

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKETED  
USNRC

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD <sup>84 APR 17 P5:16</sup>

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

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

Docket Nos. 50-413  
50-414

APPLICANTS' TESTIMONY ON  
EMERGENCY PLANNING CONTENTION 9

Duke Power Co.  
M. Reada Baskin  
North Carolina  
South Carolina  
Gaston County  
Mecklenburg County  
York County

(R.M. Glover)  
(J.T. Pugh, III)  
(P.R. Lunsford, William M. McSwain)  
(Bob E. Phillips)  
(Lewis Wayne Broome)  
(Phillip Steven Thomas)

April 16, 1984

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1 TESTIMONY OF DUKE POWER COMPANY  
2 (R. MICHAEL GLOVER) ON EMERGENCY  
3 PLANNING CONTENTION 9

4 Q. IN EMERGENCY PLANNING CONTENTION 9 INTERVENORS ALLEGE  
5 THAT IF THE SIRENS DO SOUND NOT ALL CITIZENS WHO  
6 WOULD BE AFFECTED WOULD BE ABLE TO HEAR A WARNING  
7 SIREN AS A RESULT OF HEARING IMPAIRMENTS, WEATHER  
8 CONDITIONS, DISTANCE FROM SIRENS, ETC. WHAT  
9 ASSURANCE IS THERE THAT THE PROMPT ALERTING SYSTEM  
10 FOR CATAWBA NUCLEAR STATION WILL BE HEARD BY AREA  
11 RESIDENTS?

12 A. The alert and notification system for Catawba Nuclear  
13 Station is designed to meet the criteria listed in  
14 NUREG-0654, Appendix 3 and FEMA-43. From discussions  
15 I have held with FEMA representatives (who are  
16 responsible for final review of this system for  
17 adequacy), the combination of a well-designed  
18 alerting system, an emergency broadcast system that  
19 can operate 24 hours per day over a wide area, the  
20 fact that a large percentage of people are listening  
21 to radio or TV normally throughout the day, and that  
22 social networking takes place rapidly in an  
23 emergency, gives assurance that EPZ residents and  
24 transients will be rapidly notified of an emergency.

25 Further assurance is given by the fact that Duke  
26 Power Company will install and maintain tone alert  
27 radios in all schools, hospitals, nursing homes, day  
28 care facilities, and industrial facilities with 20 or

1 more employees. This distribution will be complete  
2 in July of this year. The tone alert radio monitors  
3 the lead emergency broadcast station in the area and  
4 will give listeners first-hand information on the  
5 event. Thus, reliance for alert and notification is  
6 not based solely upon the sirens and people's radios  
7 or TVs in their homes but also upon a warning system  
8 for special facilities.

9 Finally, Acoustic Technology Incorporated (ATI)  
10 has evaluated the Catawba System in regards to  
11 meeting all applicable criteria of FEMA-43. They  
12 have stated in their report that the system alerts a  
13 majority of people in the EPZ and with consideration  
14 of additional coverage or other factors in certain  
15 areas of the EPZ, will fully comply with FEMA-43. A  
16 copy of the ATI report is found in M. Read  
17 Bassiouni's testimony.

18 Two of the three issues raised in Contention 9  
19 (weather conditions and distance from the sirens) are  
20 addressed in ATI's report as well as in FEMA-43 and  
21 NUREG-0654.

22 NUREG-0654 allows use of a 10db (decibel) per  
23 distance doubled sound attenuation factor in  
24 determining siren range if there are no "line of  
25 sight" intervening topographical features. Duke's

1 design used this factor in establishing radii of  
2 coverage for the Federal Signal Corporation sirens  
3 used in the Catawba system. ATI uses a more  
4 conservative approach in evaluating siren coverage  
5 radii than that in NUREG-0654 but was able to show  
6 that there was sufficient overlap of siren coverage  
7 in most areas to meet FEMA criteria.

8 In NUREG-0654 weather conditions are not  
9 addressed directly but are a component of the 10db  
10 per distance doubled sound attenuation factor. ATI's  
11 computer model evaluates the effect of specific  
12 weather conditions on the system.

13 Hearing impairments are a concern expressed in  
14 this contention. Assurance that such individuals are  
15 alerted comes from statement in the brochure, mailed  
16 to all EPZ residents, that the hearing impaired  
17 should contact their local emergency management  
18 agency on receipt of the brochure. In this way,  
19 arrangements can be made prior to an event to provide  
20 special alerting.

21 Q. YOU MENTION THAT THE ATI REPORT RECOMMENDS  
22 CONSIDERATION OF ADDITIONAL COVERAGE OR OTHER FACTORS  
23 TO FULLY COMPLY WITH FEMA-43. IN WHAT AREAS DO THEY

1 RECOMMEND THIS CONSIDERATION AND WHAT DO THE  
2 APPLICANTS INTEND TO DO TO FULLY SATISFY FEMA-43 IN  
3 REGARDS TO THE CATAWBA ALERTING SYSTEM?

4 A. On Map No. 2 in the ATI report, certain "regions" are  
5 shown to be below Federal guidelines for sound  
6 generated by the sirens being 10db above assumed or  
7 measured ambient background sound levels.

8 Applicant intends to do the following in each of  
9 these regions:

10	11		<u>Action to be Taken</u>	<u>Date for Resolution</u>
12	3		Additional ambient sound levels	Evaluation
13			to be taken in the small portion	Complete By
14			of this region. Coverage will	5/1/84. Any
15			be extended or additional equip-	additional
16			ment added based on evaluation.	equipment
17				installed by
18				9/1/84.
19	4		Two additional sirens to be	Installed by
20			added.	9/1/84.
21	9		(Riverview Area) One additional	Installed by
22			siren to be added.	9/1/84.
23	9, 10, 13,		(Edge of EPZ area) Additional	Evaluation
24	and 16		Sound Level measurements to be	Complete By
25			performed and scoping studies	5/1/84. Any
26			to evaluate whether an effec-	additional
27			tive increase in capability per	equipment
28			unit of cost can be achieved	installed by
29			while still meeting basic design	9/1/84.
30			objectives. Coverage will be	
31			extended or additional equipment	
32			added based on evaluation.	
33	Rock Hill		One additional siren to be added	Evaluation
34			in downtown Rock Hill. The two	Complete By
35			other areas will be reevaluated	5/1/84. Any
36			as to population density and	additional
37			ambient sound level. Coverage	equipment

1		will be extended or additional	installed by
2		equipment added based on evalua-	9/1/84.
3		tion.	
4	Fort Mill,	The small area identified will	Evaluation
5	Clover	be reevaluated as to population	Complete By
6		density and ambient sound level.	5/1/84. Any
7		Coverage will be extended or	additional
8		additional equipment added based	equipment
9		on evaluation.	installed by
10			9/1/84.

