 doing some surface damage alongside of the grouted wells as
7 the power block settled, and thereby opening pathways for
8 contaminants.

9 What I'm thinking about here is entirely new, that
10 the well stem itself, that the well structure grouted with
11 cement, would act almost like a rebar in cement --

12 JUDGE PARIS: We understand that. They testified
13 to that. And I think you are beginning to belabor the point
14 beyond where it is useful to us.

15 MR. LAWLESS: Okay. Well, I think I've gotten all
16 the information I wanted to out of it, but I do want to say
17 that I don't think it's quite the same issue and we would
18 like to address that when the opportunity comes.

19 BY MR. LAWLESS:

20 Q What is the large pressure drop in well 42-A,
21 October 1971, due to? That's shown on the figure 12.

22 A (Farrell) Would you repeat the question, please?

23 Q Yes. What is the large drop shown in the
24 hydrograph of well 42? Could you explain that? It occurred
25 about October 1971. What was that due to?

1 A The observation well 42-A is monitoring the
2 piezometric surface in the confined aquifer immediately below
3 the marl. That -- the hydro graph there indicates that the
4 fluctuation in the -- from late summer to fall, the
5 potentiometric surface dropped approximately 20 feet.

6 JUDGE PARIS: Are you Mr. Farrell? You moved.

7 THE WITNESS: (Farrell) Yes.

8 JUDGE PARIS: Would you pull that mike a little
9 closer to you, Mr. Farrell.

10 THE WITNESS: (Farrell) I can't specifically say
11 what caused that fluctuation of the potentiometric surface.
12 It would appear to be in the range of what you would expect
13 of normal seasonal fluctuations.

14 BY MR. LAWLESS: '

15 Q But there was no corresponding fluctuation in
16 wells 42-B, C and D. And if it were seasonal --

17 A (Papadopoulos) For wells 42, C and D are within the
18 marl. 42-A is in Tertiary aquifer or below it. The
19 fluctuations there are due to the Tertiary aquifer. The
20 reason there's no variation in 42-C and 42-D is because those
21 are in the marl and the communication between the marl and
22 the Tertiary aquifer is very poor.

23 Q And so that drop, then, is strictly due to
24 seasonal reasons?

25 A It could be possible, that pumpage increases

1 during the summer in the vicinity of the site --

2 A (Farrell) Basically that the direction you would
3 expect the fluctuation of the potentiometric surface to
4 follow on a seasonal basis on a qualitative basis, we don't
5 know specifically what-all influenced that fluctuation.
6 There's many things that could influence it.

7 Q If it were seasonal, would we not also expect
8 something in 42-D?

9 A Not necessarily. It doesn't have to have a
10 fluctuation like that.

11 Q So seasonal variations impact on confined
12 aquifers?

13 A You'll find the general characteristic is that the
14 seasonal fluctuation in a confined aquifer with the same
15 magnitude of influence will be larger because it is related
16 to the storage coefficient. The storage coefficient of a
17 confined aquifer is much smaller so the fluctuation in the
18 aquifer will reflect a much smaller -- the same fluctuation
19 in a confined aquifer as that in an unconfined aquifer will,
20 for the same storage change, be reflected by a much different
21 fluctuation of potentiometric surface, so you can't expect --
22 you shouldn't expect the same magnitude of fluctuation.

23 Q Right. Well, I would agree with that. But I see
24 that there is no fluctuation at all in 42-D. That's what I
25 was concerned about.

1 A Well --

2 JUDGE MARGULIES: All these additional statements
3 have no meaning, Mr. Lawless, as to whether you agree or
4 disagree. You have to ask the witnesses questions. These
5 side comments just take up time. They add nothing to the
6 record.

7 MR. LAWLESS: Well, they are not meant as side
8 comments but they are meant as an opportunity to allow them
9 to restate their -- or change or add additional information.
10 I'll try to make those side comments into questions as we go
11 through this. Again, it's one of those things that are hard
12 to work with.

13 BY MR. LAWLESS:

14 Q You mentioned storage coefficients for the
15 confined aquifer and the unconfined aquifer. Were they
16 calculated?

17 A (West) Yes. They were calculated from pumping
18 test data.

19 Q I didn't see them in the data but they were
20 calculated for both?

21 A (Farrell) No, that's not correct. The storage
22 coefficient was calculated for the confined aquifer in
23 relationship to the make-up wells. The storage coefficient
24 was not calculated for the unconfined aquifer.

25 Q How did you calculate it? What sort of test did

1 you use to calculate it for the confined aquifer?

2 MR. CHURCHILL: Your Honor, may I ask the
3 applicability of this to the question on the permeability of
4 the marl. I know there was an area we did do on summary
5 disposition that was disposed of which was on geological and
6 hydrological formations below the marl. We are talking about
7 the confined aquifer below the marl and the storage
8 coefficient. I would like to ask the relevance. It could be
9 it isn't relevant. I'm just not aware of what it would be.

10 MR. LAWLESS: Maybe I could just add one short
11 comment. He made some comment at the end that I didn't quite
12 catch about why they calculated the storage coefficients.
13 Maybe if he could repeat that or elaborate on that, that
14 would take care of my question.

15 MR. CHURCHILL: I don't have an objection if it's
16 relevant to the issue, but since the storage coefficient is
17 not relevant to the determination of travel time or
18 permeability in marl, then I think we shouldn't waste time on
19 it.

20 MR. LAWLESS: If he can elaborate on that -- is it
21 relevant? Why did you calculate it?

22 THE WITNESS: (Farrell) We calculated the storage
23 coefficient of the confined aquifer to identify the aquifer
24 characteristics in relationship to the assessment of the
25 pumping of the Tuscaloosa aquifer yielding water that is

1 planned to be used during the operation of the plant. The
2 storage coefficient provides you -- you need that
3 characteristic to evaluate the influence of pumping on the
4 aquifer.

5 BY MR. LAWLESS:

6 Q I understand. Thank you.

7 On figure 14 and also at page 19 -- figure 14 and
8 page 19; page 19, the last paragraph, the first sentence you
9 mentioned "The vertical permeability of the marl is
10 anisotropic, as is evidenced by the differences in head
11 decline observed between the piezometers of well clusters A
12 and B."

