

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD APR 24 12:07

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

Docket Nos. 50-413 06
50-414 06

A-EP-17

5/11/84

APPLICANTS' TESTIMONY ON
EMERGENCY PLANNING CONTENTION 9

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

April 16, 1984

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NUCLEAR REGULATORY COMMISSION

Docket No. 50-413/414 Official Ex. No. App EP-17

In the matter of Duke, Catawba 1 & 2

Staff	IDENTIFIED	<input checked="" type="checkbox"/>
Applicant	RECEIVED	<input checked="" type="checkbox"/>
Intervenor	RECEIVED	<input type="checkbox"/>
Cont'g Unit	RECEIVED	<input type="checkbox"/>
Contractor	DATE	<u>5/11/84</u>
Other	Witness	
Reporter		<u>M. Melzer</u>

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. Reada
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>Region No.</u>	<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 ROOME) 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:



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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



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.



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- 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.



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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



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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



REPORT

ANALYSIS, VERIFICATION, AND TESTING OF THE SIREN PROMPT NOTIFICATION SYSTEM FOR THE CATAWBA NUCLEAR STATION

APRIL 1984

PREPARED FOR:
DUKE POWER COMPANY
CHARLOTTE, NORTH CAROLINA



ACOUSTIC TECHNOLOGY INC.

ATI

BOSTON, MASSACHUSETTS

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ACOUSTIC TECHNOLOGY INC.

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SUMMARY

Duke Power Company contracted Acoustic Technology, Inc. (ATI) to verify and field test the acoustic coverage of the siren notification system installed within the plume exposure pathway Emergency Planning Zone (EPZ) of the Catawba Nuclear Station. This study documents the adequacy of the warning system in meeting the guidelines set forth in the Federal Emergency Management Agency's (FEMA's) regulations 44 CFR 350 Planning Standard E, Appendix 3 of NUREG-0654/FEMA REP-1, and the The Standard Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants (FEMA-43): September 1983.

The Catawba Nuclear Station siren system was designed by the Utility based on the above FEMA guidelines. The ATI analysis, based on a computer model, is somewhat more conservative than the system original design basis due primarily to the following factors:

1. Method of determining attenuation factors (ATI uses a computer model, the Utility design basis used an attenuation factor of 10 dB per distance doubled).
2. Method of determining ambient background noise (ATI uses a 50 or 60 dB ambient based on population density studies and actual field measured ambient, the Utility design basis used 50 or 60 dB ambient based on population density studies).



3. Application of cost/benefit evaluation for marginal coverage areas was considered only in the Utility design basis.

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

Map 1 shows the composite acoustic coverage of the 60 and 70 dBC siren alert signal of the entire system with 67 high-power sirens, which is based on the siren data obtained from the actual siren testing. The 60 and 70 dBC coverage for the installed sirens was evaluated based on the demographic distribution and ambient sound environments within the EPZ, to determine if essentially 100 percent of the population receives adequate alert coverage.

According to FEMA-43, the siren alerting system may be designed so that the siren sound level either exceeds 10 dB above the average outdoor daytime ambient sound levels, or provides 60/70 dBC acoustic alert coverage



depending upon the population density of the area. An ambient background noise survey was conducted within the 10-mile EPZ to document the average measured outdoor ambient sound level in specific areas located outside 60 dBC siren acoustic contours. Based on the ambient noise survey, the average ambient sound level for each area outside 60 dBC contours was determined. Map 2 indicates the regions outside of the 60 dBC coverage with the 50 dBC acoustic coverage contours plotted for each siren location. Accordingly, it was determined that the installed siren warning system is in compliance with FEMA-43 guidelines to alert the public within most areas of the 10-mile EPZ of Catawba Nuclear Station. Consideration of additional coverage for portions of the regions identified in Section 8.0 as being outside of 50 dB coverage will bring the Catawba system into full compliance with FEMA-43 in all EPZ areas.



1.0 INTRODUCTION

The nuclear accident at Three Mile Island (TMI) emphasized the need for better emergency preparedness procedures for commercial nuclear power plant licensees and for state and local officials who would be responsible for alerting the public in the event of a general nuclear emergency. In October 1980, the Nuclear Regulatory Commission (NRC) and FEMA issued a document entitled Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (NUREG-0654, FEMA-REP-1). Among other things, this document lists the criteria for prompt notification of the public in the event of a general nuclear plant emergency. These criteria are presented in NUREG-0654, Appendix 3: "Means for Providing Prompt Alerting and Notification of Response Organizations and the Population."

The final legislation regarding prompt notification was published in the Federal Register which defines the requirements as follows: "The nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway Emergency Planning Zone (EPZ). The design objective shall be to have the capability to essentially complete the initial notification of the public within the plume exposure pathway EPZ within about 15 minutes."

Documentation of the system design coverage is required as stated in FEMA-43. ATI was contracted by Duke Power Company to independently



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evaluate and document the acoustic coverage of the installed siren alert notification system of Catawba Nuclear Station. This system consists of 66 Federal Signal Corporation (FSC) Thunderbolt sirens and one FSC STH10B siren.

The design objective of the installed siren system is to provide a full acoustic coverage for the populated sections of the Catawba Nuclear Station EPZ, in compliance with FEMA/NRC regulations. FEMA-43 states that for an adequate siren system, the expected siren sound level should exceed 70 dBC where the population density exceeds 2000 persons per square mile and 60 dBC in other inhabited areas. Alternatively, the siren sound level coverage should exceed the average measured daytime ambient sound level by 10 dB.

In February 1984, a team of ATI consultants and engineers conducted field testing for a sample number of sirens and performed an ambient background noise survey to determine the average measured outdoor daytime ambient sound level within the 10-mile EPZ. The field test program for the siren system included:

1. Evaluation of siren sound pressure level output at 100 feet.
2. The Siren System Acoustic Performance Test, consisting of:
 - a. A determination of the sirens' propagation range,
 - b. Validation of the acoustic coefficients of sound propagation, and
 - c. Verification of acoustic coverage.



Siren sound level measurements were made for a representative, randomly selected sample of six sirens. This sample size was determined to provide at least a 95 percent confidence interval with the assumption of a 2 dB level of accuracy for average siren output. ATI's test engineers, assisted by personnel from Duke Power Company performed the sound level measurements using acoustic instrumentation which conforms to standards set by the American National Standards Institute (ANSI). Sound level meters were calibrated both before and after testing in accordance with ANSI procedures. Siren sound pressure levels, ambient background noise levels, and meteorological conditions were noted at each of the measurement locations for each siren activation. Locations for field measurements were selected on the basis of site specific conditions for each installed siren, and varied depending on factors such as road accessibility and how many times the siren was activated.

According to FEMA-43 criteria, the 60 dBC and 70 dBC acoustic coverage contours of the installed siren systems have been obtained by using the ATI computer model (See Appendix 1). These sound contours were superimposed on the United States Geological Survey (USGS) map of the 10-mile EPZ, and are presented on Map 1. Daytime summer average weather conditions were used for this analysis. Map 2 illustrates areas which are located outside 60 dBC acoustic contours.