1 TESTIMONY OF M. READA BASSIOUNI  
2 ON EMERGENCY PLANNING CONTENTION 9

3 Background Information

4 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

5 A. M. Reada Bassiouni, Acoustic Technology Inc., 22  
6 Union Wharf, Boston, Massachusetts, 02109.

7 Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND RELEVANT WORK  
8 EXPERIENCE?

9 A. Please see my current resume, which is included as  
10 Attachment A to this testimony.

11 EPC-9 Testimony

12 Q. ARE YOU FAMILIAR WITH THE APPLICANTS' SIREN  
13 NOTIFICATION SYSTEM FOR THE CATAWBA NUCLEAR STATION?

14 A. Yes.

15 Q. HOW DID YOU ACQUIRE THIS FAMILIARITY?

16 A. Duke Power Company contracted with Acoustic  
17 Technology Inc. (ATI) to verify and field test the  
18 acoustic coverage of the siren notification system  
19 installed within the plume exposure pathway Emergency  
20 Planning Zone (plume EPZ) of the Catawba Nuclear  
21 Station. As principal consultant for ATI, I prepared  
22 a report which documents the adequacy of the warning  
23 system in meeting the guidelines set forth in the  
24 Federal Emergency Management Agency's (FEMA's)  
25 regulations at 44 C.F.R. §350, Planning Standard E,

1 Appendix 3 of NUREG-0654/FEMA REP-1, and the Standard  
2 Guide for the Evaluation of Alert and Notification  
3 Systems for Nuclear Power Plants (FEMA-43).

4 Q. PLEASE BRIEFLY SUMMARIZE HOW YOU PREPARED YOUR REPORT  
5 EVALUATING THE SIREN SYSTEM AT THE CATAWBA NUCLEAR  
6 STATION.

7 A. The warning system design includes 66 high-power  
8 rotational sirens, rated 125 dBC at 100 feet, and one  
9 siren rated 113 dBC at 100 feet. Verification of the  
10 acoustic coverage for the siren warning system was  
11 accomplished by using a computer model developed by  
12 ATI, and field measurements of sound levels. The  
13 actual measured siren output at 100 feet, obtained  
14 through field testing for a sample number of sirens,  
15 was used to predict the extent of the 60 and 70 dBC  
16 acoustic coverage of the siren system for daytime  
17 summer average meteorological conditions. Predicted  
18 siren sound pressure level (SPL) values for each  
19 measuring location were obtained from the ATI  
20 acoustic computer model. The predicted and measured  
21 siren SPL's were in excellent agreement, and the ATI  
22 computer model calculated slightly conservative  
23 predictions of siren acoustic coverage.

24 According to FEMA-43, the siren alerting system  
25 may be designed so that the siren sound level either  
26 exceeds 10 dBC above the average outdoor daytime

1 ambient sound levels, or provides 60/70 dBC acoustic  
2 alert coverage depending upon the population density  
3 of the area. An ambient background noise survey was  
4 conducted within the 10-mile EPZ to document the  
5 average measured outdoor ambient sound level in  
6 specific areas located outside 60 dBC siren acoustic  
7 contours. Based on the ambient noise survey, the  
8 average ambient sound level for each siren outside 60  
9 dBC contours was determined.

10 Q. HAVE YOU COMPLETED THIS REPORT?

11 A. Yes.

12 Q. IS THE BASIS FOR YOUR CONCLUSION EXPLAINED IN YOUR  
13 REPORT?

14 A. Yes.

15 Q. DO YOU ADOPT THIS REPORT AS YOUR TESTIMONY FOR USE IN  
16 THIS PROCEEDING?

17 A. Yes.

18 Q. WHAT CONCLUSIONS DID YOU REACH?

19 A. The installed siren system was found to provide the  
20 required 60 and 70 dBC public alert coverage for most  
21 areas. There are areas located outside 60 dBC  
22 contours. However, by applying the 10 dB above-the-  
23 ambient criteria based on an ambient background noise  
24 survey, these areas are reduced. The installed siren  
25 warning system provides an adequate notification to  
26 the majority of the public within the 10-mile EPZ.

1        However, since the EPZ has been extended beyond the  
2        geometric 10-mile radius, some areas along the  
3        extended plume EPZ are not covered by the existing  
4        siren acoustic coverage. Further evaluation of these  
5        regions in question will be performed to determine if  
6        additional coverage is required in these areas.  
7        Thus, subject to verification through further study  
8        of these few identified regions, I conclude that the  
9        siren system is adequate to notify the public in the  
10       10-mile plume EPZ. I would like to refer you to the  
11       report itself for a more detailed explanation of my  
12       study and its results. The report is attached as  
13       Attachment B.

1 TESTIMONY OF THE STATE OF NORTH CAROLINA  
2 (J.T. PUGH, III) ON  
3 EMERGENCY PLANNING CONTENTION 9

4 Q. DOES THE STATE PLAN PROVIDE INFORMATION WHICH  
5 ADDRESSES THIS CONTENTION?

6 A. Yes, Annexes C, E, and G of the N.C. State Plan.

7 Q. WHAT IF ANY STEPS DOES THE STATE CONTEMPLATE TAKING  
8 TO ASSURE THAT HEARING IMPAIRED PERSONS WOULD BE  
9 ALERTED IN THE EVENT SIRENS ARE SOUNDED IN A  
10 RADIOLOGICAL EMERGENCY?