13 * Does this anisotropy imply that there is
14 significant variation in the vertical permeabilities
15 throughout the marl?

16 A (Farrell) Anisotropic describes -- is a term
17 describing the fact that the permeability varies with
18 location in the material.

19 Q Yes. And we saw that earlier in the data that we
20 talked about. Figure 14 shows differences in head decline
21 through the marl. Does this suggest to you the reason why
22 you described it as anisotropic? Was it based on the data
23 that we've talked about earlier? Was it based on the
24 profiles that we see on figure 14?

25 A I guess what you are asking is what was the basis

1 for us stating -- describing the marl as anisotropic, having
2 anisotropic permeability?

3 Q Yes.

4 A The basis of that is our investigation of a marl
5 through an observation of lithologic characteristics and
6 relating it to permeability, just general characteristics of
7 permeability of materials. It was based on the permeability
8 tests that we have run on the marl and the data here
9 corrected, in terms of the pore pressure in these
10 piezometers.

11 Q So the piezometer profiles in figure 14, then, do
12 support your conclusion that it is anisotropic?

13 A That is what we are saying.

14 Q And figure 14 was determined over a distance --
15 the wells that fed into the profiles here -- this was
16 determined over a distance of -- across the power block --
17 and I don't really have a good estimate on that but that's
18 what, really -- 1000 feet or larger?

19 A (Crosby) The distance between --

20 JUDGE MARGULIES: You are asking two questions
21 now. You have to break down your questions.

22 MR. LAWLESS: I apologize.

23 BY MR. LAWLESS:

24 Q The piezometer profiles that you have got here in
25 figure 14 come from wells over a distance of how far?

1 A (Crosby) First, so you understand, the well
2 clusters A and B were on opposite sides of the power block
3 and they are on opposite sides of the figure. But the wells
4 shown in each one of the sections there are right next to one
5 another, so that they are not across the power block.

6 A (Papadopoulos) It's a vertical profile.

7 Q You have cluster A and cluster B and well series
8 42.

9 A (Crosby) Well cluster A and well cluster B are
10 1200 feet apart.

11 Q Okay. That's what I was looking for. 1200 feet.

12 A (West) Approximately.

13 Q Since your own data shows anisotropy in the
14 permeability of the marl, is it conceivable that this could
15 be extended throughout the marl underlying Vogtle over larger
16 distances?

17 A (Farrell) As we have said yesterday, I believe, on
18 the basis of our permeability testing that we have done, I
19 think I just said in our review of the many feet of core that
20 was collected throughout the site area and beyond, we
21 interpolated and extrapolated through those data points and
22 found a consistent pattern of lithology, thickness of
23 material, and its general characteristics. And we -- and
24 permeability characteristics. So we are stating that this --
25 that the permeability characteristics of the marl is

1 anisotropic.

2 Q And this would hold over large distances, not just
3 over that 1200 feet? So you could expect that to continue
4 over large distances?

5 A Yes.

6 Q Then if it is anisotropic and you have only looked
7 at these cluster A, cluster B and series 42 -- 42 series --
8 of course you have other data points too.

9 Can you say with confidence what the boundary
10 conditions of the permeability range is?

11 A You are asking what we believe is the permeability
12 of the marl? We believe the permeability of the marl, based
13 on the data we collected, indicates that it is less than 10
14 to the minus 7 centimeters per second is the effective
15 permeability of the marl.

16 Q I'm sorry, that was an engineering term I used. I
17 used boundary conditions. Are you familiar with boundary
18 conditions, the term itself?

19 A Yes. I am familiar with the term.

20 Q Let me ask the question again, then. What have
21 you determined to be the boundary conditions on the
22 permeability?

23 A (Papadopoulos) The boundary conditions of
24 permeability -- I know boundary conditions is a mathematical
25 term but it's not something that's applied to permeability.

1 Boundary conditions on the marl system -- maybe
2 what you want to ask?

3 Q Yes. You've --

4 A The boundary conditions are that the head at the
5 top of the marl is equal to the head within the water table;
6 the head at the bottom of the marl is equal to the head in
7 the Tertiary aquifer.

8 At outgrowths of the marl along the Savannah
9 River, the head is equal to the elevation of the marl. And
10 other exposures would be similar -- to the elevation of the
11 marl.

12 Q I'm still looking for the boundary condition on
13 the data itself for the permeability.

14 You have published numbers that run from 10 to the
15 minus 6 to 10 to the minus 9. Were those the boundary
16 conditions of the permeability? Can you say with confidence
17 that those are the boundary conditions? Or are there other
18 boundary conditions?

19 MR. CHURCHILL: Your Honor, this question has been
20 asked over and over again. We have heard in many different
21 forms the answer of how the permeability was determined. The
22 applicability of statistics or the inapplicability -- he's
23 asked the same question over and over again and gotten the
24 same answers.

25 MR. LAWLESS: I have asked the same question and

1 haven't been answered yet.

2 MR. CHURCHILL: At the very least we need his
3 definition of what he means by boundary conditions.

4 JUDGE LINENBERGER: Let me express a further
5 concern. Boundary conditions are quite understandable
6 things. So are boundary values.

7 From the nature of your questioning, Mr. Lawless,
8 it is not clear where you are talking about boundary
9 conditions and where you might be talking about bounding
10 values. Can you make that distinction --

11 MR. LAWLESS: Thank you. Yes.

12 JUDGE LINENBERGER: -- when you speak to these
13 witnesses, because it would help them, I'm sure.

14 MR. LAWLESS: Thank you. That helps me a lot.

15 BY MR. LAWLESS:

16 Q With the information that you have checked,
17 recognizing, as you already pointed out, the marl is
18 anisotropic in its boundary values, how confident are you
19 that you have found the lowest and the highest value of
20 permeability?

21 A (Papadopoulos) The lowest value is of no
22 consequence to us. What we are interested in was primarily
23 to see what is the upper bound.