As part of the verification of the acoustic coverage of the siren alerting system for the Catawba Nuclear Station, an ambient background noise survey was also conducted to determine the average measured outdoor daytime



ambient sound level. The areas outside of the 60 dBC siren sound coverage contours were surveyed to establish accurate daytime ambient sound levels to ensure adequate acoustic coverage. The measuring locations for the survey are also indicated on Map 2.

By determining the average outdoor daytime ambient sound levels, a siren signal that is 10 dB above these ambient sound levels can be determined to satisfy FEMA-43 criteria. The siren signal acoustic coverage of the installed siren warning system was evaluated based on these actual measured ambient sound levels. Most areas outside the 60 dBC siren sound coverage contours were adequately covered by the existing siren sound coverage.



2.0 EVALUATION OF CATAWBA STATION EPZ

2.1 TOPOGRAPHIC CONSIDERATIONS

As recommended in FEMA-43, USGS topographic maps were used during the analysis process. The plume exposure pathway EPZ of Catawba Station includes a composite of nine USGS topographic map quadrangles of foot scale 1:24,000. An index of the topographic map quadrangles used for this analysis with latitude and longitude indications is shown in Figure 1. Two of the map quadrangles, Clover and Rock Hill West, are not currently available in the 1:24,000 scale. Therefore, 1:62,500 scale maps for the area were enlarged to fit the scale of the other EPZ maps. Land elevations and ground conditions were read directly from the USGS maps as input into the computer analysis for sound propagation to ensure accurate predictions.

Catawba Nuclear Station is located on the shores of Lake Wylie in York County, South Carolina. The surrounding area is predominantly rural and is characterized by gently rolling hills, which are mainly tree covered. The Catawba site elevation is approximately 600 feet above mean sea level (msl). Land elevations within the EPZ range from 600 feet msl to 750 feet msl. At a typical siren location, changes in elevation for the sound propagation area vary 30 to 90 feet, with the average difference of 50 to 60 feet between the highest and lowest points along a sound propagation path. Therefore, relatively significant topographical features of the EPZ must be considered in the calculation of sound attenuation over long distances.



2.2 DEMOGRAPHIC DISTRIBUTION

Three counties, York County, South Carolina (SC), Gaston County, and Mecklenburg County, North Carolina (NC) are located within the EPZ of Catawba Nuclear Station. Based on the 1980 Population Census, there is a total population of approximately 93,000 persons within the Catawba EPZ. Significant population groups within the 10-mile EPZ are located in Rock Hill, SC; York, SC; Fort Mill, SC; and Clover, SC. The population and land area for these areas were evaluated by Duke Power Company to determine their population density. FEMA-43 guidelines indicate that areas where the population exceeds 2,000 persons per square mile should be covered by a louder siren signal. Based on this evaluation, Rock Hill, Fort Mill, and Clover have areas where the population density exceeds 2,000 persons per square mile. These areas are shown on Map 1.

2.3 METEOROLOGICAL CONSIDERATIONS

FEMA-43 guidelines suggest that average summer daytime weather conditions be used to calculate siren sound contours. To determine these conditions, excerpts from Section 2.3 of Catawba Nuclear Station's Final Safety Analysis Report (FSAR) relating to meteorology were evaluated to assess levels of temperature, relative humidity, wind speed and direction. The source of this data is the Douglas Municipal Airport in Charlotte, NC.

o Temperature:

The monthly average temperature variation of the Catawba Nuclear Station climatology ranges from 42.1°F in January to 78.5°F in



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July with a yearly average of 60.5°F. These monthly temperatures were calculated as an average of the daily maximum and daily minimum temperature. It is recognized that this average monthly temperature is not a true "daytime" average as requested in FEMA-43. However, for the purpose of design analysis, these averages provide a good indication of the daytime average. Therefore, to determine the average summer weather conditions, the monthly temperatures for June (75.9°F), July (78.5°F) and August (77.7°F) were averaged. As a result, the average summer temperature is calculated to be 77.4°F.

o Relative Humidity:

The relative humidity for the site was derived by evaluating the monthly mean dewpoints for June, July, and August with respect to the monthly temperature. The derived relative humidities for June, July, and August are 50 percent, 54 percent and 58 percent, respectively. The average summer relative humidity was calculated to be 54 percent.

o Wind Speed and Direction:

The highest mean wind speed for the Catawba Nuclear Station vicinity is 8.9 mph in the months of March and April. The mean wind speed is 7 mph in June, 6.6 mph in July, and 6.5 mph in August. Therefore, the average summer mean wind speed is 6.7 mph. The prevailing wind directions for the Catawba vicinity during June, July, and August are Southwest, Southwest, and South



respectively. Therefore, the average dominant wind direction in the summer is determined to be the Southwest.

Based on this evaluation, the following average summer meteorological conditions were used in the computer analysis for the siren sound coverage:

Temperature:	77.4 ^o F
Relative Humidity:	54 percent
Wind Speed:	6.7 mph
Wind Direction:	Southwest



3.0 SIREN ACOUSTIC COMPUTER MODEL

The siren sound levels within Catawba Nuclear Station plume exposure EPZ were calculated using a computer model developed by ATI. The computer model considers meteorological factors, topographical factors, and land surface conditions. These factors affect the propagation of the acoustic signal generated by a siren.

The results of the analyses for each siren location are presented in Appendix 1a. From these results, the 60 and 70 dBC contours have been plotted for each siren location. These siren sound contours are presented in Appendix 1b and have been plotted to the scale of the USGS maps for the EPZ. The various factors considered in the sound propagation analysis by the computer model are summarized as follows:

A. Hemispherical Wave Divergence

The change in sound pressure level from hemispherical divergence is uniform in all directions and occurs at a rate of 6 dB per doubling of distance from the sound source. This non-dissipative sound pressure level attenuation is a result of the decrease in energy density (energy per unit area) of the propagating sound wave. The energy density of a sound wave decreases as the distance from a sound source increases because of the increase in the surface area over which the constant energy of the wave is distributed.

B. Atmospheric Absorption

Molecular absorption further reduces the sound energy. This



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dissipative sound level attenuation is from inelastic collisions of air molecules. Absorption is highly dependent on the temperature and the relative humidity of the air, and is quite pronounced at long distances and at high frequencies.

C. Ground Effects

Sound attenuation is a function of the ground cover and the siren's height. The ground cover conditions were read directly from USGS maps at various directions and distances from the installed siren locations. These conditions were used to calculate the sound attenuation due to the absorptive effect of the different ground coverings.

The primary path of outdoor sound propagation is the direct line-of-sight path; the secondary path is the ground reflected path. Both of these paths are subject to sound attenuation due to the effect of ground cover between the sound source and distant locations.

In general, five types of ground cover are distinguishable from USGS maps for evaluation by the ATI computer model:

1. Dense vegetation - forests, mangrove, and thick brush attenuate sound to the greatest extent.
2. Wooded marsh - Vegetation attenuates sound, but water reflects sound to a certain extent, so attenuation by this ground cover is not as great as that by denser vegetation.

3. Water, marshes - Water acts as a reflector for sound propagation so attenuation over water is very slight.
4. Open fields - Where there is no dense vegetation or other barriers to sound, attenuation is slight.
5. Urban and suburban areas - Sound reflects well from pavement at acute incidence angles. Sound is attenuated to a significant extent, however, in urban areas close to the siren; buildings act as sound barriers and reflection is poor because of high incidence angles. In urban areas further away from the siren, sound propagates with a low attenuation rate as a result of increased reflection due to the lowered angle of incidence.