11 A. No specific plans are in place at the state level to  
12 assure hearing impaired persons would be alerted in  
13 the event sirens are sounded. However, Duke's  
14 Brochure and "crawl messages" on TV should provide  
15 assurance that these individuals will be alerted.  
16 Furthermore, we believe that the volunteer firemen  
17 and the county policy responsible for canvassing the  
18 area will identify these people, where they live, and  
19 will insure notification.

20 Q. WHAT, IF ANY, MEASURES DOES THE STATE CONTEMPLATE  
21 TAKING TO ASSURE THAT PERSONS WHO DID NOT HEAR THE  
22 FIXED SIRENS FOR SOME REASON OTHER THAN A HEARING  
23 IMPAIRMENT ARE ALERTED TO TURN TO AN EMERGENCY RADIO  
24 OR TELEVISION STATION?

25 A. The North Carolina Plan has a system supplemental to  
26 the sirens. This system incorporates local law  
27 enforcement and volunteer fire department personnel

1 to drive the roads and streets to notify residents of  
2 the action to take. There is nothing in the plan to  
3 prevent the sounding of the sirens multiple times if  
4 it is deemed necessary to insure notification.

5 Q. HOW MANY EMERGENCY BROADCAST SYSTEM (EBS) STATIONS  
6 COULD BE UTILIZED TO NOTIFY THE PUBLIC IN THE EVENT  
7 OF A RADIOLOGICAL EMERGENCY?

8 A. Forty-one EBS stations are available in the Charlotte  
9 Operational Area, which provide coverage to all parts  
10 of the population in the EPZ.

11 Q. HOW MANY OF THE EBS STATIONS INVOLVED IN THE RESPONSE  
12 TO THE PREVIOUS QUESTION HAVE EMERGENCY BACKUP POWER  
13 SUPPLIES?

14 A. Eleven (11).

15 Q. ARE YOU AWARE OF THE EMERGENCY EVACUATION PLANS FOR  
16 CAROWINDS THEME PARK?

17 A. Yes. We have received and reviewed the Carowinds  
18 plan and procedures. We are currently working with  
19 the officials of Carowinds to improve their plan and  
20 procedures.

21 Q. DO YOU HAVE CONFIDENCE IN THE FEASIBILITY OF  
22 EVACUATING CAROWINDS IN SUFFICIENT TIME?

23 A. Yes. The evacuation time estimates for Carowinds  
24 contained in the PRC Voorhees Study show this is  
25 feasible even when the park is crowded. The

1 estimates are based on the maximum reported  
2 attendance at the park. We have no basis for  
3 questioning the accuracy of the study.

4 Q. HOW WILL THE APPROPRIATE PEOPLE AT CAROWINDS BE  
5 NOTIFIED IN THE EVENT OF A RADIOLOGICAL EMERGENCY?

6 A. The Mecklenburg County EOC will notify Carowinds  
7 security by commercial telephone. Additionally, the  
8 Carowinds security office will be provided with tone  
9 alert radio, which will also provide notification of  
10 an emergency.

1                   TESTIMONY OF THE STATE OF SOUTH CAROLINA  
2                   (P.R. LUNSFORD AND W.M. MCSWAIN) ON  
3                   EMERGENCY PLANNING CONTENTION 9

4   Q.   DO THE STATE PLANS PROVIDE INFORMATION WHICH  
5       ADDRESSES THIS CONTENTION?

6   A.   Yes, Part IV.B.1 and Annex A of the S.C. Site-  
7       Specific Plan and Part IV.C.13 and Annex C of  
8       SCORERP.

9   Q.   WHAT STEPS DOES THE STATE CONTEMPLATE TAKING TO  
10       ASSURE THAT THE HEARING IMPAIRED WOULD BE ALERTED IN  
11       THE EVENT SIRENS ARE SOUNDED IN A RADIOLOGICAL  
12       EMERGENCY?

13  A.   These individuals are being identified at the county  
14       level and special attention will be given to these  
15       individuals during the emergency. (PL, WM)

16  Q.   WOULD THOSE MEASURES BE WITHIN THE PROVINCE OF THE  
17       COUNTY?

18  A.   Yes. (PL, WM)

19  Q.   WHAT MEASURE, IF ANY, DOES THE STATE PLAN TO TAKE TO  
20       ASSURE THAT PERSONS WHO DID NOT HEAR THE FIXED SIRENS  
21       FOR SOME REASON OTHER THAN HEARING IMPAIRMENT ARE  
22       ALERTED TO TURN TO AN EMERGENCY BROADCAST RADIO OR  
23       TELEVISION STATION?

24  A.   In the plans several special facilities have been  
25       identified: those who could be impaired in hearing  
26       the sirens, such as people in factories, for example.

1 Individual contact would be made with those special  
2 facilities such as by a phone call or a visit. (PL,  
3 WM)

4 Q. HAVE THOSE FACILITIES BEEN IDENTIFIED?

5 A. Yes. They include among others, schools and  
6 industries. (PL, WM)

7 Q. WHERE WOULD ONE GET A LIST OF THOSE FACILITIES?

8 A. From the county. (PL, WM)

9 Q. HAVE YOU PROVIDED FOR A BACKUP TO THE EMERGENCY  
10 WARNING SIRENS?

11 A. That would be a York County responsibility. (PL, WM)

12 Q. HOW MANY EMERGENCY BROADCAST STATIONS ARE THERE IN  
13 SOUTH CAROLINA THAT WOULD ACT IN RESPONSE TO AN  
14 EMERGENCY AT THE CATAWBA NUCLEAR STATION?