24 The value of 10 to the minus 7 was indicated by
25 the in situ tests as providing an upper bound. In fact, it

1 may be much smaller than that, but that's not really critical
2 in terms of the type of calculations that we intended to use
3 this data. So the upper bound is 10 to the minus 7
4 centimeters per second.

5 Does that answer your question?

6 Q But it seems that this is in reference to the data
7 that we spoke of earlier, that that data did seem to come out
8 with a bound somewhere closer in the 10 to the minus 6 range.

9 A As I tried to explain a little while ago, 10 to
10 the minus 6 range -- first of all, that data was data done in
11 the permeability and I addressed the issue of the limitations
12 of laboratory determinations of permeability.

13 JUDGE MARGULIES: You'll excuse me, At this
14 point, we still have an obligation to those who want to make
15 limited appearances. Is there anyone present who wants to
16 make a limited appearance at this time? There is no
17 response.

18 You may continue.

19 MR. LAWLESS: Thank you.

20 BY MR. LAWLESS:

21 Q One additional question --

22 MR. CHURCHILL: Your Honor, I'm not sure the
23 witness had finished his answer.

24 JUDGE MARGULIES: I'm sorry. I didn't mean to
25 interrupt him. I thought he had finished his answer.

1 THE WITNESS: (Papadopoulos) So, in terms of the
2 laboratory data, I don't know, really, what upper or lower
3 bounds can be -- if there were 100 samples available compared
4 to the 10 available.

5 But, as I said earlier, again, our evaluation of
6 the permeability of the marl in terms of calculating travel
7 times was based on the in situ tests. And those provided us
8 an upper bound of 10 to the minus 7.

9 Now, in fact the permeability of the marl could be
10 much lower than that, but we are not interested, really, in
11 determining the lower bound on the permeability data.

12 BY MR. LAWLESS:

13 Q Considering that you could take 100 samples and
14 haven't, my question then is this: How confident are you
15 that you have found the highest permeability value?

16 A (Papadopoulos) As I tried to explain a little while
17 ago, I am very confident that the value is less than 10 to
18 the minus 7. And the indication for that confidence, or the
19 basis of my confidence for that is the calculations that I
20 made to determine what is the potential flow rate under
21 different permeabilities.

22 As I indicated a little while ago, 10 to the minus
23 7 centimeters per second permeability would be equivalent to
24 having about 10 percent of the recharge to the aquifer going
25 through the marl, as an upper bound.

1 Now, if the permeability is much higher than that,
2 you should have much higher flow rates. And the aquifer --
3 the water table would not be existing there if we had higher
4 flow rates across the marl, given that recharge is only 15
5 inches.

6 Second, I have made some other independent
7 calculations looking at the decline in water level
8 piezometers.

9 If you look at the piezometers which were drilled
10 -- the hydrographs of the piezometers, it took -- these
11 piezometers, after they were being drilled, they were filled
12 up with water as they were installed, and they took about two
13 months before the water level declined and stabilized.

14 I made a graph analysis of the decline rate in
15 those wells and that gave me permeabilities which are 10 to
16 the minus 8 centimeters per second.

17 Now, there were some limitations in my approach in
18 evaluating the water level decline, because exactly the first
19 date when that water level was raised in the well was not
20 clear to me and the total change in the water level was not
21 clear to me. But potential error in that calculation that I
22 made is less than one order of magnitude.

23 Based on these calculations that I mentioned, I'm
24 very confident that effective vertical permeability of the
25 marl is less than 10 to the minus 7 centimeters per second.

1 Q Thank you. With the data that you gave us
2 yesterday, with a mean that was established in that data of
3 10 to the minus 6 as opposed to the 10 to the minus 7 value
4 that you now feel confidently is the correct value, with the
5 data that we have from yesterday, a value of 10 to the minus
6 6 as the mean, does that 10 to the minus 6 value disturb your
7 confidence at all?

8 A (Papadopoulos) Not at all. As I mentioned, if I
9 had 10 to the minus 6 of permeability, I should have 20
10 inches of water per year flowing through that aquifer. The
11 total recharge to the system is 15 inches. You cannot have
12 flow with more than what's available.

13 Q If I use 10 to the minus 6 as a value to calculate
14 water flow or contaminant flow through the marl, do you feel
15 that I would be wrong in doing that?

16 A Very much so.

17 Q Even when your mean comes out to be 10 to the
18 minus 6?

19 A (Farrell) I would like to say that is not our
20 mean. That's your mean that you have stated.

21 Q I'm sorry. You are correct on that. But the mean
22 that I calculated using your data.

23 A You are getting back to statistical analysis and
24 we have stated that we don't believe that statistical
25 analysis, as you have presented it, is applicable in

1 evaluating the permeability of the materials.

2 A (Papadopoulos) Mr. Lawless, maybe if I give you an
3 example it will become clearer.

4 If we take a sand and a clay under it, and I'm
5 trying to look at flow through the sand and the clay
6 underlying it, the clay and the sand would have 3, 4, 5
7 orders of magnitude difference in permeabilities. And I can
8 take hundreds of samples from the sand and hundreds of
9 samples from the clay and I'll always have orders of
10 magnitude of difference in those permeabilities.

11 Going -- taking that data and making a statistical
12 analysis of the type that you are talking is going to be
13 completely meaningless, really. I'll have a very high
14 standard deviation. I'll have a mean which is different from
15 both of the permeabilities. Whereas the vertical flow
16 through that system would be simply controlled by the
17 harmonic mean of those two permeabilities, and the fact that
18 the standard deviation of that data is very large, or the
19 mean is so -- closer to the permeability of the sand, would
20 not really have any meaning in terms of determining the rate
21 of flow across that two-unit system.

22 JUDGE MARGULIES: We have pretty well exhausted
23 this subject. We'll take a 15-minute recess and proceed from
24 there.

25 (Recess.)

1 JUDGE MARGULIES: Back on the record. Is there
2 anyone else who wishes to make a limited appearance?

3 While we are on the subject of limited
4 appearances, yesterday three people made limited appearances,
5 Lesley Price, Susan Register, and Charles Henry.