Within the EPZ of the Catawba Station, the typical ground features are dense vegetation and open field. Also, several urban and suburban areas exist which are considered in the computer analysis.

D. Wind Shadows

Wind gradients near the ground are usually positive; that is, wind speed increases with height. As a result, a wind shadow zone is most commonly encountered upwind of a siren because headwinds with positive wind gradients bend sound rays upward. Downwind, the sound rays are bent downward and no shadow zone is produced. Crosswind, there is a zone of transition.



E. Barrier Attenuation Effects

A mound of earth, a hill, or a structure, if large enough, are partial barriers to sound and can reduce sound levels within their shadow zone. The sound attenuation caused by a barrier is estimated by the computer model.

The computer model determines the effective barrier height which is the height above the line-of-sight from the siren to the receiver location. The other two essential dimensions are the distance from the siren to the barrier, and the distance from the barrier to the receiver. These dimensions are used to calculate the attenuation of sound from the barriers. Topographical data from USGS maps are used to calculate the sound attenuation from barrier effects caused by the high elevations generating acoustic shadow zones behind ridges and hills.

F. Siren Characteristics

Another factor considered by the ATI computer model is the siren type. The Catawba Nuclear Station alert system uses two types of sirens: the FSC Thunderbolt 1000B and the FSC STH10B. The computer analysis used siren sound outputs of 125 dBC at 100 feet for the FSC Thunderbolt, and 113 dBC at 100 feet for STH10B to generate the 60 and 70 dBC sound contours. The siren fundamental tone frequency used in the analysis was in the 500 Hz octave band. Justification for these siren outputs was based on manufacturer's specifications and field testing of these sirens conducted by ATI.



The height of the pole on which each siren is mounted is also considered in the analysis. The installed sirens are mounted on poles at a height of 50 feet 6 inches, \pm 6 inches.



4.0 FIELD VERIFICATION OF SIREN ACOUSTIC COVERAGE

4.1 INSTRUMENTATION AND PROCEDURES FOR SIREN TESTING

All instruments used for the siren testing comply with the standards set forth by ANSI. The instruments were battery operated and portable. The sound level meters used in the field include Bruel & Kjaer (B&K) 2215, 2218, 2219, and 2230 meters, which are Type 1 meters and comply with ANSI S1.4-1983 (Specifications for Sound Level Meters). All sound filters used (octave, and one-third octave filter sets) comply with ANSI S1.11-1966 specifications.

Four high precision instrumentation tape recorders were used to collect and store the siren signals and ambient sound levels at various measurement sites for later detailed laboratory analysis and evaluation. This procedure was useful in the verification of siren tone frequencies and siren tone effectiveness in far-field sound propagation, and the documentation of ambient sound levels. The recorders comply with ANSI/SAE J184a (Qualifying a Sound Data Acquisition System).

At the beginning of each test day, all sound level meters were battery checked and calibrated with a B&K 4230 calibrator (accuracy $\pm .2$ dB). A calibration tone was recorded at the beginning and the end of each recorded tape. All recording adjustments made during each test were noted on the tape. At the end of the day, all sound level meters were checked and calibrated again. Any variance from proper calibration was noted and the

appropriate corrections were made to the data. This procedure was followed in compliance with ANSI S1.10-1966 (Calibration of Microphones).

The choice of measuring locations for the siren testing was made after considering several factors. Practical considerations, for instance, restricted all locations to those accessible by automobile. To fully test the accuracy of ATI's computer predictions, a set of measuring locations was selected at various angles and distances from each siren tested. These points were also selected to sample ground cover and vegetation representative of the propagation area of each siren, and to be easily identified on USGS maps (intersections, sharp bends in the road, etc., were preferred). Typical distances from measuring locations to the siren were in the range of 2,000 to 10,000 feet. These distances roughly correspond to average 90 and 55 dBC contours for the siren sites. It can be safely assumed that any areas closer than 2,000 feet will be satisfactorily covered by the siren sound signal. The measurement locations for each of the sirens tested are given in Appendix 2.

At each measurement location, all sound level meters were positioned to face in the direction of the siren being tested. Sound level meters were held at least four feet above the ground and six feet away from any reflective surface (such as a fence or a building). Each microphone was fitted with a windscreen to reduce error caused by wind noise. The measurement procedure followed by the test engineers was in compliance with ANSI S1.13-1971 (Method for Measurement of Sound Pressure Level) standards.



For each siren test measuring location, a written description of the site acoustic path, nearby background noise sources, and the quality of the siren signal were noted to aid in the processing and analysis of the data. At each location, the instantaneous, direct measurement of an ambient sound level was conducted before each activation. This procedure was followed to determine the validity of the siren signal level data. If the measured siren sound level is close to the ambient sound level, for instance, the observed meter reading of the siren signal may be influenced by the high ambient sound level.

In addition to the direct measurements, 1 to 3 minute samples of siren signal and ambient background noise were recorded at selected measuring locations to enable frequency analysis of the siren tone frequencies.

Generally six or seven measuring locations were predetermined for each siren activation. Since each siren was activated 2 to 6 times, a total of 14 to 38 measuring locations were specified for each siren site. The duration of each activation (2 to 3 minutes) was sufficient to allow 4 to 7 revolutions of the rotating siren horn.

The team of test engineers was taken by car to the first set of locations. After measurements were made for the first activation of the siren, the engineers were picked up and dropped off at a different set of locations where measurements were made during the next activation of the siren. The engineers were then picked up and transported to the next set of locations where the procedure was repeated.



Because of the long distances involved, walkie-talkies using the utility's FM communication radio system were used to confirm that the test engineers were prepared for a siren activation. The siren was activated manually from the siren control box by Duke Power Company Personnel.

One ATI test engineer remained in close proximity of the siren to make additional measurements. The engineer was elevated by a bucket truck to the height even with the centerline of the siren horn, and at a distance of 100 feet from the siren pole. Measurements were made and recorded in this manner for all six tested sirens; to verify the siren sound output rating, and to record data to be used for narrow band frequency analysis of the siren signal.

4.2 DATA REDUCTION AND ANALYSIS

4.2.1 Siren Narrow Band Frequency Analysis

Six FSC Thunderbolt sirens of the 67 installed sirens in the Catawba Prompt Notification System were randomly selected to evaluate the acoustic performance of the system. Near-field measurements were made to determine the sound output at 100 feet from each tested siren. Far-field measurements were made to establish the accuracy of the computer predicted sound coverage of each tested siren. In addition, narrow band frequency analyses were performed on both near-and far-field siren signal data to:



1. Determine the exact propagation frequencies of the sirens of the prompt notification system, and
2. Study the effects of atmospheric attenuation on the far-field propagation of the spectral components of the siren signals.

Siren acoustic performance was evaluated through recorded measurements made at the centerline of the siren, 100 feet away from the siren pole. These measurements were made to satisfy FEMA-43 Standard Guide requirements for determination of siren sound output. During the analysis, narrow band frequency spectra were obtained from the siren signal. These spectra are presented in Appendix 3, and provide information about the harmonic content of each siren tested. A summary of the results of the near-field analyses is presented in the following table.