15 A. The emergency broadcast lead station in the Catawba  
16 area is in Charlotte. We have the York County area  
17 normally serviced by the Spartanburg operational area  
18 and they have several stations in York County to  
19 monitor that station out of Spartanburg. We will be  
20 able to monitor the station out of Charlotte before  
21 operation of Catawba. (PL, WM)

22 Q. COULD THESE STATIONS BE UTILIZED TO NOTIFY THE  
23 PUBLIC?

24 A. Yes, they have been. They are listed in the plan.  
25 (WM, PL)

- 1 Q. IN A POWER OUTAGE WILL EMERGENCY VEHICLES BE USED TO  
2 NOTIFY THE PUBLIC?
- 3 A. Yes. Those emergency vehicles will be coordinated by  
4 York County. (PL, WM)
- 5 Q. DO YOU KNOW WHETHER CAROWINDS THEME PARK HAS  
6 NOTIFICATION PLANS OR PROCEDURES FOR EVACUATION OF  
7 VISITORS AND EMPLOYEES?
- 8 A. Yes they do. (WM)
- 9 Q. HAVE YOU REVIEWED THOSE PLANS AND PROCEDURES?
- 10 A. Yes, I have. I have discussed them with officials of  
11 Carowinds. (WM)
- 12 Q. ARE YOU AWARE OF ANY ESTIMATES REGARDING THE TIME IT  
13 WOULD TAKE TO COMPLETE THE EVACUATION OF CAROWINDS  
14 UNDER A RANGE OF CONDITIONS INCLUDING PEAK CROWDS?
- 15 A. Yes I am. (WM)
- 16 Q. ARE YOU FAMILIAR WITH THE APPLICANTS' ASSESSMENTS OF  
17 EVACUATION OF CAROWINDS? DO YOU AGREE WITH THEIR  
18 ESTIMATES?
- 19 A. Yes. (WM)
- 20 Q. DO YOU KNOW WHETHER HERITAGE USA HAS NOTIFICATION  
21 PLANS OR PROCEDURES FOR EVACUATION OF VISITORS AND  
22 EMPLOYEES?
- 23 A. Yes they do. (PL)
- 24 Q. HAVE YOU REVIEWED THOSE PLANS AND PROCEDURES?
- 25 A. Yes. I have discussed them with officials of  
26 Heritage USA. (PL)

1 Q. ARE YOU AWARE OF ANY ESTIMATES REGARDING THE TIME IT  
2 WOULD TAKE TO COMPLETE THE EVACUATION OF HERITAGE USA  
3 UNDER A RANGE OF CONDITIONS INCLUDING PEAK CROWDS?

4 A. I have information from them concerning a specific  
5 instance when during the Christmas holidays they had  
6 an exhibition of lights where they were running  
7 hundreds of automobiles through the area. They gave  
8 us a favorable estimate of their abilities. As a  
9 matter of fact they stated that their ability to  
10 control the traffic was excellent. I believe it is.  
11 (PL)

12 Q. ARE YOU FAMILIAR WITH THE APPLICANTS' ASSESSMENT OF  
13 EVACUATION OF HERITAGE USA?

14 A. Yes. (PL)

15 Q. DO YOU AGREE WITH THAT ESTIMATE?

16 A. I have no reason to disagree with it. (PL)

17 Q. DOES THE STATE HAVE PROCEDURES TO NOTIFY THE  
18 CAROWINDS AND HERITAGE USA EMERGENCY STAFF?

19 A. That has been left to the counties. I believe  
20 Mecklenburg County is responsible for notifying  
21 Carowinds and York County is responsible for  
22 notifying Heritage USA. (PL, WM)

1 TESTIMONY OF GASTON COUNTY  
2 (BOB E. PHILLIPS) ON  
3 EMERGENCY PLANNING CONTENTION 9

4 Q. DOES THE COUNTY PLAN CONTAIN INFORMATION PERTAINING  
5 TO THIS CONTENTION?

6 A. Yes, Gaston County information is set forth at  
7 Section IV.B and Annexes C, E, and G of the N.C.  
8 State Plan.

9 Q. CONTENTION 9 DEALS WITH THE ADEQUACY OF EMERGENCY  
10 NOTIFICATION MEASURES, INCLUDING THE SIRENS THAT WILL  
11 BE SOUNDED IN THE EVENT OF A RADIOLOGICAL EMERGENCY.  
12 HAS GASTON COUNTY PROVIDED FOR A BACK-UP TO THE  
13 EMERGENCY WARNING SIRENS?

14 A. Yes. We have back-up sirens on mobile vehicles along  
15 with PA systems which will go through all the areas  
16 in the EPZ of Gaston County. We automatically use  
17 our sirens in addition to the Duke Power sirens.  
18 When the fixed sirens go off our volunteer fire  
19 people will also go out on these routes with their PA  
20 systems and notify the public.

21 Q. ARE THOSE ROUTES ALREADY WORKED OUT?

22 A. Yes.

23 Q. DO THE PEOPLE MANNING THE VEHICLES KNOW EACH PIECE OF  
24 EQUIPMENT AND WHAT ROUTE THEY ARE SUPPOSED TO TAKE?

25 A. Yes.

26 Q. DO YOU HAVE ANY IDEA HOW LONG THAT PROCESS WOULD  
27 TAKE?

28 A. Anywhere from 14 minutes to 22 minutes.

1 Q. FOURTEEN TO 22 MINUTES FROM THE TIME THEY ROLL OUT OF  
2 THE FIRE HOUSE TO THE TIME THEY COMPLETE THEIR  
3 ROUTES?

4 A. Right. If we have problems we can always press the  
5 county police, the Sheriff's Department, and the  
6 rescue squads into service if they would be needed.

7 Q. SO IF FOR ANY REASON ONE OR MORE FIXED SIRENS FAILED  
8 TO GO OFF, WOULD YOU STILL HAVE THESE BACK-UP SIRENS  
9 GOING THROUGH THE NEIGHBORHOODS NOTIFYING PEOPLE TO  
10 TURN ON THEIR RADIOS TO THE EMERGENCY BROADCAST  
11 SYSTEM?

12 A. That is correct.

13 Q. WHEN WOULD THESE BACK-UP VEHICLES BE DISPATCHED IN  
14 RELATION TO THE TIME THE FIXED SIRENS WERE ACTIVATED?

15 A. We would activate the fixed sirens and then  
16 immediately after that we would dispatch the  
17 volunteer fire people.

18 Q. DO YOU KNOW HOW MANY OF THESE MOBILE VEHICLES MOUNTED  
19 WITH SIRENS OR PA SYSTEMS ARE AVAILABLE FOR USE?

20 A. Yes, there is one unit at the station, one unit at  
21 South Point, two units at New Hope, and two units at  
22 Union Road.