6 In their statements they made allegations
7 regarding improprieties involving NRC personnel. We fully
8 realize that their statements were not evidence, they were
9 not made under oath, but the Board feels it is incumbent upon
10 them to take their testimony, the segments of the transcript
11 as to what they testified about, and forward those
12 transcripts to the appropriate arm within the Commission who
13 investigates allegations of improprieties of Commission
14 personnel and permit them to take whatever action they deem
15 appropriate on those allegations. And that is what we will
16 do.

17 We wished to advise the parties of our intent. It
18 will be a simple transmission without any comment, in that
19 the statements were not made under oath.

20 You may continue, Mr. Lawless.

21 MR. LAWLESS: Thank you.

22 BY MR. LAWLESS:

23 Q On page 20, at the end of the first paragraph, I
24 would like to ask a question about your harmonic mean
25 permeability of 4.3 times 10 to the minus 8. How was that

1 harmonic mean calculated? It appears to have been calculated
2 by the Bouwer method as listed on page 56 to 60; is that
3 correct?

4 MR. CHURCHILL: Could we have an identification of
5 the document to which you are making reference?

6 MR. LAWLESS: It's on page 60. I'm sorry, it's
7 the February '86 document.

8 MR. CHURCHILL: I'm sorry. I see it. Go ahead.

9 THE WITNESS: (Farrell) I'm not sure of the pages
10 of Bouwer's text that you are referring to, but yes, he
11 describes a harmonic mean and that's the method that we
12 used.

13 BY MR. LAWLESS:

14 Q Could you -- give me just one second on this.

15 With the calculation of a harmonic mean
16 permeability of 10 to the minus 8 centimeters per second, you
17 then calculate a travel time through the marl of 123 years;
18 is that correct?

19 A (Farrell) Not with the harmonic mean as
20 calculated. We used 10 to the minus 7 centimeters per second
21 for that calculation.

22 Q So adopting an average vertical permeability of 1
23 foot per year, then, was based on 10 to the minus 7, as
24 discussed here?

25 A 10 to the minus 7 centimeters per second is

1 essentially equivalent to .1 foot per year. Just different
2 units.

3 Q Was it 10 to the minus 7 or was there a
4 coefficient? Just 10 to the minus 7?

5 A The number is the value of the coefficient of
6 hydraulic conductivity, or commonly referred to as
7 permeability.

8 Q This is not -- I'm not trying to have a technical
9 question here. I'm just looking for the real permeability
10 number that you used. What was it?

11 A (Papadopulos) 1 times 10 to the minus 7
12 centimeters, which is equivalent to .1 feet per year.

13 Q And if the coefficient -- excuse me -- if the
14 permeability was 1 times 10 to the minus 6, if there was an
15 error in your assumption -- you say here that assuming the 10
16 laboratory tests are representative. If there was an error
17 in your assumption, if, indeed, it was 10 to the minus 6,
18 then that would have a very large impact on travel time; is
19 that correct?

20 MR. CHURCHILL: Objection, your Honor. We have
21 been over this again and again and again. He's told where
22 the 10 to the minus 7 came from. It was not from these
23 laboratory tests and he has justified why the 10 to the minus
24 7 is conservative.

25 JUDGE MARGULIES: Do you wish to respond?

1 MR. LAWLESS: I am trying to get some definition
2 of their level of confidence on the 123 years calculation
3 that was made. They are using 1 times 10 to the minus 7 as a
4 calculation of -- in the calculations of the travel time. 1
5 times 10 to the minus 7 is their permeability.

6 If the permeability, indeed, is not 1 times 10 to
7 the minus 7; if, instead, it is 1 times 10 to the minus 6,
8 how much of an impact would that have on the travel time?

9 MR. CHURCHILL: My objection, your Honor, is that
10 this ground has been plowed over and over again. He's
11 already asked the question and it has been explained why 10
12 to the minus 6 is not applicable and why, on the basis of
13 physical observations, 10 to the minus 6 would be
14 impossible.

15 We can go over it for the next two weeks but I
16 think that it's just wasting all of our time.

17 MR. LAWLESS: I'm not certain that I can accept
18 that comment "impossible." "Impossible" means that there has
19 been a fair statistical analysis, and of course that has not
20 been done. In fact, what we are basing this on is the
21 judgment of these scientists, and I'm asking them, if that
22 judgment were wrong, if, indeed, it were 10 to the minus 6
23 instead of 10 to the minus 7, would that impact the travel
24 time across the marl?

25 THE WITNESS: (Papadopoulos) The --

1 JUDGE LINENBERGER: Just one minute. Mr. Lawless,
2 would it satisfy your purposes to get an answer to the
3 question what is the basis of confidence for the 123-year
4 travel time value?

5 MR. LAWLESS: I think that might. As I found out
6 over the break -- I'm still not certain of all of the rules
7 here -- but it looks like we will be able to make our direct
8 comments later, after all of this is over with. Possibly at
9 that time we can discuss some of these things. But I think
10 that would probably help, yes. Thank you.

11 JUDGE LINENBERGER: Why don't you just ask that
12 question, then. And let's kind of move on. We are spending
13 an awful lot of time here.

14 MR. LAWLESS: Yes. But the issue is rather
15 important. If using a 10 to the minus 6 number as I did,
16 turns out to give us a travel time --

17 JUDGE LINENBERGER: Mr. Lawless, I thought -- we
18 were trying to be of assistance to you, telling you what
19 question to ask and now you are getting back into a
20 discussion again.

21 JUDGE PARIS: Mr. Lawless, they have indicated
22 their reasons for using 10 to the minus 7. They said they
23 are confident that's what they should use.

24 MR. LAWLESS: Yes, yes.

25 JUDGE PARIS: Now, rather than beating that horse

1 to death, if you disagree with that the time for you to tell
2 us about that is when you file your proposed findings.

3 MR. LAWLESS: Right. Okay. And I find that out
4 during the break. I wasn't aware that was coming up and that
5 will help a lot. Thank you.