MAXIMUM SOUND PRESSURE LEVELS (SPL) AT 100 FEET

<u>SIREN NO.</u>	<u>SIREN TONE: FUNDAMENTAL</u>		<u>SIREN TONE: FIRST HARMONIC</u>		<u>OVERALL SPL (dB)</u>
	<u>FREQUENCY(Hz)</u>	<u>SPL(dB)</u>	<u>FREQUENCY(Hz)</u>	<u>SPL(dB)</u>	
6	675	125	1350	113	125
22	660	127	1320	116	127
30	670	125	1340	116	125
34	660	125	1320	114	125
51	690	126	1385	115	126
60	680	126	1370	115	126

The FSC Thunderbolt sirens produced a fundamental tone frequency in the range of 660 to 690 Hz. The overall maximum values measured vary in a range of 125 dBC to 127 dBC.

In addition to determining the acoustical characteristics of the tested sirens, near- and far-field narrow band spectra were compared to study the effects of attenuation factors on far-field sound propagation. For illustrative purposes, near- and far-field narrow band analyses for a representative siren (Siren 22) are shown in Figures 2 and 3, respectively. As shown in Figures 2 and 3, the higher harmonics contribute less to the total SPL at large distances from the siren, since the relative amplitudes of these harmonics are substantially attenuated at long distances. This effect is from the atmospheric attenuation of the higher frequencies, an effect which increases with distance.

It should be noted that far-field sound propagation is dependent on siren signal fundamental frequency. The higher the fundamental frequency, the greater the sound propagation loss will be. To illustrate this effect, the following table is provided.

<u>Tone Frequency</u> <u>Hz</u>	<u>Average SPL measured</u> <u>at 100 feet (dB)</u>	<u>Atmospheric Attenuation</u> <u>for 5,000 Feet (dB)</u>
670 (fundamental)	125	8
1,340 (first harmonic)	115	16
2,010 (second harmonic)	109	17
2,680 (third harmonic)	104	28

The first column in the table lists the tone frequencies of the fundamental and its harmonics of a typical siren. The second column lists the average SPL for each siren tone frequency, obtained from the data in Appendix 3. The third column lists calculated values for atmospheric attenuation losses

for siren signal propagation at 5,000 feet (assuming the meteorological conditions under which the testing was conducted). Attenuating factors other than atmospheric absorption are relatively frequency independent, and affect all harmonics equally. Since atmospheric absorption is the dominant attenuating factor of the higher frequencies, it is considered here for comparison and evaluation purposes.

The table shows that, on the average, the SPL of the siren signal's fundamental tone is substantially greater than that of all its higher harmonics, and would also be the least attenuated by the atmosphere. It would be expected that this frequency will be the dominant tone at greater distances. Examination of Figures 2 and 3 illustrates this concept. For example, the difference in amplitude between the fundamental and its first harmonic in the near-field of Siren 22 (100 feet from siren) is about 9 dB, while in the far-field (9,000 feet) this difference increases to almost 18 dB. The far-field measurements show that the SPL of the fundamental tone of each siren tested was considerably greater than that of its higher harmonics.

4.2.2 Siren Signal-Time Variation

Recordings of the variation of siren signal SPL with respect to time were made for the tested sirens. All of these measurements were made at the centerline height of the siren projector, at a distance of 100 feet. The results are presented in Appendix 4. In addition, the variation of siren signal SPL vs time for siren 22, a typical case, is shown in Figure 4. The

peak levels attained by the tested sirens ranged from 126 to 128 dBC. As can be seen from this figure, the time history curve of the FSC Thunderbolt siren is a periodic shape with maximum SPL when the siren is facing the measuring microphone.

The graphic level recordings shown in Appendix 4 also indicate that the FSC Thunderbolt sirens tested completed one revolution cycle in 25 to 26 seconds, with a corresponding rotation rate of 2.3 to 2.4 rpm. However, it should be noted that Duke Power Company will configure the system to operate at the 4 rpm siren rotation mode.



5.0 COMPARISON OF FIELD TEST RESULTS WITH PREDICTED VALUES

For purposes of comparison with the actual siren SPL measurements, corrections for meteorological conditions and the dBC to dBA conversion were made to the computer predicted SPL values. The data summary tables in Appendix 5 include temperature, relative humidity, wind speed and direction for the day, and the time of each individual siren test. Hourly reports of the ambient temperature, relative humidity, and wind conditions for each test day were obtained from the National Weather Service office at the Douglas Airport in Charlotte, NC. Subsequently, ATI's computer model was used to predict siren sound levels based on the specific meteorological conditions recorded during the siren tests. Further, for each tested siren, the sound level output and siren fundamental tone frequency measured at 100 feet from the siren were used as input parameters for ATI's computer model.

To compare the measured siren field test results to the analytically predicted sound pressure level values, a statistical analysis of the differences was performed. To ensure the accuracy of this analysis, the only field measurements used were those which were not unduly influenced by local effects. Measurement data values were not considered in comparison between measurements and predicted values, if they were affected by any of the eight following conditions:

1. An acoustic barrier effect caused by large distant buildings, structures, or topographical features which shielded the receiver from the siren signal.



2. A local shadow-zone: nearby homes or other structures which acted as an acoustic barrier, e.g. the test engineer may have been located behind a house, a small hill, etc.
3. A sudden and sporadic wind or atmospheric effect causing a large variation of the siren signal.
4. Disagreement due to factors not shown on USGS maps.
5. Interference of an audible siren signal by passing traffic.
6. Failure of a siren signal to register above the ambient noise level.
7. Equipment or human error, e.g. weak batteries, incorrect meter readings, etc.
8. Increase in a measured level due to reflection from surrounding topography (hills, mountains, etc.).

Conditions which typically affected the field measurement data during the Catawba siren testing were factors 4, 6, and 8. A histogram depicting the differences between the predicted and the measured SPL for the tested sirens, along with the average and the standard deviation, is given in Figure 5. The average difference between the predicted and measured SPL values is -0.53 dB. This indicates an excellent correlation between the



computer model and the actual field measurements. It should also be noted that the negative value for the average indicates slightly conservative predicted values. Since -0.53 dB is less than the precision of the sound level meter (± 1 dB), it can be concluded that the computer model is a very accurate prediction method. The standard deviation, which is a measure of the typical fluctuation of the test values about the predicted values, was calculated to be 1.9 dB.

A plot of the differences between predicted and measured SPL values vs distance from the siren is shown in Figure 6. Eighty-nine percent of all differences are within ± 3 dB of perfect agreement, once again showing the good predictive ability of the computer model. Since the 60 dBC contour usually occurs at distances in the range of 6,000 to 8,000 feet from the siren, this portion of the plot should be considered. Most distances further than 6,500 feet show measured values greater than the predicted values, once more indicating the conservative nature of predictions at large distances from the siren.

It should be noted that since the fundamental tone frequency of the tested sirens was around 660 Hz, this parameter was used as input to ATI's computer model to compare field test results with predicted values. The acoustic coverage and alert effectiveness of these sirens may be increased by adjusting the sirens to produce a slightly lower fundamental frequency (575 Hz). However, the accuracy and conservative nature of the model will remain, regardless of the frequency adjustment that is selected, within the optimum range.