23 Q. HOW MANY OF THE VEHICLES HAVE PA SYSTEMS?

24 A. All 5.

25 Q. WHAT MESSAGE WOULD BE GIVEN?

- 1 A. We would broadcast whatever messages the situation  
2 called for. If it was a developing situation, we  
3 would tell people to turn on their televisions and to  
4 listen for further information.
- 5 Q. WHAT STEPS DOES GASTON COUNTY CONTEMPLATE TAKING TO  
6 ASSURE THAT HEARING-IMPAIRED PERSONS WOULD BE ALERTED  
7 IN THE EVENT SIRENS ARE SOUNDED IN A RADIOLOGICAL  
8 EMERGENCY?
- 9 A. During their yearly donation drives, in which they go  
10 door-to-door in the county, members of the volunteer  
11 fire department will ask residents whether there is a  
12 hearing-impaired person living at that address. This  
13 information will be reported to me and I will advise  
14 our law enforcement people, who would make door-to-  
15 door contact with hearing-impaired residents during  
16 an emergency.
- 17 Q. WHAT, IF ANY, MEASURES DO GASTON COUNTY PLAN TO TAKE  
18 TO ASSURE THAT PERSONS WHO DID NOT HEAR THE FIXED  
19 SIRENS FOR SOME REASON OTHER THAN A HEARING  
20 IMPAIRMENT ARE ALERTED TO TURN TO AN EMERGENCY  
21 BROADCAST RADIO OR TELEVISION STATION?
- 22 A. Our mobile alerting should cover this.
- 23 Q. ARE THERE ANY EMERGENCY BROADCAST STATIONS IN GASTON  
24 COUNTY?

1 A. There are EBS stations in Gaston County, but as far  
2 as activation of EBS is concerned, we use the primary  
3 station WBCY in Charlotte. We will have a direct  
4 radio link with them.

1 TESTIMONY OF MECKLENBURG COUNTY  
2 (LEWIS WAYNE BROOME) ON  
3 EMERGENCY PLANNING CONTENTION 9

4 Q. EMERGENCY PLANNING CONTENTION 9 ARGUES THAT THE  
5 EMERGENCY PLANS DO NOT ADEQUATELY PROVIDE FOR EARLY  
6 NOTIFICATION AND CLEAR INSTRUCTION TO STATE AND LOCAL  
7 RESPONSE ORGANIZATIONS. WHERE DOES THE MECKLENBURG  
8 COUNTY EMERGENCY RESPONSE PLAN ADDRESS THE AREAS OF  
9 (1) PUBLIC ALERTING, (2) THE EMERGENCY BROADCAST  
10 SYSTEM, AND (3) NOTIFICATION OF CAROWINDS?

11 A. Part 3, Section IV.B and Annexes C, E and G of the  
12 N.C. State Plan.

13 Q. IN PARTICULAR, CONTENTION 9 ASSERTS THAT NOT  
14 EVERYBODY WOULD HEAR THE EMERGENCY SIRENS. DO YOU  
15 HAVE A BACKUP OR SUPPLEMENTAL ALERTING SYSTEM WHICH  
16 WOULD ALERT THOSE PEOPLE WHO MIGHT NOT HAVE HEARD THE  
17 SIRENS?

18 A. Yes. We have a supplemental system which consists of  
19 the volunteer fire departments who have made a  
20 commitment to zone warning responsibility, by  
21 emergency vehicles, as indicated in the Charlotte-  
22 Mecklenburg plan. Where specific departments have a  
23 specific zone responsibility, they would proceed to  
24 that area and alert the public by a PA System.

25 Q. WHEN IS THE SUPPLEMENTAL SYSTEM EMPLOYED?

1 A. The supplemental system would be called upon when the  
2 sirens sound. Participation by the volunteer fire  
3 department staff will be voluntary.

4 Q. WHO MAKES THE DETERMINATION AS TO WHEN THAT SYSTEM  
5 SHOULD BE ACTIVATED AND WHAT IS THE BASIS FOR THAT  
6 DETERMINATION?

7 A. The duty dispatcher would have the authority to  
8 activate it in the event the EOC was not fully  
9 functional; if the EOC was functional or a minimum  
10 representative staff was in the EOC, the EOC would  
11 make that determination. Also, if prompt  
12 notification ability had been compromised for  
13 whatever reason, we would utilize this capability.

14 Q. WITH RESPECT TO YOUR SUPPLEMENT ALERTING SYSTEM, DO  
15 YOU HAVE PROCEDURES IN PLACE TO SPECIFY THE DUTIES OF  
16 THE PERSONS DRIVING THE VEHICLES AS WELL AS THE  
17 NUMBER OF VEHICLES, RESPONSE TIME, AND SPECIFIC  
18 ROUTES?

19 A. Yes, we do. We have identified the units of the  
20 volunteer fire departments. They have committed to  
21 certain responsibilities with regard to alert and  
22 notification. Routes have been identified and zones  
23 and/or sectors have been identified. Radio  
24 communications are available in the vehicles, PA  
25 systems are available in the vehicles, and a canned  
26 taped message in the SOP is available and would be

1 the one that they would broadcast over the vehicle PA  
2 system to alert the public with regard to what to do  
3 or a course of action they should take.

4 Q. WHAT PROVISIONS HAVE BEEN MADE FOR IDENTIFYING AND  
5 NOTIFYING HEARING-IMPAIRED PEOPLE WHO WOULD NOT HEAR  
6 THE SIRENS?

7 A. The brochure instructs people who are hearing-  
8 impaired to contact our office to arrange for special  
9 notification, if needed. In addition, provisions are  
10 in place for "crawl messages" on TV screens through  
11 the EBS. "Crawl messages" are written emergency  
12 messages that can be made to pass along the bottom of  
13 a TV screen during programming.

14 Q. EMERGENCY PLANNING CONTENTION 9 ALSO FOCUSES ON THE  
15 IMPACT THAT A POWER FAILURE MIGHT HAVE ON EMERGENCY  
16 BROADCAST INFORMATION EITHER FROM THE STANDPOINT OF  
17 RADIO OR TELEVISION RECEIVERS IN PEOPLE'S HOMES OR  
18 FROM THE STANDPOINT OF BACKUP POWER SUPPLY FOR  
19 EMERGENCY BROADCAST STATIONS. CAN YOU COMMENT ON  
20 THIS ISSUE?

