

UNITED STATES OF AMERICA DOCKETED
NUCLEAR REGULATORY COMMISSION USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In the Matter of)
DUKE POWER COMPANY, et al.)
(Catawba Nuclear Station,)
Units 1 and 2))

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

Docket Nos. 50-413
50-414

APPLICANTS' TESTIMONY ON
EMERGENCY PLANNING CONTENTION 6

Duke Power Company	(R. Michael Glover)
North Carolina	(Dayne Brown, J.T. Pugh, III)
South Carolina	(William M. McSwain)
Gaston County	(Bob E. Phillips)
Mecklenburg County	(Lewis Wayne Broome)
York County	(Phillip Steven Thomas)

April 16, 1984

1 TESTIMONY OF THE STATE OF NORTH CAROLINA
2 (DAYNE BROWN AND J.T. PUGH, III) ON
3 EMERGENCY PLANNING CONTENTION 6

4 Background Information on Mr. Brown

5 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

6 A. My name is Dayne Brown, and I am Chief of the North
7 Carolina Radiation Protection Section, Division of
8 Facility Services, 1330 St. Mary's Street, Raleigh,
9 North Carolina, 27605.

10 Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND
11 RELEVANT EMPLOYMENT HISTORY AND EXPERIENCE.

12 A. I have attached a Statement of Qualifications to this
13 testimony, marked at Attachment A. (DB)

14 Q. MR. BROWN, DO YOU HAVE ANY BACKGROUND EXPERIENCE IN
15 EMERGENCY PLANNING?

16 A. Yes, I completed a couple of short training courses
17 sponsored by the Federal Emergency Management Agency
18 on emergency planning and accident response. I have
19 been affiliated with the technical planning function
20 for response to radiological emergencies in North
21 Carolina since 1967. I have also been affiliated
22 with the Southern Emergency Response Council and
23 participated in the development of their mutual
24 assistance plan. (DB)

25 Q. HAVE YOU HAD ANY EXPERIENCE WITH RADIOLOGICAL
26 DECONTAMINATION?

1 A. Yes, I have been involved with U.S. Public Health
2 Service training programs in decontamination. I also
3 served as health physicist at the NASA personnel
4 facility in Cleveland, Ohio where my responsibilities
5 included decontamination of personnel and facilities
6 in conjunction with small nuclear reactors and
7 cyclotron facilities. I have also evaluated
8 decontamination procedures for radioactive material
9 facilities licensed by my section and for hospitals
10 in their own emergency planning.(DB)

11 Q. PLEASE SUMMARIZE YOUR OCCUPATIONAL DUTIES.

12 A. I am responsible for the management of the State's
13 comprehensive radiation control program. This
14 program consists of licensing, inspection, and
15 enforcement for both specific license facilities and
16 general license facilities. Overall, there are 600-
17 700 discrete facilities subject to such licensing,
18 inspection and enforcement. I am also responsible
19 for regulation, inspection and enforcement of x-ray
20 equipment at more than 4,000 facilities. My office
21 is also responsible for the Environmental Radiation
22 Monitoring and Surveillance program which focuses on
23 the spectrum of radiation sources ranging from
24 natural phenomena, weapons testing, power plants, and
25 privately licensed waste burial sites. Since 1967, I

1 have participated in the planning within North
2 Carolina for response to any radiological incident or
3 accident. (DB)

4 EPC 6 Testimony

5 Q. IS THERE INFORMATION IN THE N.C. STATE PLAN WHICH
6 ADDRESSES THIS CONTENTION?

7 A. Yes, Part 1, Section IV.E of the N.C. State Plan.
8 (JTP, DB)

9 Q. IF EPZ RESIDENTS ARE ASKED TO EVACUATE, WHAT IF ANY
10 CONTROLS WILL BE INSTITUTED TO PROVIDE FOR SHELTERING
11 AND REGISTRATION OF EVACUEES?