6 BY MR. LAWLESS:

7 Q Could you give me the basis of your confidence in
8 your estimate of the 123-year travel time across the marl?

9 A (Farrell) We believe that that's a minimum time
10 for water to travel across the marl.

11 Q And you are very confident in that?

12 A (Papadopoulos) There are several parameters that
13 entered in the calculation of the travel time. These are
14 permeability or hydraulic conductivity, the gradient, and the
15 porosity.

16 We have, as I indicated, a very high confidence
17 that the permeability is less than 10 to the minus 7. We
18 have actually measured water levels, so we are extremely
19 confident of the gradient. And we have a very large number
20 of porosity measurements and we are very confident with the
21 porosity that we used in these calculations.

22 Therefore, we have to be confident, also, with the
23 number that we are given as being a lower limit of the travel
24 time.

25 Q I'll back up for just one moment to page 17. One

1 short question.

2 17, this February '86 document -- on page 17 in
3 your July '85 document -- let's see, in the 1985 document,
4 the last sentence under number 35, "The direction of
5 groundwater flow beneath the power block area is northward to
6 Mathes Pond as shown in figure 9." Has that been changed in
7 this document?

8 MR. CHURCHILL: Has what been changed, your
9 Honor?

10 MR. LAWLESS: The flow northward. Has the flow
11 northward been changed?

12 THE WITNESS: (Farrell) What document?

13 MR. LAWLESS: The July '85 document.

14 MR. CHURCHILL: Your Honor, if he thinks there's
15 something in the current testimony that has been changed he
16 should ask about it. If he thinks it has been changed he
17 should point it out specifically to the witness where he
18 thinks there's been a change between the two documents.

19 MR. LAWLESS: I have it cited here, if you will
20 just give me one second, please.

21 I found it and I also found their answer. They
22 are still using a northward movement from Mathes Pond -- and
23 it's not on page 17, it's on page 23 of the document.

24 BY MR. LAWLESS:

25 Q The question is this, then: Do you feel that the

1 flow of contaminants will move northward and only northward
2 towards Mathes Pond?

3 JUDGE MARGULIES: You just confirmed that in the
4 document and that is their testimony. What is the purpose of
5 asking the question?

6 BY MR. LAWLESS:

7 Q Is it possible it could be used in any other
8 direction? Is northward used as an example or do you feel
9 like the only movement will be northward?

10 A (Farrell) Are you asking about a statement we made
11 in our February '86 testimony?

12 Q Yes.

13 A What page is that?

14 Q I found it on page 23, "groundwater moving
15 northward." It's the first sentence in the paragraph on page
16 23.

17 A (Papadopoulos) That is the direction that the
18 gradients at the site indicate, northward as being the
19 direction of groundwater flow.

20 Q And you feel like it could not possibly move in
21 any other direction?

22 A Since contaminants cannot really, or groundwater
23 cannot flow up gradient, your assumption would be correct.

24 Q Okay. On page 24 -- let me find the spot.

25 In the first paragraph on that page, five lines up

1 from the bottom of the first paragraph --

2 JUDGE PARIS: What page are we on?

3 MR. LAWLESS: Page 24. And it's page 24 in the
4 1986 document and page 19 in the 1985 document.

5 JUDGE PARIS: Unless there's a real good reason to
6 refer to that earlier document, I would prefer that you not
7 do it. We don't have it up here and therefore it doesn't
8 mean anything to us.

9 MR. LAWLESS: In that document they had described
10 a number of assumptions that they had made to make the
11 calculations at that time, and they described those
12 assumptions as conservative; conservative assumptions was not
13 used in the '86 document. I was wondering why they made that
14 change. Are these assumptions, then, no longer
15 conservative?

16 MR. CHURCHILL: Could you tell us exactly which
17 assumptions in the current testimony you are referring to,
18 Mr. Lawless?

19 MR. LAWLESS: Yes. On page 19, in the '85
20 document, six sentences from the bottom of the first
21 paragraph; and on page 24 in the '86 document, five sentences
22 up.

23 JUDGE PARIS: Five sentences up from where?

24 MR. LAWLESS: Five sentences up from the bottom of
25 the first paragraph, on page 24: "Each of the analyses is

1 based on a one-dimensional flow model."

2 MR. CHURCHILL: Could we have the question then,
3 Mr. Lawless? Relevant to that sentence, "each of the
4 analyses is based on a one-dimensional flow model"?

5 BY MR. LAWLESS:

6 Q The words "conservative assumptions" was deleted
7 from one text to the next. I was wondering if they could
8 explain why.

9 A (West) If you look at page 24, the beginning of
10 the second paragraph, the same words are used.

11 Q You mean all of the analysis?

12 A (Crosby) Perhaps we should read it. "All of the
13 analyses impose extreme assumptions" --

14 Q It's right above that.

15 A You are interrupting me. The one he was referring
16 to is, "all of the analyses impose extreme assumptions
17 involving the manner in which the radioactive release could
18 occur."

19 JUDGE PARIS: By extreme assumptions do you mean
20 conservative assumptions?

21 THE WITNESS: (Crosby) Yes.

22 JUDGE PARIS: Does that clarify it?

23 MR. LAWLESS: Actually I'm referring to a sentence
24 six lines above that. I was not referring to that.

25 THE WITNESS: (Crosby) Our testimony states that

1 they were extreme conservative assumptions. We are not
2 changing that.

3 BY MR. LAWLESS:

4 Q So the extreme assumptions, you are equating that
5 with conservative assumptions?

6 A (Crosby) That's true.

7 Q Okay. Thank you.

8 On page 25 to 26, at the bottom of the page you
9 are using porosity measurements of 31 to 37.6 percent. How
10 many samples did you have to determine that porosity?

11 A Eight samples.

12 Q Could you read the data?

13 A Okay. They were from samples out of the backfill
14 from sample 10 and sample 11, and the porosity values were:
15 39.4, 38.8, 37.6, 35.0, 36.9, 34.9, 32.9, and 31.6.

16 However, the important thing is that these samples
17 were recompactd at various percentages. I'll read those
18 down to you as well in the same column, same order: 92.9,
19 93.9 -- these are percents of compaction.