21 A. To my knowledge, the primary EBS station for  
22 Charlotte-Mecklenburg has a backup power supply.

23 Q. EPC 9 ALSO DEALS WITH NOTIFICATION PROCEDURES FOR  
24 CAROWINDS AND HERITAGE USA. DO YOU HAVE ANY COMMENT  
25 ON THE ALLEGED LACK OF ADEQUATE NOTIFICATION  
26 PROCEDURES FOR EITHER OF THOSE FACILITIES?

- 1 A. I cannot address Heritage USA as it is in South  
2 Carolina. I can address Carowinds. This office has  
3 made personal contact and written contact with  
4 Carowinds management. We have a procedure in place  
5 to assist the Carowinds management in the evacuation  
6 of the facility by providing pickup and evacuation  
7 for unescorted children at Carowinds. Mecklenburg  
8 County will notify Carowinds and Carowinds will  
9 follow our recommended course of action.
- 10 Q. WHAT IS THE NATURE OF THE ASSISTANCE YOU WOULD  
11 PROVIDE?
- 12 A. Buses for getting the unescorted children out of the  
13 park, law enforcement to assist in traffic control  
14 and crowd control.

1 TESTIMONY OF YORK COUNTY  
2 (PHILLIP STEVEN THOMAS) ON  
3 EMERGENCY PLANNING CONTENTION 9

4 Q. DOES THE YORK COUNTY PLAN CONTAIN INFORMATION  
5 RELATING TO THIS CONTENTION?

6 A. Yes. Annexes C, D, E and Q of the York County  
7 Emergency Operations Plan.

8 Q. EMERGENCY PLANNING CONTENTION 9 QUESTIONS THE  
9 ADEQUACY OF ADVANCE NOTIFICATION EFFORTS --  
10 SPECIFICALLY, THE EMERGENCY SIRENS. WHAT DOES YORK  
11 COUNTY CONTEMPLATE DOING TO INSURE THAT HEARING  
12 IMPAIRED PERSONS CAN BE NOTIFIED IN THE EVENT THAT  
13 THE SIRENS ARE SOUNDED?

14 A. I can think of two specific things. First, Duke's  
15 brochure directs hearing impaired people to notify  
16 local government of their particular hearing  
17 impairment. Second, we have been maintaining a list  
18 in the EOC of people who have particular problems due  
19 to some kind of physical handicap including hearing  
20 impairment. We will continue to maintain this list  
21 so that we can address their needs in the event of an  
22 emergency.

23 Q. HOW WILL YORK COUNTY NOTIFY HEARING-IMPAIRED CITIZENS  
24 OF THE NEED TO TAKE PROTECTIVE MEASURES?

1 A. The county has a specialty notification list which  
2 should include hearing impaired persons and a  
3 designated contact person. We will notify the  
4 designated contact person or go to the house of the  
5 hearing impaired person if necessary.

6 Q. IF PERSONS LIVING IN A CERTAIN AREA WHO ARE NOT  
7 HEARING IMPAIRED FOR SOME REASON DO NOT HEAR THE  
8 SIRENS, WHAT CAN THE COUNTY DO TO NOTIFY THEM?

9 A. York County has a backup notification system that we  
10 utilize. We have available 15 to 18 vehicles with  
11 audio equipment, but we may also use bullhorns in  
12 non-equipped vehicles. Using these emergency  
13 vehicles, we would saturate the area notifying  
14 people. In addition, depending upon the area  
15 involved, we would have door to door notification  
16 using our rural volunteer firemen. Procedures will be  
17 in place to specify the exact routes to be followed,  
18 the message to be conveyed, and by who and how such  
19 message will be conveyed.

20 Q. DO YOU KNOW HOW LONG THIS PROCESS WOULD TAKE?

21 A. Twenty minutes to a couple of hours (depends on size  
22 of the area).

23 Q. DO YOU KNOW WHETHER THERE ARE ANY SPECIAL  
24 NOTIFICATION PROCEDURES FOR PLACES WITH POSSIBLE  
25 LARGE CONCENTRATIONS OF PERSONS, SUCH AS CAROWINDS  
26 AND HERITAGE USA?

1 A. Yes, there is the tone alert system provided by Duke.  
2 If there is an event, the system will automatically  
3 come on.

4 Q. HOW WOULD THE TONE ALERTS BE ACTIVATED?

5 A. They would be activated by the EBS station. I might  
6 add that we also have a specialty notification list  
7 that we maintain in the York County EOC. This is  
8 made up of entities who have special problems, either  
9 in the sense of having large numbers of employees or  
10 persons or having age groups which cannot travel  
11 rapidly, such as nursing homes, day care centers,  
12 large industrial sites, school districts, Carowinds  
13 and Heritage USA, etc.

14 Q. WHAT IS DONE WITH THAT LIST IN THE EVENT OF AN  
15 EMERGENCY?

16 A. Depending on the level of the emergency, we would  
17 call by telephone those particular groups.

18 Q. DO YOU KNOW WHETHER CAROWINDS THEME PARK HAS  
19 PROCEDURES FOR EVACUATION OF VISITORS AND EMPLOYEES?

20 A. Yes, they do.

21 Q. HAVE SUCH PLANS OR PROCEDURES BEEN REVIEWED BY THE  
22 COUNTY?

23 A. Yes.

24 Q. HAS YORK COUNTY DISCUSSED THESE PLANS WITH THE  
25 OFFICIALS OF CAROWINDS?

26 A. Yes.

1 Q. ARE YOU AWARE OF ANY ESTIMATES OF THE TIME IT WOULD  
2 TAKE TO COMPLETE THE EVACUATION OF CAROWINDS UNDER A  
3 RANGE OF CONDITIONS INCLUDING PEAK CROWDS?