12 A. Evacuation routes have preplanned traffic control
13 points to guide the evacuees to available shelters.
14 Shelter traffic is designed to channel all incoming
15 evacuees through registration. (DB, JTP)

16 Q. WHAT EFFORTS ARE BEING MADE TO GET AS MANY PEOPLE AS
17 POSSIBLE TO GO TO AND REGISTER AT A SHELTER?

18 A. Evacuation routes have preplanned traffic control
19 points to guide the evacuees to available shelters.
20 Personnel at the check points monitor the vehicles
21 and passengers and advise the people to go to a
22 shelter for registration and further monitoring for
23 radiological contamination. The people in the EPZ
24 are urged by Duke Power's Brochure, as well as radio
25 and TV broadcasts, to proceed to a shelter for
26 registration and necessary monitoring checks for

1 radioactive contamination. The sheriff's department,
2 volunteer fire departments, and local rescue squads
3 canvas the EPZ, instructing the people on the need
4 for registering at the shelter and complying with all
5 shelter procedures. (DB, JTP)

6 Thus, while registration at a shelter is not
7 mandatory, unless the governor so decides, we are
8 reasonably assured, based on the above efforts and
9 our experience that people will follow directions in
10 an emergency, that contaminated persons will go to a
11 shelter to get decontaminated. (JTP, DB)

12 Q. WHAT MEASURES WILL BE TAKEN TO CONTACT AND MONITOR
13 INDIVIDUALS WHOSE VEHICLES, CLOTHING, AND OTHER
14 POSSESSIONS MAY HAVE BEEN CONTAMINATED?

15 A. All measures within reason will be taken at traffic
16 check points to persuade contaminated individuals to
17 have themselves decontaminated as well as their
18 private vehicle. No individual should be missed with
19 EBS broadcast messages, canvassing by the sheriff's
20 department, volunteer fire departments, local rescue
21 squads, and instructions received at traffic control
22 points. (DB, JTP)

23 Q. WILL A SUFFICIENT NUMBER OF PERSONS AND SUFFICIENT
24 INSTRUMENTATION BE AVAILABLE TO SCREEN POTENTIALLY
25 CONTAMINATED INDIVIDUALS AND THEIR POSSESSIONS?

1 A. Yes. A sufficient number of persons and sufficient
2 instrumentation will be available to screen
3 potentially contaminated individuals and their
4 possessions in Gaston and Mecklenburg Counties. The
5 following is a list of each county's resources in
6 this area: (JTP)

7 Gaston County

8 200 each -- trained monitors
9 50 each -- CDV-700 (low-range survey meters)
10 50 each -- CDV-715 (high-range survey meters)
11 700 each -- CDV-742 (high-range dosimeters)
12 66 each -- CDV-750 (dosimeter chargers)

13 Mecklenburg County

14 250 each -- trained monitors
15 170 each -- CDV-700 (low-range survey meters)
16 481 each -- CDV-715 (high-range survey meters)
17 2,422 each -- CDV-742 (high-range dosimeters)
18 457 each -- CDV-750 (dosimeter chargers)
19 36 each -- CDV-138 (low-range dosimeters)
20 14 each -- CDV-717 (remote survey meters for
21 fallout shelters) (JTP)

22 Q. TO WHAT EXTENT MAY TRAINING OR ORIENTATION BE
23 PROVIDED TO AVAILABLE PERSONNEL AS THE NEED ARISES?
24 A. The Division of Emergency Management has an on-going
25 program to train radiological monitor instructors and
26 they are responsible for training monitors within
27 their counties. Instructor training requires
28 completion of the 33-hour Basic Radiation Emergency
29 Preparedness Course (BREP) plus an additional 4-hour
30 instructor module. Designated county personnel are
31 then presented at least the first two modules (16

1 hours) of the BREP course for minimum qualification
2 as a Radiological Monitor. Annual refresher training
3 and exercises are conducted as necessary. The
4 training is accomplished before the need arises. A
5 total of 200 trained radiological monitors are
6 available in Gaston County with 250 trained
7 radiological monitors available within Mecklenburg
8 County. (DB, JTP)

9 Q. DO YOU VISUALIZE THAT THE PROCEDURES WHICH YOU HAVE
10 DESCRIBED FOR SCREENING INDIVIDUALS AND THEIR
11 POSSESSIONS FOR CONTAMINATION WILL HAVE AN ADVERSE
12 EFFECT ON TRAFFIC FLOW AND HENCE EVACUATION TIMES?
13 IF SO, PLEASE EXPLAIN.