6.0 AMBIENT BACKGROUND NOISE SURVEY

The 79 measuring locations for the ambient background noise survey were selected through an extensive preparation and field investigation process. Since the primary interest of the ambient background noise survey was placed on the areas outside the 60 dBC siren acoustic coverage, measuring locations were chosen in these areas, as shown on Map 2. As described in FEMA-43, factors considered in evaluating the ambient sound level in these areas included population density, effects of major transportation routes, and effects of commercial/industrial activities.

For each location, the overall ambient sound pressure levels were measured. These included measurements made with A-weighting, and in one-third octave bands containing the predominant tones of typical sirens. The background noise sources affecting the reading and a brief description of the measuring locations were noted. These data are presented in Appendix 6. Table 1 presents a summary of the dBA, 500 Hz, and 630 Hz one-third octave band direct measurements made for each location. These measurements are in accordance with the procedures recommended in the FEMA-43 Standard Guide.

In addition to direct measurements, Nagra IV-5J and Nagra IV-SN instrumentation tape recorders were used to record the ambient sound environment at each location for further laboratory analysis. Recordings made for analysis were approximately 1 to 3 minutes in length, depending on the characteristics and variability of the ambient noise. A calibration tone was recorded at the beginning and end of each tape, and all recording

adjustments were noted. At the end of the surveying day, all recording equipment was checked and calibrated again. Any variance from proper calibration was noted and the appropriate corrections were made to the data. This procedure was followed in compliance with ANSI S1.10-1966 (Calibration of Microphones). The recording system set-up was in compliance with ANSI/SAEJ184 (Qualifying a Sound Data Acquisition System).

Since the ambient sound level at a location may vary greatly with time, it is necessary to give a statistical description of the variation. To accomplish this, a B&K 4426 Noise Level Analyzer was used to sample the sound level 10-times per second for the duration of each recorded measurement. By using linear response recorded tapes, it was possible to filter for C-weighted, A-weighted, or various one-third octave bands and derive the statistical information. Since the signal frequency of the FSC Thunderbolt sirens tested falls within the range of 561 Hz to 671 Hz, this sampling procedure was performed for the 630 Hz one-third octave band frequency and with A-weighting to reveal overall levels. Results of these analyses were obtained through a B&K Type 2312 Alphanumeric Printer. A summary of the data obtained is presented in Table 2.

To facilitate understanding of ambient noise sources, a B&K 2031 Narrow Band Spectrum Analyzer was used. The analyzer produces a narrow band frequency spectrum, with frequency plotted vs amplitude. Knowledge of the ambient sound frequency spectra can ensure the dominance of the siren discreet tone over the ambient sound at the siren signal frequency.

6.1 AMBIENT SOUND FREQUENCY CHARACTERISTICS

To better understand the nature of the ambient sound environment within the 10-mile EPZ of Catawba Nuclear Station, it is necessary to consider ambient sound frequency characteristics. These characteristics can be described in terms of standard weighting and filtering schemes, such as C-and A-weighting, and one-third octave band filtering. The usefulness of each weighting scheme (dBC, dBA) depends upon the frequencies of interest, as each scheme places emphasis upon certain frequencies and de-emphasizes others.

The overall SPL at a given point is the logarithmic addition of SPLs at all frequencies. C-weighting serves to de-emphasize the extreme low (<50 Hz) and high (>5,000 Hz) frequencies slightly while retaining the equal emphasis on middle frequencies, as shown in Figure 7. The A-weighting scheme was developed to approximate the frequency response of the human ear, which cannot perceive low or high frequency noise as well as it does noise in the middle frequencies (see Figure 7). Since A-weighting approximates human sensitivity, it is very useful in assessing the annoyance aspects of noise.

One-third octave band measurements consider only those frequencies which are within a one-third octave around a certain center frequency. Thus, the 630 Hz one-third octave band considers only that sound with frequencies between 562 and 708 Hz. One-third octave band filtering is useful when



only certain frequencies are of interest, such as those near the siren signal frequency.

Figure 8 shows the relationship between the one-third octave band SPLs and overall SPL as expressed in dBC. As an example, the one-third octave band frequency spectrum from 0 to 2,000 Hz of a typical ambient sound level in a rural area has been plotted in dBC. The logarithmic addition of all the SPLs of frequency bands from 31 Hz to 2,000 Hz yields an overall sound pressure level of 52 dBC. As shown in Figure 8, the recommended frequency range for siren tones is 400 to 800 Hz. A characteristic spectrum for an ambient sound level shows dB levels of 34, 35, 36, and 37 for the recommended siren frequencies of 400 to 800 Hz. These dB levels at the one-third octave band of the predominant siren tones are substantially lower than the overall level, since the logarithmic sum of all bands must equal 52 dBC.

6.2 AMBIENT SOUND VARIATION WITH TIME

Background ambient sound levels vary with time. In the case of a steady noise source, this variation may be slight. More often, however, ambient conditions are changing at a measuring location, and therefore overall one-third octave band noise levels may change. Ambient sound level as a function of time for a location with typical traffic activities is shown in Figure 9. The dashed curve shows the continuous variation of C-weighted values which increase and decrease as motor vehicles pass by the

measuring location. The solid curve represents the variation of the A-weighted noise level with time, and the third curve shows the noise variation at the 500 Hz one-third octave band. As described previously, C-weighting takes almost equally all frequencies into account while A-weighting de-emphasizes the lower and higher frequencies. At any point in time, therefore, the dBC value will be greater than or equal to the dBA value. In addition, each of these curves varies over 20 dB as motor vehicles pass the measuring location, producing a wide range of noise values.

It should also be noted that the varying ambient sound level at a location may rise above and fall below the siren signal level. If at some moment the ambient sound level is too loud for a siren signal to be detected, a moment later it may decrease so that the siren can be heard. Since it is impossible to know what the ambient sound level may be at any particular time during siren activation, it is necessary to look at statistical probability distributions of ambient sound levels. One way to do this is to describe the sound in terms of levels exceeded for a certain percentage of the time. An L_n sound level for instance, is the sound level exceeded n percent of the time. Thus L_{10} is the sound level exceeded only 10 percent of the time (almost the highest level), L_{50} is the sound level exceeded 50 percent of the time (the median level), and L_{90} is the sound level exceeded 90 percent of the time (almost the lowest level). L_{10} and L_{90} are important because most of the varying noise level remains between these values. In addition, L_{90} is often used as a measure of background noise level.

Another way to characterize a varying noise level is to describe it in terms of equivalent sound energy (L_{eq}). L_{eq} is the constant sound level which over the same time interval would expend the same amount of sound energy as the time-varying source. This equivalent constant level, L_{eq} , places more emphasis on loud, transient noise which can be disturbing, and is therefore useful in analyzing the ambient sound along major transportation routes. Also, L_{10} is often applied to highway noise analysis since it is a measure of the louder traffic noise which can obscure a siren signal.

A graphic level representation of ambient sound level variation at a location, measured for approximately three minutes with A-weighting is shown in Figure 10. During the measurement, a B&K Noise Level Analyzer was used to sample the varying noise level 10-times per second, each sample consisting of the noise level (in dBA) at that instant. This is done because it is necessary to break up the ambient sound level measurement, a continuous function, into many discrete values to apply statistical methods of analysis. On the basis of 1,800 total samples of the continuously varying noise level, the levels of the statistical descriptors L_{eq} , L_{10} , L_{50} and L_{90} were computed. They are shown in Figure 10.