4 A. Yes, I am generally aware of Applicants' Evacuation  
5 Time Study estimates for Carowinds.

6 Q. IF SO, DO YOU AGREE OR DISAGREE WITH SUCH ESTIMATES?  
7 ON WHAT BASIS?

8 A. The estimates appear to be reasonable.

9 Q. DO YOU KNOW WHETHER HERITAGE USA HAS PROCEDURES FOR  
10 EVACUATION OF VISITORS AND EMPLOYEES?

11 A. Yes, they do.

12 Q. HAVE SUCH PLANS OR PROCEDURES BEEN REVIEWED BY THE  
13 COUNTY?

14 A. Yes.

15 Q. HAS YORK COUNTY DISCUSSED THESE PLANS WITH OFFICIALS  
16 OF HERITAGE USA?

17 A. Yes.

18 Q. ARE YOU AWARE OF ANY ESTIMATES OF THE TIME IT WOULD  
19 TAKE TO COMPLETE THE EVACUATION OF HERITAGE USA UNDER  
20 A RANGE OF CONDITIONS INCLUDING PEAK CROWDS?

21 A. Yes, I am generally aware of Applicants' Evacuation  
22 Time Study estimates for Heritage USA.

23 Q. IF SO, DO YOU AGREE OR DISAGREE WITH SUCH ESTIMATES?  
24 ON WHAT BASIS?

25 A. The estimates appear to be reasonable.

1 Q. IS TRAFFIC CONTROL ONE OF YORK COUNTY'S  
2 RESPONSIBILITIES IN THE EVENT OF A RADIOLOGICAL  
3 EMERGENCY?

4 A. Yes it is.

5 Q. WHAT DEPARTMENT HANDLES THAT?

6 A. The sheriff's department.

7 Q. HAVE YOU TALKED TO ANYONE AT THE SHERIFF'S DEPARTMENT  
8 ABOUT ANY SPECIAL PROBLEMS IN TRAFFIC CONTROL?

9 A. Yes.

10 Q. DO THESE SPECIAL PROBLEMS INCLUDE THE POSSIBLE  
11 EVACUATION OF HERITAGE USA OR CAROWINDS?

12 A. Yes.

13 Q. WHAT HAS THE SHERIFF'S OFFICE TOLD YOU ABOUT DEALING  
14 WITH LARGE NUMBERS OF AUTOMOBILES COMING FROM EITHER  
15 OR BOTH OF THOSE TWO FACILITIES?

16 A. Because of the volume of traffic that could come from  
17 Heritage USA and Carowinds, obviously there were some  
18 traffic-control considerations that had to be  
19 discussed and ironed out. However, evacuation  
20 procedures were adequate at both locations, and the  
21 Carowinds and Heritage USA representatives that are  
22 dealing with our entities are satisfied that their  
23 standard operating procedures are adequate.

EPC 9  
Bassiouni Attachment A

Resume of:

Dr. M. Reada Bassiouni  
Principal Consultant

Education

Syracuse University, Syracuse, New York -  
Ph.D. in Mechanical Engineering, Major: Acoustics (1976)

Syracuse University, Syracuse, New York -  
Selected courses in Business Administration

Carleton University, Ottawa, Ontario, Canada -  
M.E. in Mechanical Engineering (1972)

Alexandria University, Alexandria, Egypt -  
B.S. in Mechanical Engineering (1969)

Technical Societies

National Forensic Center -  
chosen as an expert in acoustics, noise and vibration  
control

Institute of Noise Control Engineering (INCE) - member

American Society of Testing Materials (ASTM) - member

American Society of Mechanical Engineers (ASME) - member

Acoustical Society of America (ASA) - member

Detailed Experience Record

1980-  
Present      **ACOUSTIC TECHNOLOGY, INC.  
BOSTON, MASSACHUSETTS**

Founded Acoustic Technology, Inc. (ATI) and is the principal technical consultant in acoustics, vibration, and noise control for utilities, manufacturers, and agencies. His area of specialization has been design and implementation of prompt notification warning systems required by NUREG-0654/FEMA REP-1, Appendix 3. As an acoustic expert, he has witnessed and conducted various siren performance tests in conjunction with determining the actual siren acoustic capabilities for utilities and siren manufacturers. Under his direction ATI developed a computer model for prediction of siren acoustic coverage for varying meteorological and ground conditions.

Also, he has had an active role in field testing installed warning systems including documentation and testifying results for the NRC. Under his technical direction ATI has provided consulting services to the following nuclear utilities:



**ACOUSTIC TECHNOLOGY INC.**

1. Arizona Public Service Company  
Palo Verde 1, 2, 3, Nuclear Generating Stations
2. Cincinnati Gas & Electric Company  
Wm. H. Zimmer Nuclear Power Station
3. Florida Power & Light Company  
Turkey Point Power Plant  
St. Lucie Power Plant
4. GPU Nuclear Corporation  
Three Mile Island Nuclear Power Station
5. Jersey Central Power & Light  
Oyster Creek Nuclear Generating Station
6. Louisiana Power & Light  
Waterford-3 Nuclear Station
7. Mississippi Power & Light  
Grand Gulf Nuclear Station
8. Omaha Public Power District  
Fort Calhoun Nuclear Power Station
9. Public Service Electric & Gas Company  
Salem Nuclear Generating Station
10. Rochester Gas and Electric Corporation  
R.E. Ginna Nuclear Power Station
11. Sacramento Municipal Utility District  
Rancho Seco Nuclear Generating Station
12. South Carolina Electric & Gas Company  
V.C. Summer Nuclear Power Station
13. Toledo Edison Company  
Davis-Besse Nuclear Power Station
14. Virginia Electric & Power Company  
Surry Station  
North Anna Station
15. Gulf States Utilities Co.  
River Bend Station
16. Public Service Indiana  
Marble Hill Nuclear Generating Station
17. Duquesne Light Company  
Beaver Valley Nuclear Power Station



ACOUSTIC TECHNOLOGY INC.