14 A. No, we do not anticipate that our procedures will
15 have an adverse effect. (DB, JTP)

16 Q. IF NOT, PLEASE EXPLAIN.

17 A. Our policy is that contaminated vehicles will be
18 decontaminated only when the area affected is small
19 and judged to contain few contaminated vehicles.
20 Where a larger area is affected and when
21 decontamination would hinder movement out of the
22 threatened areas, vehicles will be impounded and
23 evacuees bussed to shelters. It is believed that
24 this procedure of parking contaminated vehicles in

- 1 open areas and busing individuals to shelters will
- 2 facilitate a continuous flow of traffic and meet our
- 3 goal of an orderly and safe evacuation. (DB, JTP)

1 TESTIMONY OF DUKE POWER COMPANY
2 (R. MICHAEL GLOVER) ON EMERGENCY
3 PLANNING CONTENTION 6

4 Q. CONTENTION 6 ALLEGES THAT THE EMERGENCY PLANS DO NOT
5 CONTAIN ADEQUATE PROVISIONS FOR PREVENTING
6 CONTAMINATED PERSONS FROM ENTERING NON-CONTAMINATED
7 AREAS, SUCH AS SHELTERS. WHAT PROVISIONS HAVE BEEN
8 MADE TO PREVENT THIS PROBLEM? WILL REGISTRATION AT
9 SHELTERS BE MANDATORY FOR EVACUEES?

10 A. From an emergency planning standpoint, Duke Power
11 Company, North Carolina, South Carolina, York County,
12 Mecklenburg County and Gaston County will be making
13 their best efforts to ensure that, if persons in the
14 EPZ are contaminated from a release, they will go to
15 shelters for decontamination services. Registration
16 and monitoring at the shelters is strongly encouraged
17 in the brochure (see p. 4, "if instructed, leave the
18 area and check in at a shelter"; p. 10, "drive to
19 your shelter and register. You may stay at the
20 shelter. Or after you register at the shelter you
21 may choose to stay with friends or relatives living
22 at least 15 miles from the plant . . ."; p. 10,
23 "shelters would be provided with facilities for
24 decontamination of evacuees and their vehicles and
25 personal items").

26 State and county planners have indicated to me
27 that people cannot be forced to report to shelters.
28 But, by including these provisions in the brochure

1 and by running EBS messages making people aware that
2 if they live in a contaminated area and evacuated
3 without going to a shelter they should go to a
4 shelter immediately and be checked for radioactive
5 contamination, their interests are served. Also, if
6 their physical condition or circumstances did not
7 permit going immediately to a shelter, people could
8 be asked to shower at home, launder their clothes,
9 and bag the clothes for when they are able to go to
10 the shelter. We are providing "reasonable assurance"
11 that adequate measures are being taken from a
12 planning standpoint. A recommendation that pre-
13 established messages to this effect be included in
14 the State/County plans has been forwarded to both
15 states in a January 23, 1984 letter to each State
16 Director. It is my understanding that each state
17 intends to include this information in pre-
18 established messages. The effect on evacuation time
19 and traffic flows is in my opinion minimal at most in
20 that the study assumes everyone that is a willing
21 evacuee goes to the shelter.

1 TESTIMONY OF THE STATE OF SOUTH CAROLINA
2 (W.M. MCSWAIN) ON
3 EMERGENCY PLANNING CONTENTION 6

4 EPC 6 Testimony

5 Q. WITH REGARD TO CONTENTION 6, IS INFORMATION CONTAINED
6 IN THE S.C. STATE PLAN WHICH ADDRESSES THIS MATTER?

7 A. Yes, Part IV.B.5 of the S.C. Site Specific Plan and
8 Part IV.C.6 of SCORERP.

9 Q. WHAT STEPS WILL BE TAKEN BY THE STATE OF SOUTH
10 CAROLINA TO PREVENT CONTAMINATED PERSONS FROM
11 ENTERING NONCONTAMINATED ZONES?

12 A. I am sure that a state of emergency will be declared
13 by the government in the affected area. EBS
14 announcements will be broadcast over all media.
15 Based upon the continuing process of public education
16 through the brochure and the EBS announcement, the
17 affected people would go to the shelters. (WM)

18 Q. IS THAT STATEMENT BASED ON YOUR EXPERIENCE THAT
19 PEOPLE IN AN EMERGENCY WILL DO WHAT THEY ARE TOLD?

20 A. Yes. (WM)

21 Q. IS REGISTRATION MANDATORY?

22 A. No, but people are strongly encouraged in the
23 brochure to register, and this will be reinforced
24 through EBS messages. (WM)

25 Q. WHAT EFFORTS ARE BEING MADE TO GET AS MANY PEOPLE AS
26 POSSIBLE TO REGISTER AT A SHELTER?

1 A. We are making efforts through EBS announcements,
2 brochures, public meetings, the media, and through
3 the education process that is ongoing and will be
4 expanding. (WM)