To depict the range of ambient sound level variation which exists at each measuring location, ATI prepared probability histograms. A typical probability histogram is shown in Figure 11. This histogram corresponds to the noise variation illustrated in Figure 10, and shows the percentage of the samples that fall within certain 2 dB intervals. Thus, 10 percent

(about 180) of the 1,800 total samples fall in the range 42 dBA to 44 dBA, 15 percent (almost 270) fall in the range 44 dBA to 46 dBA, etc. A histogram with narrow spike would suggest a very steady ambient sound level, while one which is very spread out would represent a widely-varying ambient sound level.

6.3 DEFINITION OF AMBIENT BACKGROUND NOISE LEVEL

The alert ability of an outdoor warning siren signal is related to the minimum ambient sound level that occurs at a listener site, during the time period that the warning signal of a siren is sounded. According to the FEMA-43 Standard Guide, if an early warning system includes a siren system, "the ambient background noise level should be measured in that one-third octave band(s) containing the predominant tone(s) of the siren(s) used". Furthermore, FEMA-43 states that a siren alert signal should be 10 dB higher than the average outdoor daytime ambient sound level for the one-third octave band containing the predominant tone of the siren signal. This is because the human ear detects pure tones if they are at least 9 dB higher than the background noise level.

The instantaneous, direct sound level meter measurements obtained by ATI during the ambient survey provide the dBA and one-third octave band frequency levels from 500 and 630 Hz, as presented in Table 1. Based on the actual field siren testing; predominant tones of the sirens were found in the 630 Hz one-third octave frequency band. Although direct sound level



meter measurements are good indications of the ambient level, the statistical descriptors L_{10} , L_{50} , L_{90} and L_{eq} provide a more exact measure of the fluctuating noise level. Table 2 presents the summary of the statistical analyses conducted for all measuring locations. A comparison of the direct, instantaneous ambient sound level measurements with the statistically calculated ambient levels in Table 2 shows that approximately 75 percent of the direct measurements fall within the range of the L_{10} and L_{50} values. Approximately 25 percent are similar to the calculated L_{90} levels.

When one considers the relatively short duration of the peak siren sound signal for a rotational siren which is used in the 10-mile EPZ of Catawba Nuclear Station, the L_{10} value of the 630 Hz one-third octave band provides an adequate measure of the average outdoor daytime ambient sound level for the purpose of a conservative design. It should be noted that the areas located outside 60 dBC siren acoustic coverage are surrounded by several sirens. Therefore, the public in these areas should be alerted by a siren alert signal emitted from more than one siren. The multiple number of siren alert signals will have an effect of increasing the total duration of the peak siren acoustic signal. Therefore, the measured ambient sound level for an area outside of the 60 dBC coverage can be defined as the L_{10} or L_{50} value of the one-third octave band of the predominant siren tones depending upon the number of sirens surrounding each area.

The areas located outside 60 dBC siren coverage were grouped into 23 regions as shown on Map 2. One to 7 locations were selected for noise

level measurements for each region depending on the size of the region. The L_{10} , L_{50} and L_{90} values of the one-third octave band of the predominant siren tone for each measuring location are presented in Table 3. The average outdoor daytime ambient sound level for a region was determined by taking the average of the measured ambient sound levels in the area. By taking the average among the measured values, overall average L_{10} , L_{50} and L_{90} levels were calculated for each region for a case-by-case consideration.

The L_{10} values for 13 regions (2, 5, 8, 10, 11, 12, 13, 16, 18, 19, 20, 22, 23) are 40 dB or less. Nine other regions (1, 3, 6, 7, 9, 14, 15, 17, 21) had L_{50} values which were less than 40 dB. Only Region 4 has a L_{50} value of greater than 40 dB.

7.0 EVALUATION OF THE EXISTING SIREN PROMPT NOTIFICATION SYSTEM

The siren warning system for the 10-mile EPZ of the Catawba Nuclear Station consists of 67 FSC sirens installed to provide adequate acoustic alert coverage to the public within the EPZ. According to the criteria of FEMA-43, the 60 and 70 dBC acoustic contours of the installed sirens were calculated and shown on Map 1. During the field testing, the siren system provided an actual siren fundamental frequency of 630 Hz, and a range of siren output at 100 feet from 123 dBC to 127 dBC. However, the computer analyses for Map 1 were based on the fundamental frequency around 570 Hz, and a siren output of 125 dBC, since 570 Hz is known to be more effective for far-field sound propagation than a fundamental of 630 Hz. It should be noted that the siren output of 113 dBC was used for siren 19. The data obtained from the siren far-field measurements indicate that the computer model used for the present study produced a more conservative acoustic coverage (2 to 3 dB level of conservativeness).

An ambient background noise survey was also performed to document and determine the average measured daytime ambient sound levels in areas outside 60 dBC siren contours. The 10-dB-above-the-ambient criteria indicated in FEMA-43 was applied for these regions. Map 2 shows the average daytime ambient sound levels for the regions outside of the 60 dBC coverage. Accordingly, the 50 dBC acoustic contours for each siren were plotted to show total system coverage. However, since the EPZ has been extended beyond the geometric 10-mile radius, some areas along the extended EPZ are not covered by the existing siren acoustic coverage.

Examination of Map 2 shows that portions of Regions 3, 4, 9, 10, 13, 16, and 17 have marginal 50 dB coverage primarily due to being near the EPZ boundary. Examination of Map 1 shows portions of areas having a population greater than 2,000 persons per square mile within Rock Hill, Clover, and Fort Mill which have marginal 70 dB coverage (10 dB above assumed ambient of 60 dB).

8.0 CONCLUSIONS AND RECOMMENDATIONS

The siren alert system coverage for Catawba Nuclear Station has been analyzed and verified through siren field testing. Sixty and 70 dBC siren contours have been calculated through a computer model which used data from actual field measurements of siren performance. Extensive comparison of measured and predicted sound levels indicates that the acoustic model is accurate and conservative in its predictions. This trend has been observed at other nuclear power plant sites where ATI has performed extensive field testing to verify acoustic alert coverage. The installed siren system was found to provide the required 60 and 70 dBC public alert coverage for most areas. There are areas located outside 60 dBC contours. These areas are reduced by applying the 10 dB above-the-ambient criteria based on an ambient background noise survey. Results of this analysis indicates that the installed siren warning system provides an adequate notification to the majority of the public within the 10-mile EPZ. However, there are areas that require additional evaluation. Therefore, to determine full compliance with FEMA-43, it is recommended that further evaluation of the portions of Regions 3, 4, 9, 10, 13, 16, 17 outside of 50 dB coverage, and identified portions of Rock Hill, Clover, and Fort Mill, be performed to conclude if additional alerting coverage is required to notify the public in these areas.