18. Philadelphia Electric Company  
Limerick Generating Station
19. Duke Power Company  
Catawba Nuclear Station
20. Indiana & Michigan Electric Company  
Donald C. Cook Nuclear Station
21. Illinois Power Company  
Clinton Power Station
22. Carolina Power & Light Company  
H. B. Robinson Plant  
Brunswick Steam Electric Plant  
Shearon Harris Nuclear Power Plant

Additionally, Dr. Bassiouni has been called upon as an expert witness by many legal firms. He has had extensive experience in analyzing hearing damage claims and OSHA violations which require testing and measurements of high noise levels and determination of their effects on humans. He has also conducted acoustic analyses of tape recordings to identify recorded voices and tape tampering. Dr. Bassiouni has prepared and reviewed environmental noise impact statements. His activities include computer analysis and advanced field measurements. He has performed evaluations of airport noise impacts due to changes in air traffic volume.

1976-1980

**STONE & WEBSTER ENGINEERING CORPORATION (S&W)  
BOSTON, MASSACHUSETTS**

- a. Acoustic Specialist for the Prompt Notification System required by NUREG-0654/FEMA REP-1 Appendix 3. Responsible for computer modelling and ambient noise surveying and support of siren system design.
- b. Noise control engineering for nuclear and fossil-fueled power projects to meet the Occupational Safety and Health Act (OSHA) criteria, property line sound level regulations imposed by local regulatory agencies or individual plant criteria selected to prevent noise complaints from the community.
- c. Acting as a consultant to diagnostic vibrations and noise measurements to evaluate equipment performance deviation for existing plants.
- d. Preparing noise control specifications for new equipment, limiting the noise to allowable levels such that the resultant sound level in the plant area does not exceed the OSHA regulations.



**ACOUSTIC TECHNOLOGY INC.**

- e. Designing and developing noise control devices for dominant noise sources within the plant.
- f. Selecting the acoustical materials to control in-plant and exterior sound levels.
- g. Measurements, predictions, and evaluation of noise control data.

Dr. Bassiouni performed work for the following clients:

1. Cincinnati Gas & Electric  
W.H. Zimmer Nuclear Power Station
2. Baltimore Gas & Electric  
Calvert Cliffs Nuclear Power Station
3. Occidental Petroleum  
Geothermal Power Plant
4. Great Northern Paper Company  
Millinocket, Maine
5. Atlantic City Electric Company  
Deep Water Station - Return to Coal Firing
6. Stone & Webster Engineering Corporation  
Reference Nuclear Power Plant (RNPP)
7. Texaco, Inc.  
Light Olefins Unit, Port Arthur, Texas
8. Sacramento Municipal Utility District (SMUD)  
Geothermal Power Plant
9. Virginia Electric & Power Company  
North Anna Unit Nos. 3 and 4
10. Duquesne Light Company  
Beaver Valley Power Station - Unit No. 2
11. Niagara Mohawk Power Corporation  
Nine Mile Unit 2
12. Power Authority of the State of New York  
Greene County Projects



1975-1976

**AVCO EVERETT RESEARCH LABORATORY, INC.  
EVERETT, MASSACHUSETTS**

Senior Acoustic Scientist

Duties consisted of the following:

1. Experimental acoustic design for laser systems. Acoustic elements design and material compatibility and acoustic properties testing.
2. Design and analysis of special design acoustic mufflers and silencers.

1975

**TERRY CORPORATION, a subsidiary of INGERSOLL-RAND COMPANY  
WINDSOR, CONNECTICUT**

Noise Consultant

Duties consisted of the following:

1. Developed noise data for use by marketing in presenting and guaranteeing noise levels to customers.
2. Developed practical acoustic enclosure systems for use on turbine and gears.
3. Analyzed existing products (single and multistage turbines and gear units) to determine compliance with the national noise standards.
4. Ensured that OSHA noise standards were met in the new product design.
5. Reviewed new industrial noise standards applied to the company products.
6. Determined the impact of existing and proposed noise control legislation and regulations on corporate activities.

1972-1975

**SYRACUSE UNIVERSITY  
SYRACUSE, NEW YORK**

Mechanical and Aerospace Engineering Department

Duties consisted of the following:

1. Conducted extensive acoustic measurements using various techniques.
2. Performed supporting diagnostic techniques for the associated flow field.



**ACOUSTIC TECHNOLOGY INC.**

3. Acoustic data reduction methods, data analysis, and results reporting.
4. Investigated and evaluated noise reduction methods.

1971

CARLETON UNIVERSITY  
OTTAWA, ONTARIO, CANADA  
(AEROTHERMODYNAMICS DIVISION)

Research Assistant - Engineering Department

Fields: Fan and compressor acoustic design and tested acoustic liners

Instructor of Mechanical Engineering

Full and part-time Consulting Engineer in air conditioning and refrigeration systems, Alexandria, Egypt.

Publications

Authored:

1. "Outdoor Sound Propagation over Ground with Several Impedance Discontinuities"; Acoustical Society of America Paper; presented November 1982; Orlando, Florida

Co-authored the following:

1. "Prompt Siren Notification System Design" POWER ENGINEERING, March 1983
2. "Prediction and Experimental Verification of Far-field sound propagation over Varying Ground Surfaces" Internoise "83" paper.
3. "Acoustic and Flow Characteristics of Cold High-Speed Coaxial Jets," AIAA Paper No. 78-241, January 1978
4. "Supersonic Jet Noise Suppression by Coaxial Cold/Heated Jet Flows," AIAA Paper No. 76-507, July 1976
5. "Some Recent Developments in Supersonic Jet Noise Reduction," AIAA Paper No. 75-503, March 1975
6. "Potential of Coaxial Multi-Nozzle Configurations for Reduction of Noise from High Velocity Jets," Second Interagency Symposium of University Research in Transportation Noise, North Carolina University, 1974
7. "Reduction of Noise from Supersonic Jets by Coaxial Multi-Nozzle Schemes," Eighth International Congress on Acoustics, London, 1974



ACOUSTIC TECHNOLOGY INC.

8. "Quarterly Progress Reports, Nos. 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14, submitted to Office of Noise Abatement, Department of Transportation, Washington, D.C.
9. "A High-Speed High-Temperature Flow Facility" Final report under Grant SSF (70)-25, submitted to New York State Science and Technology Foundation



ACOUSTIC TECHNOLOGY INC.