5 Q. WHAT MEASURES WILL BE TAKEN TO DECONTAMINATE VEHICLES
6 AND INDIVIDUALS AT THE SHELTER?

7 A. Once the evacuees arrive at the shelters, first they
8 will be monitored. If they are found to be
9 contaminated they will be instructed to take showers,
10 they will receive fresh clothes, and if their
11 vehicles are contaminated also, they will be sent to
12 a washdown area to be washed down. (WM)

13 Q. WILL A SUFFICIENT NUMBER OF PERSONS AND
14 INSTRUMENTATION BE AVAILABLE TO SCREEN POTENTIALLY
15 CONTAMINATED INDIVIDUALS AND THEIR POSSESSIONS?

16 A. Yes. Based upon what we have done in previous
17 exercises we have available resources that we can
18 draw upon in adjacent counties as well as the ones
19 that are located in the host counties where the
20 sheltering will take place. The following is a list
21 of emergency equipment and supplies: (WM)

22 LIST OF EMERGENCY EQUIPMENT AND SUPPLIES

23	<u>Radiological Monitoring Equipment</u>	<u>Quantity</u>
24	CDV-715 Survey Instruments	7,941
25	CDV-700 Survey Instruments	1,277
26	CDV-700M Survey Instruments	8
27	CDV-720 Survey Instruments	460
28	CDV-717 Survey Instruments	717
29	CDV-138 Dosimeters	424

1	CDV-730	Dosimeters	1,189
2	CDV-742	Dosimeters	11,719
3	CDV-750	Dosimeter Chargers	1,223

4 Q. ARE THE INDIVIDUALS THAT WILL OPERATE THESE MONITORS
5 TRAINED IN THE OPERATION OF THE MONITORS?

6 A. Yes. The radiological defense officer supervises the
7 training, which is held periodically. As a matter of
8 fact, during the second week of April we held a
9 session out on the coast. (WM)

10 Q. HOW MANY PRIMARY SHELTERS ARE THERE IN THE SOUTH
11 CAROLINA STATE PLAN?

12 A. Thirty-eight. (WM)

13 Q. DO YOU HAVE THIRTY-EIGHT INDIVIDUALS WHO CAN MONITOR
14 PEOPLE FOR CONTAMINATION?

15 A. More than that. For example, we have one hundred in
16 Cherokee County alone. (WM)

17 Q. DO YOU FEEL THAT THE DECONTAMINATION PROCEDURES THAT
18 YOU JUST DESCRIBED WILL IMPEDE THE FLOW OF TRAFFIC
19 AND ADVERSELY AFFECT EVACUATION?

20 A. No. It is going take some management, but we believe
21 it will not impede the evacuation. (WM)

22 Q. DOES YOUR EXPERIENCE WITH ANY OF THE EMERGENCY DRILLS
23 SUPPORT YOUR ANSWER?

24 A. I have worked at one shelter during the previous
25 exercise and it went very smoothly. That was an
26 exercise of course, but the procedures were followed

1 by the radiological monitors. I believe that on that
2 particular exercise they monitored roughly seventy-
3 five evacuees in the proper amount of time. (WM)

4 Q. DID THAT FORM A BOTTLENECK?

5 A. No. They were out of the weather and were monitored
6 and then registered. (WM)

1 TESTIMONY OF GASTON COUNTY
2 (BOB E. PHILLIPS) ON
3 EMERGENCY PLANNING CONTENTION 6

4 Q. DOES THE GASTON COUNTY PLAN PROVIDE INFORMATION
5 REGARDING THIS CONTENTION?

6 A. Yes, Part 2, Section IV.E of the N.C. State Plan.

7 Q. EMERGENCY PLANNING CONTENTION 6 FOCUSES ON WHETHER
8 THERE ARE ADEQUATE PROVISIONS IN THE EMERGENCY PLANS
9 FOR PREVENTING CONTAMINATED PERSONS FROM ENTERING
10 NON-CONTAMINATED AREAS, SUCH AS SHELTERS. WHAT
11 EFFORTS ARE BEING MADE TO GET AS MANY PEOPLE AS
12 POSSIBLE TO GO TO A SHELTER AND TO REGISTER THERE
13 SHOULD THE NEED ARISE?

14 A. Duke Power Company's brochure instructs people in the
15 EPZ to go to the nearest shelter and register there
16 if they have been told to evacuate. We will use
17 personnel monitoring at the shelters and at the
18 decontamination points outside the EPZ. There has
19 also been information on this in the local newspaper.
20 I would also direct people to go to the shelters on
21 the EBS radio channel. Based upon my experience,
22 people will do as instructed in an emergency as long
23 as the instructions are so that they can understand
24 them.