TABLES AND FIGURES

FIGURE 1: TOPOGRAPHIC MAP INDEX
 CATAWBA NUCLEAR POWER STATION

Gastonia South, NC - SC 1973	Belmont, NC - SC 1973	Charlotte West, NC Photorevised 1980	35°15'
Clover, (enlarged) 1947	Lake Wylie, SC - NC 1973	Fort Mill, SC - NC Photorevised 1980	35°07'30"
Tirzah, SC 1982	Rock Hill West, (enlarged) 1949	Rock Hill East, 1968	35°
81°15'	81°07'30"	81°	34°52'30"

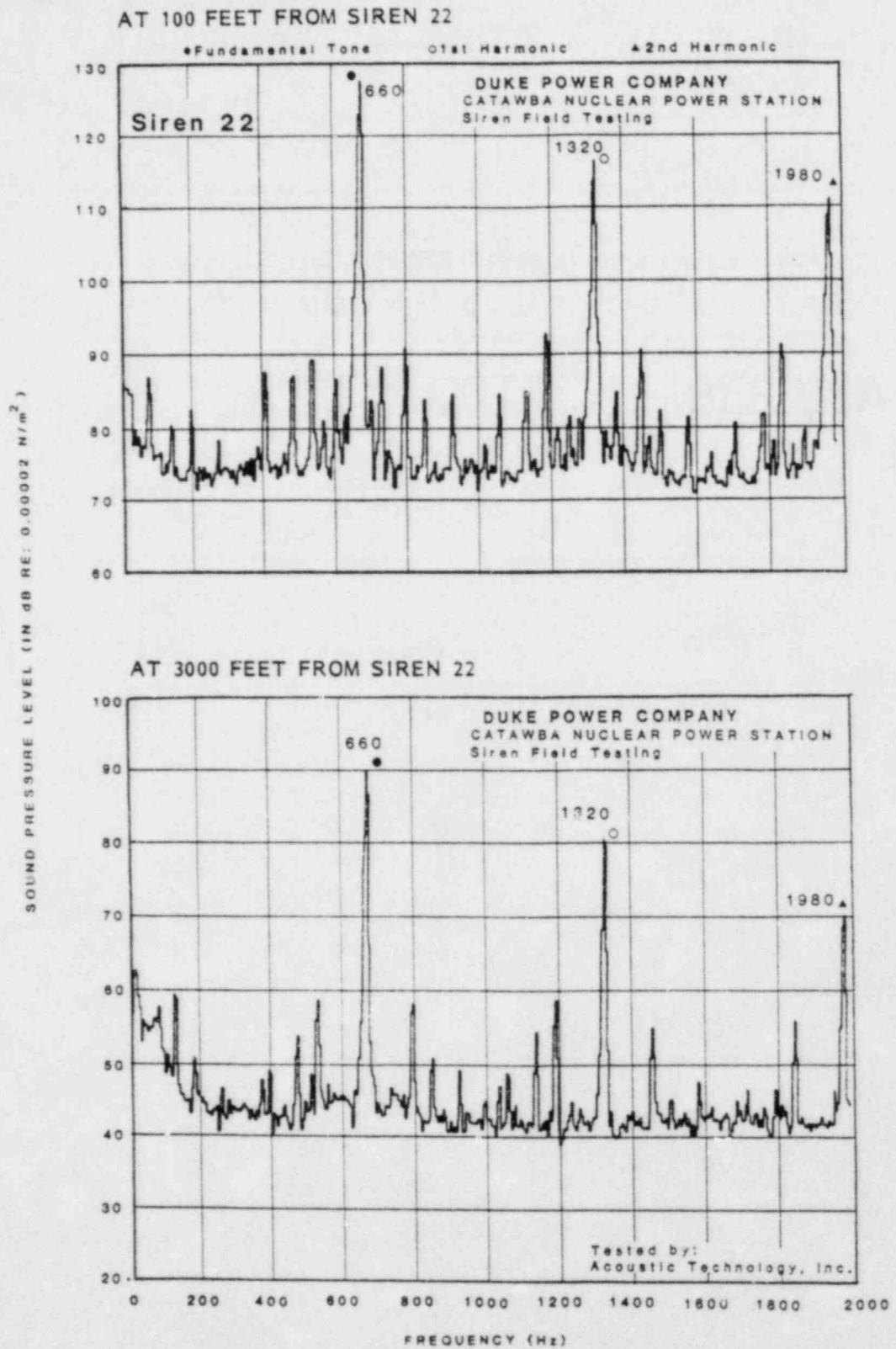
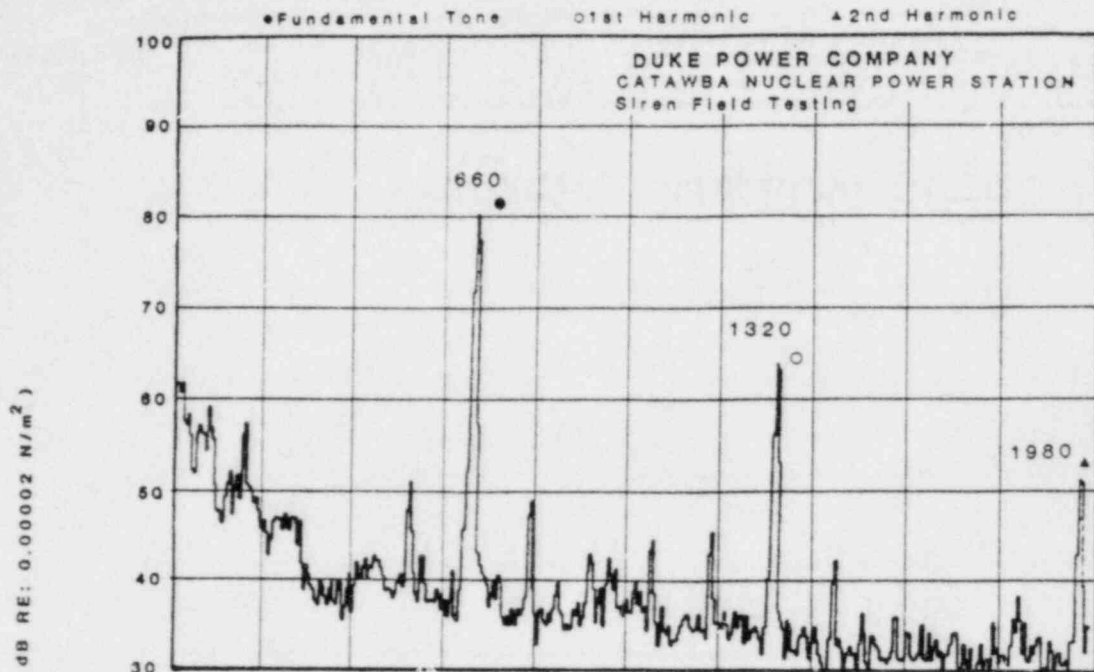


FIGURE 2 : NARROW BAND SPECTRA OF SIREN SIGNAL (SIREN 22) AT VARIOUS DISTANCES FROM THE SIREN.