20 Q One second. I'm sorry. Let me just make a column
21 and I'll be right with you. Go ahead.

22 A 92.9 percent, 93.9 percent -- this is again
23 starting at the top; right?

24 Q Yes.

25 A 95.7 percent, 99.8 percent, 91.2 percent, 94

1 percent, 97 percent, 98.8 percent.

2 Q Were they recompacted before or after you
3 determined the porosities?

4 A No, the porosity is determined after they have
5 been recompacted in the laboratory.

6 Q Afterwards, okay.

7 A (West) To those compaction levels.

8 Q Those recompactions, then, you got those
9 porosities?

10 A That's correct.

11 A (Farrell) The samples that meet the compaction
12 criteria were the ones that were used in that analysis of the
13 porosity.

14 Q What was the criteria? Did all of these meet the
15 criteria?

16 A No, they did not. Those -- the compaction
17 criteria, compaction at an average of 97 percent.

18 A (Crosby) And that's the compaction level that was
19 used in the backfill for the plant, so those are realistic
20 values for the in-place backfill.

21 Q Let me see if I understand, then. Were they
22 compaction criteria of 97 percent -- when you obtained 97
23 percent those were the values that you used?

24 In other words, for instance, the first one had a
25 compaction of 92.9 percent and a porosity of 39.4; did you

1 just throw that value out? Just to understand you?

2 A (Farrell) We used those, the porosities of those
3 samples that met the compaction criteria. Those that were
4 not compacted or compacted to below that criteria were not
5 used.

6 Q So, for instance, the 92.9 -- just trying to see
7 if I understand what you are saying. For example, the 92.9
8 compaction on the 39.4 porosity was then thrown out or not
9 used to calculate the average porosity of 34 percent?

10 A (Farrell) The way you expressed it there would
11 seem to me misleading.

12 Q Give me an example then?

13 A Let me clarify something. The samples were
14 compacted to a certain percentage of density and then the
15 porosity was measured of that sample. So what it -- we are
16 expressing here, or the relationship, is that the porosity of
17 the sample at whatever compaction -- percent compaction is
18 indicated, that's the porosity of that sample at that
19 compacted effort.

20 The sample we used, what is described in our
21 testimony, are only those samples that are compacted to a
22 percentage of maximum density that met the compaction
23 criteria of 97 percent.

24 So, for example, the sample that was only
25 compacted to 92.9 percent, that sample was not used in the

1 analysis.

2 Q Okay. Thank you.

3 On page 25 you used a permeability in the backfill
4 of 1220 feet per year. This was a change from the 2260 feet
5 per year that you had used earlier. Could you explain the
6 change? Was this based -- excuse me. That's the question:
7 Explain the change.

8 A (Papadopoulos) The 2200 feet per year was, again, a
9 laboratory-determined permeability for the backfills. Since
10 most calculations of travel time were, particularly
11 concerning the backfill, hydraulic in situ tests were
12 conducted in the backfill area to determine the in situ
13 permeability of the tests, of the backfill area. The value
14 of 1200 is the highest value obtained from those tests on the
15 backfill and was used by them to calculate travel time.

16 Q This is in your report, Dr. Papadopoulos?

17 A Yes. The values are the ones which I reported in
18 my report.

19 Q That's the results of hydrogeologic testing? I
20 think that's February '86 also; is that correct?

21 A Yes.

22 Q Thank you.

23 On page 26 you calculated, using Darcy's law, you
24 calculated a groundwater velocity of 14.4 feet per year.
25 This is based on the assumptions that were made, and so forth

1 and so on.

2 Did you compare that 14.4 feet per year with the
3 data provided by the Savannah River plant from groundwater
4 velocities in their area?

5 MR. CHURCHILL: Objection, your Honor. In your
6 November 12 order you specifically said that the geological
7 and geohydrological data from the Savannah River plant were
8 not at issue here. What was at issue here was the data on
9 the geological and hydrological structures and features at
10 the Vogtle plant.

11 MR. LAWLESS: That's a good objection. However,
12 we are dealing with very complex calculations; they are
13 esoteric. They are hard for the average person to
14 appreciate, sometimes even for engineers and scientists. And
15 one of the things that I would think that a scientist or
16 engineer or hydrogeologist would want to do is check that
17 number with calculations, particularly if it were available
18 and particularly if it were from subsurface groundwater
19 movement nearby.

20 JUDGE PARIS: Mr. Lawless, if we were comparing
21 travel times in natural substrate, there might be some
22 validity in your argument. I can't for the life of me see
23 why we need to compare travel time from backfill with travel
24 time in natural substrate on the SRP.

25 MR. LAWLESS: It's still based on a calculation.

1 I think what I'm trying to do is establish that their
2 calculations on groundwater travel time have been made
3 nearby, and I'm just wondering if they have checked their
4 calculations with any other calculations in the area. I
5 think that maybe the materials are different. However, one
6 can always judge how one set of calculations did against
7 actual data -- that is to say how predictions did, and these
8 are predictions -- and how those predictions did against
9 actual real world data.

10 JUDGE PARIS: Dr. Papadopoulos has some testimony
11 relating to ways of calculating groundwater travel time.
12 Would it not be appropriate to wait, perhaps ask him
13 questions about that when we get to it?

14 MR. LAWLESS: I have questions for that testimony
15 as well, but I was just wondering whether this 14.48 feet per
16 year and the other calculations were checked against any
17 other available data from the literature.

18 JUDGE PARIS: I don't see how that would help us.

19 JUDGE MARGULIES: The objection is sustained.

20 BY MR. LAWLESS:

21 Q One of the radioactive elements that you looked at
22 in your calculations was strontium 90.

23 Let me back up just one minute to ask about that
24 objection that was sustained. Can we still address our
25 direct comments, when we are giving the opportunity to later

1 on to the information in the literature on those kind of
2 issues?

3 JUDGE MARGULIES: I suggest it may be appropriate
4 to speak with Staff in terms of them being able to help you
5 in this proceeding in terms of how you present the case.

6 MR. LAWLESS: Okay. Thank you.

7 BY MR. LAWLESS:

8 Q On the strontium 90 that was mentioned on the
9 bottom of the page, the comment was made that "migration of
10 strontium 90 and cesium in the groundwater will be
11 retarded." Can you describe how much the strontium 90 would
12 be retarded, as compared to the cesium 137 and as compared to
13 tritium?