1 Q. WILL MONITORING FOR CONTAMINATION BE DONE AT SHELTERS
2 AND WILL A SUFFICIENT NUMBER OF PERSONS AND
3 SUFFICIENT INSTRUMENTATION BE AVAILABLE FOR
4 RADIOLOGICAL MONITORING OF POTENTIALLY CONTAMINATED
5 INDIVIDUALS AS THEY ENTER A SHELTER?

6 A. Yes. Our Gastonia Fire Department and also our
7 volunteer fire departments would provide personnel
8 for decontamination at the shelter sites. We will
9 have a minimum of 12 persons at each shelter to
10 monitor. We also have the capability of increasing
11 this to 24 persons at each shelter. There are three
12 sets of radiological monitoring instruments stored at
13 each school shelter.

14 Q. HAVE FIRE DEPARTMENT PERSONNEL BEEN TRAINED IN THE
15 USE OF THOSE MONITORING DEVICES?

16 A. They have been trained in the use of them and they
17 also have the instruments on their vehicles at all
18 times.

19 Q. WILL ADDITIONAL TRAINING OPPORTUNITIES FOR EMERGENCY
20 PERSONNEL BE AVAILABLE?

21 A. Yes. We have scheduled two Basic Radiation Emergency
22 Preparedness classes per year for firemen, policemen,
23 and rescue personnel. In addition, the Red Cross
24 teaches courses on Shelter Management. Department of
25 Social Services people will be going to these.

1 Q. DO YOU ANTICIPATE THAT THE PROCEDURES THAT YOU HAVE
2 DESCRIBED FOR SCREENING INDIVIDUALS AND THEIR
3 POSSESSIONS FOR CONTAMINATION WILL HAVE AN ADVERSE
4 EFFECT ON TRAFFIC FLOW AND EVACUATION TIME?

5 A. No.

6 Q. PLEASE EXPLAIN WHY NOT.

7 A. If we find that a car is contaminated, we will park
8 the car and load the people onto buses to take them
9 to a shelter. The buses will then have to be
10 dispatched to the monitoring point in order to pick
11 them up.

12 Q. WOULD REGISTRATION AT A GASTON COUNTY SHELTER BE
13 MANDATORY?

14 A. If people show up at a shelter, it is mandatory that
15 they register but I cannot make people go to the
16 shelters.

1 TESTIMONY OF MECKLENBURG COUNTY
2 (LEWIS WAYNE BROOME) ON
3 EMERGENCY PLANNING CONTENTION 6

4 Q. DOES THE MECKLENBURG COUNTY PLAN PROVIDE ANY
5 INFORMATION WITH REGARD TO THIS CONTENTION?

6 A. Yes, Part 3, Section IV.E of the N.C. State Plan.

7 Q. EMERGENCY PLANNING CONTENTION 6 ASSERTS THAT ADEQUATE
8 PROVISIONS HAVE NOT BEEN MADE TO KEEP CONTAMINATED
9 PERSONS FROM ENTERING AN UNCONTAMNATED AREA. HAVE
10 ARRANGEMENTS BEEN MADE TO KEEP CONTAMINATED PERSONS
11 FROM ENTERING SHELTERS?

12 A. If you are talking about a person who is contaminated
13 leaving an EPZ, transferring to a shelter location
14 and entering the shelter, we would establish a
15 shelter whereby that person would not be allowed
16 inside the clean area of the facility. We would not
17 expose the person to the elements. Once inside,
18 there would be a procedure to monitor the person, to
19 provide the person with a place to go so that they
20 would not be associated with the general population
21 of the shelter and not carry the contamination. All
22 the shelter facilities have more than adequate shower
23 facilities. We would utilize those shower facilities
24 for decontamination.

25 Q. WHAT EFFORTS HAVE BEEN MADE TO GET PEOPLE TO GO TO A
26 SHELTER AND REGISTER IF THEY ARE TOLD TO EVACUATE?

1 A. The educational efforts we have undertaken, such as
2 talks to civic organizations. Specific information,
3 as I see it, would be coming from the Emergency
4 Operation Center via the Emergency Broadcasting
5 System in which we provide information and directions
6 for people to report to a shelter.

7 Q. DO YOU ANTICIPATE THAT THE REGISTRATION OF POTENTIAL
8 EVACUEES WILL POSE ANY PROBLEMS OF OVERCROWDING OR
9 DELAY OF THE EVACUATION?

10 A. With the potential resources available to us, I don't
11 foresee any problem. If there is a delay, I would
12 consider it a relatively minor or short one.

13 Q. WOULD REGISTRATION AT THE MECKLENBURG COUNTY SHELTER
14 BE MANDATORY?

15 A. If they showed up at the shelter, we would make every
16 effort that we could to make sure that those people
17 were registered so that we could identify them.
18 However, from the standpoint of actually forcing
19 someone to register, I do not think that we would go
20 to that extent.

21 Q. DO YOU ANTICIPATE THAT THE PROCEDURES FOR SCREENING
22 INDIVIDUALS AND THEIR POSSESSIONS FOR CONTAMINATION
23 WILL HAVE AN ADVERSE EFFECT ON TRAFFIC FLOW AND
24 EVACUATION TIME?

1 A. No. The screening location is at the entrance to the
2 shelters, which are well outside the 10 mile EPZ. so
3 that any delay in screening process will not hamper
4 evacuation from the EPZ. In addition, people would
5 not be left out in the elements in a line waiting to
6 be registered. They would all be under cover.

1 TESTIMONY OF YORK COUNTY
2 (PHILLIP STEVEN THOMAS) ON
3 EMERGENCY PLANNING CONTENTION 6

4 Q. DOES THE COUNTY PLAN PROVIDE INFORMATION CONCERNING
5 THIS CONTENTION?

6 A. Yes, Annex Q of the York County Emergency Operations
7 Plan.

8 Q. THE INTERVENORS CONTEND IN EMERGENCY PLANNING
9 CONTENTION 6 THAT THE EMERGENCY PLANS DO NOT MAKE
10 ADEQUATE PROVISIONS FOR PREVENTING THE ENTRANCE OF
11 CONTAMINATED INDIVIDUALS INTO UNCONTAMINATED AREAS,
12 SUCH AS SHELTERS. ARE YOU AWARE OF ANYTHING THAT IS
13 BEING DONE TO DEAL WITH THIS MATTER?

14 A. Yes. Specifically, Duke Power has covered that in
15 some detail in the brochure by reminding all
16 residents or readers of the material to be sure to go
17 to the shelters prior to going anywhere else for the
18 purpose of monitoring and decontamination. That
19 would be on the front end as the event took place.
20 Later, as part of our overall attempts to use the EBS
21 system to our advantage, we would be continually
22 putting in message form to anyone who did not go to a
23 decontamination site or monitoring site, to do just
24 that if they have any idea that they may have been in
25 any area that they may have received even the
26 slightest amount of contamination. Based upon my
27 experience, people will do as instructed in an
28 emergency.

- 1 Q. ARE ANY OF THE SHELTERS FOR USE IN THE EVENT OF A
- 2 RADIOLOGICAL EMERGENCY LOCATED IN YORK COUNTY?
- 3 A. No, they are not.

CURRICULUM VITAE
for
Dayne H. Brown

- Born August 18, 1940 in Shelby, North Carolina
- Graduated from Needham B. Broughton High School, Raleigh, N.C.
June 1958
- Graduated with honors from North Carolina State University with
Bachelor of Science degree in Physics, June 1962
- Awarded U.S. Public Health Service Radiological Health and Safety
Fellowship to attend North Carolina State University. Graduated
from North Carolina State University, January 1964, Master of Science
degree in Physics
- Employed as a health physicist by the National Aeronautics and
Space Administration, Lewis Research Center, Cleveland, Ohio from
January 1964 to February 1966
- Employed as an instructor in the Radiological Health Training Program
of U.S. Public Health Service, Cincinnati, Ohio from February 1966 to
June 1967
- June 1967 to present:
Employed as Chief of the Radiation Protection Section
Division of Facility Services
North Carolina Department of Human Resources
- Member of
 - .Conference of Radiation Control Program Directors
 - .Ex officio member of The North Carolina Radiation Protection Commission
 - .Member of The Governor's Technical Advisory Committee on
Low-Level Radioactive Waste
 - .National Health Physics Society
 - .North Carolina Chapter of The Health Physics Society
 - .North Carolina State Employees Association
 - .Ex officio member: The Advisory Committee to the North Carolina Members
of the Low-Level Radioactive Waste Management Compact Commission

Update
8/15/80
9/14/82
4/83