14 A (Crosby) I think if you read on, the next
15 paragraph explains that.

16 Q Will you describe how the strontium 90 is retarded
17 in comparison to the cesium 137? What does the "retarded"
18 mean? Can you put some discrimination on those terms?

19 A (Farrell) It's described in our testimony on page
20 -- beginning on page 27, the degree of retardation is
21 described.

22 JUDGE PARIS: The values are summarized on the
23 bottom of page 28, Mr. Lawless.

24 BY MR. LAWLESS:

25 Q These are, again, calculated values. Have they

1 been compared with actual data?

2 A (Farrell) We used -- the basis for the degree of
3 retardation is the equilibrium distribution coefficients
4 listed on page 28. Those distribution coefficients are ones
5 stated in the reference given as an average value of measured
6 values in the literature.

7 Actual measured retardation coefficients --
8 distribution coefficients of samples of the backfill at Plant
9 Vogtle are much higher than those values used in the
10 analysis.

11 Q Are you aware of the transmission time for
12 strontium 90 that has been recorded at the Savannah River
13 plant?

14 MR. CHURCHILL: Objection.

15 MR. LAWLESS: I think that's relevant. If we know
16 that transmission time is quite different from calculated
17 time, I think that's very important.

18 MR. TINGLE: Your Honor, speaking just as a member
19 of the general public, I would like to have something in the
20 nature of a test, if it were anywhere near compatible with
21 the data that they had, rather than that I had calculations.
22 Again, speaking as a layman.

23 JUDGE PARIS: Mr. Lawless, the spill involving
24 strontium 90 that I know about, at Savannah River, that
25 resulted in the radionuclide moving practically not at all

1 after it spilled from the tank --

2 MR. LAWLESS: I think you are referring to
3 settlement. Actually, strontium 90 has been found to move
4 rather rapidly from seepage basins and other sources through
5 the groundwater at very fast speeds. I think that
6 information is relevant and I wonder if they have checked
7 their calculations against the data, the transmission data
8 that is available.

9 JUDGE PARIS: I was not referring to that.

10 JUDGE MARGULIES: I'll permit the question. You
11 may answer. Did you check it or you didn't?

12 THE WITNESS: (Farrell) I'm sorry. Would you
13 repeat the question?

14 BY MR. LAWLESS:

15 Q Have you checked it or not?

16 A (Farrell) I'm sorry. Have I checked what?

17 Q Let's see. You've got calculated values of
18 transmission times for strontium 90. Have you checked those
19 calculated transmission times against the real world data
20 that is available from the Savannah River plant right
21 nextdoor, on strontium 90?

22 A The basis for the retardation coefficients and the
23 transmission of strontium 90 in our analyses is described on
24 page 28. The equilibrium distribution coefficients for
25 strontium 90 and cesium 137 are four samples of backfill that

1 were measured by the batch method.

2 That's the basis. We have actual real life
3 measurements of a distribution coefficient for strontium 90
4 and cesium 137 in the materials specifically at the Plant
5 Vogtle site.

6 MR. LAWLESS: Mr. Chairman, I think they are being
7 obtuse. If I may, the Savannah River plant used the batch
8 method also. The batch method in the laboratory has nothing
9 to do with transmission times in the real world, and they
10 have found that out themselves and I think that's a very
11 simple question that these geologists -- hydrogeologists can
12 answer.

13 JUDGE MARGULIES: I think it's obvious that the
14 answer is: No, you didn't compare it?

15 MR. LAWLESS: I think so. That's correct.

16 MR. TINGLE: Could we get the witness to state
17 that, please?

18 THE WITNESS: (Farrell) The question is did we
19 measure it to any experience at the Savannah River plant?

20 BY MR. LAWLESS:

21 Q Yes.

22 A No.

23 JUDGE MARGULIES: This is going to be an
24 appropriate time to break. There are a few things we have to
25 discuss in terms of the site visit, and we have to be over

1 there by 2:00.

2 You wanted to give us some further information on
3 the map distributed to the parties?

4 MR. WHITNEY: I think the map is self-explanatory,
5 but let me go over it very quickly.

6 JUDGE MARGULIES: We can go off the record.

7 (Discussion off the record.)

8 JUDGE MARGULIES: In an off-the-record discussion,
9 directions to the plant were provided. What I would like to
10 discuss now is the schedule for tomorrow.

11 MR. TINGLE: Excuse me, Mr. Chairman, could we
12 have a little bit of clarification on the plant visit? What
13 -- the items covered, will they be specifically -- what is to
14 go on record here? Or will it be in the nature of a general
15 site visit?

16 JUDGE MARGULIES: We went through all of that
17 yesterday.

18 MR. TINGLE: I'm sorry.

19 JUDGE MARGULIES: I'm sure Mr. Lawless can fill
20 you in on it. But let's get on to the scheduling for
21 tomorrow.

22 Are you prepared to continue with the examination
23 of the panel tomorrow, Mr. Lawless?

24 MR. LAWLESS: I have an experiment to run in the
25 morning. It has been obligated for sometime. I am available

1 the rest of the afternoon after lunch tomorrow and I'm
2 available all day on Friday. I could even possibly be back
3 later on this afternoon, if that would help.

4 JUDGE MARGULIES: No, it won't. It won't help
5 today.

6 Will the Intervenors have someone here for
7 Contention 10.5?

8 MR. TINGLE: Yes. We'll provide somebody.

9 JUDGE MARGULIES: Is it all right with the parties
10 to proceed with 10.5 tomorrow, tomorrow morning? Or do they
11 have some other suggestion?

12 MR. CHURCHILL: Your Honor, we would be ready to
13 proceed with our direct testimony on 10.5, and not knowing
14 how long anything is going to take we would also be ready to
15 proceed tomorrow with our panel on 10.1, if we should get
16 done with 10.5 before Mr. Lawless is back to resume
17 cross-examination on Contention 7.

18 JUDGE MARGULIES: Is there -- go ahead, counsel?

19 MR. BORDENICK: I was just going to say, we also
20 will be prepared to go ahead with 10.5 and 10.1. I was also
21 wondering if it's possible to get some time estimates from
22 the Intervenors, both on Contention 7 and -- I suspect we can
23 get that from Mr. Lawless; and also time estimates on 10.5
24 and 10.1; I'm afraid we may not be able to get estimates on
25 that from the representative of the Intervenors present

1 today.

2 MR. LAWLESS: Should I answer it?

3 JUDGE MARGULIES: Yes.

4 MR. LAWLESS: I'm on the last couple of pages at
5 this time and so I don't look for the groundwater contention
6 to last that much longer.

7 Then we have the rest of the groundwater -- excuse
8 me -- the questions of this panel to last that much longer.
9 But we have my testimony and any questions on that, and so
10 forth, to follow.

11 JUDGE MARGULIES: Is someone going to be prepared
12 to argue the motion on your testimony, the motion to strike
13 your testimony?

14 MR. LAWLESS: I think someone will be here to help
15 me. I believe they are depending on myself to do most of the
16 argument. There will be someone here.

17 MR. CHURCHILL: Your Honor, just in the way of
18 information, Applicants will object very strongly to having
19 Mr. Lawless argue the motion on the admissibility of his own
20 testimony. We don't have to argue that now. But if he
21 intends to do that I should put everybody on notice that we
22 don't think it's appropriate in accordance with the rules of
23 practice and we will object to that.

24 JUDGE MARGULIES: Could you cite the particular
25 rule?

1 MR. CHURCHILL: Yes, sir. He's not a member of
2 this organization. The rule is 2.7.13, part B. It says: An
3 association, incorporated or unincorporated can be
4 represented by an attorney-at-law or a duly authorized member
5 of that organization. There is the exception for allowing
6 somebody to help with the cross-examination, which is what he
7 has been doing. But he cannot be a representative of that
8 organization.

9 Beyond that, I don't think it's proper for a
10 proffered witness to also come up and argue why his own
11 testimony should be accepted in light of the legal standards
12 which are being advanced by the movant. In this case, which
13 we have had ample demonstration of, the particular individual
14 here has no respect for those legal standards. And if he
15 does understand them he certainly hasn't demonstrated that
16 here.

17 I think it would be a very unproductive and
18 inappropriate argument.

19 MR. LAWLESS: I would like to say that I have
20 great respect for the legal standards. The difficulty that I
21 have had here is as a scientist, being able to restrict
22 myself to those things that I'm not quite familiar with.
23 Issues of science I feel much more comfortable with. As a
24 forum to help us probe the statements, the scientific
25 statements, I feel comfortable with that. I just don't feel

1 comfortable with the legal restrictions or the rules that
2 have come up. But quite the contrary, I have great respect
3 for those rules and the regulations and for the Board and for
4 the opposing attorney and for the work that they are doing.
5 I think that, in my own feeling, this has been a good
6 experience. I do not look at this as a negative experience
7 at all.

8 JUDGE MARGULIES: Are you a member of the
9 organization?

10 MR. LAWLESS: What organization?

11 MR. TINGLE: GANE.

12 MR. LAWLESS: No, I am not.

13 MR. TINGLE: I would like to say also that we are
14 working with limited resources, limited funds until -- in
15 situations like this the government decides to provide the
16 opposition, as they do in some states on different things --
17 funds to at least raise these questions. All we are really
18 trying to do is raise questions and present information, and
19 the whole idea of this tribunal is to get information.

20 I realize that we have to go by the rules but I --
21 you know, as Dr. Lawless -- Professor Lawless said, we have
22 great respect for the Board here, and what's trying to be
23 done here.

24 JUDGE MARGULIES: Is there any objection to
25 starting tomorrow morning at 9:00?

1 MR. CHURCHILL: Not from Applicants. Tomorrow?

2 MR. BORDENICK: Not from the Staff.

3 MR. TINGLE: No objection. What time would
4 that --

5 MR. LAWLESS: Can we start this contention at
6 12:00?

7 JUDGE MARGULIES: We could start groundwater in
8 the afternoon, when you appear in the afternoon, but in terms
9 of starting tomorrow on 10.5 -- and you indicated someone
10 will be here for GANE?

11 MR. TINGLE: Yes, sir. 10.5, and .1 are not major
12 contentions. They are fairly limited, I think, in the scope.

13 JUDGE MARGULIES: You will have no problem having
14 someone here at 9:00? We can go ahead with that?

15 MR. TINGLE: No. No.

16 JUDGE MARGULIES: We will start tomorrow morning
17 at 9:00. We will then continue with 10.1, if we conclude
18 with 10.5, through some miracle in the morning. And then we
19 will move on to 7 in the afternoon. But Intervenors should
20 be aware that Applicant is going to oppose your arguing the
21 motion. And whoever argues the motion, whoever it's decided
22 will argue the motion for the Intervenors, they should be
23 fully familiar with all the documents that have been filed on
24 that motion, the memorandum and order of the Board in
25 particular, ruling on the motion for summary disposition.

1 We will stand in recess until tomorrow morning at
2 9:00.

3 (Whereupon, at 12:35 p.m., the hearing was
4 recessed, to reconvene at 9:00 a.m., on Wednesday, March 13,
5 1986.)
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CERTIFICATE OF OFFICIAL REPORTER

This is to certify that the attached proceedings before the UNITED STATES NUCLEAR REGULATORY COMMISSION in the matter of:

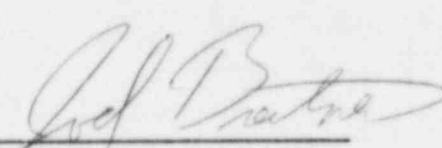
NAME OF PROCEEDING: GEORGIA POWER COMPANY, et al.
(Vogtle Generating Plant,
Units 1 and 2)

DOCKET NO.: 50-424 OL; 50-425 OL

PLACE: WAYNESBORO, GEORGIA

DATE: WEDNESDAY, MARCH 12, 1986

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission.

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