AT 5500 FEET FROM SIREN 22



AT 9000 FEET FROM SIREN 22

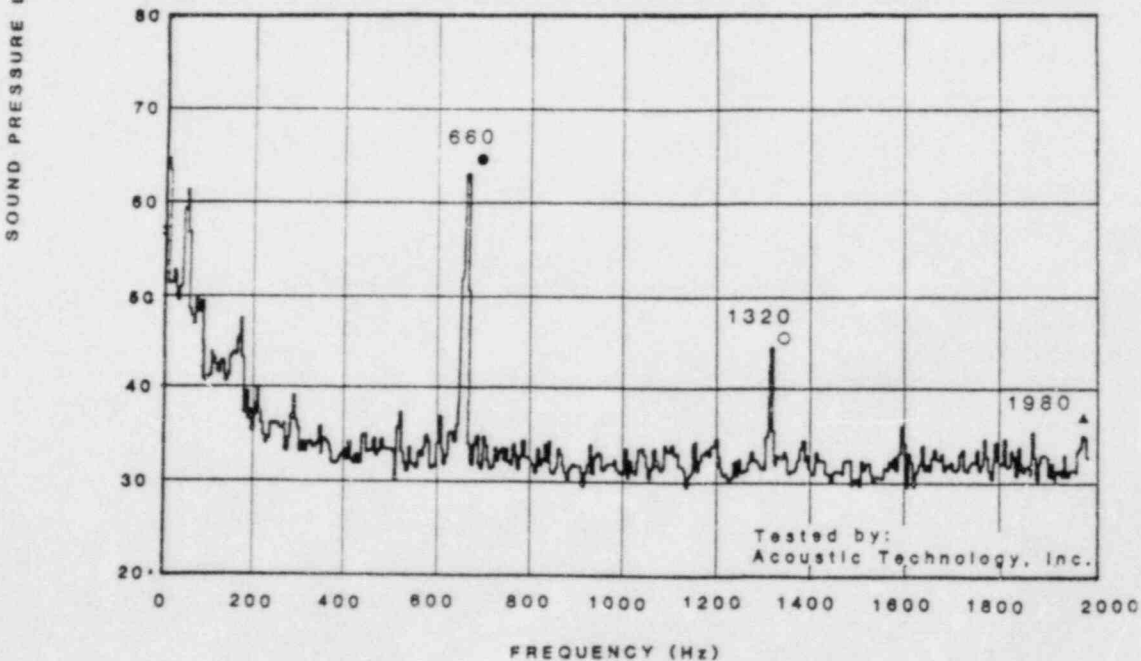


FIGURE 3 : NARROW BAND SPECTRA OF SIREN SIGNAL (SIREN 22) AT VARIOUS DISTANCES FROM THE SIREN.

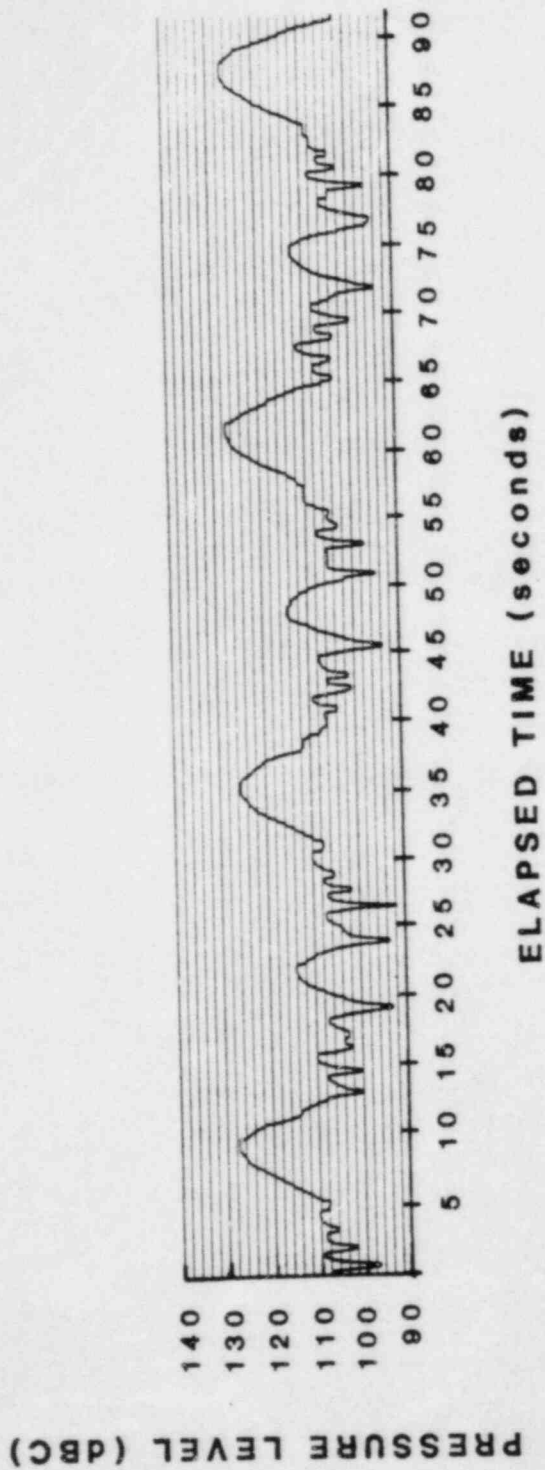
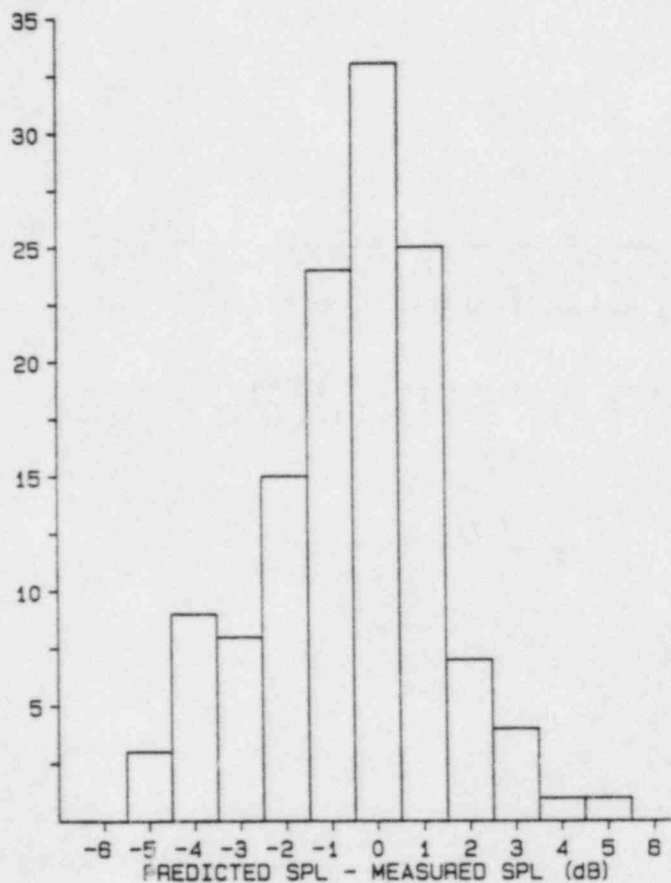


FIGURE 4: SIGNAL-TIME VARIATION FOR A TYPICAL SIREN
(SIREN 22)

NUMBER
OF
OBSERVATIONS

ATI COMPUTER ANALYSIS



AVERAGE = -0.53 dB
STANDARD DEVIATION = 1.90 dB

FIGURE 5: STATISTICAL COMPARISON OF COMPUTER PREDICTED VALUES WITH FIELD TEST RESULTS OF SIREN SOUND PRESSURE LEVELS

PREDICTED
MINUS
MEASURED
(dB)

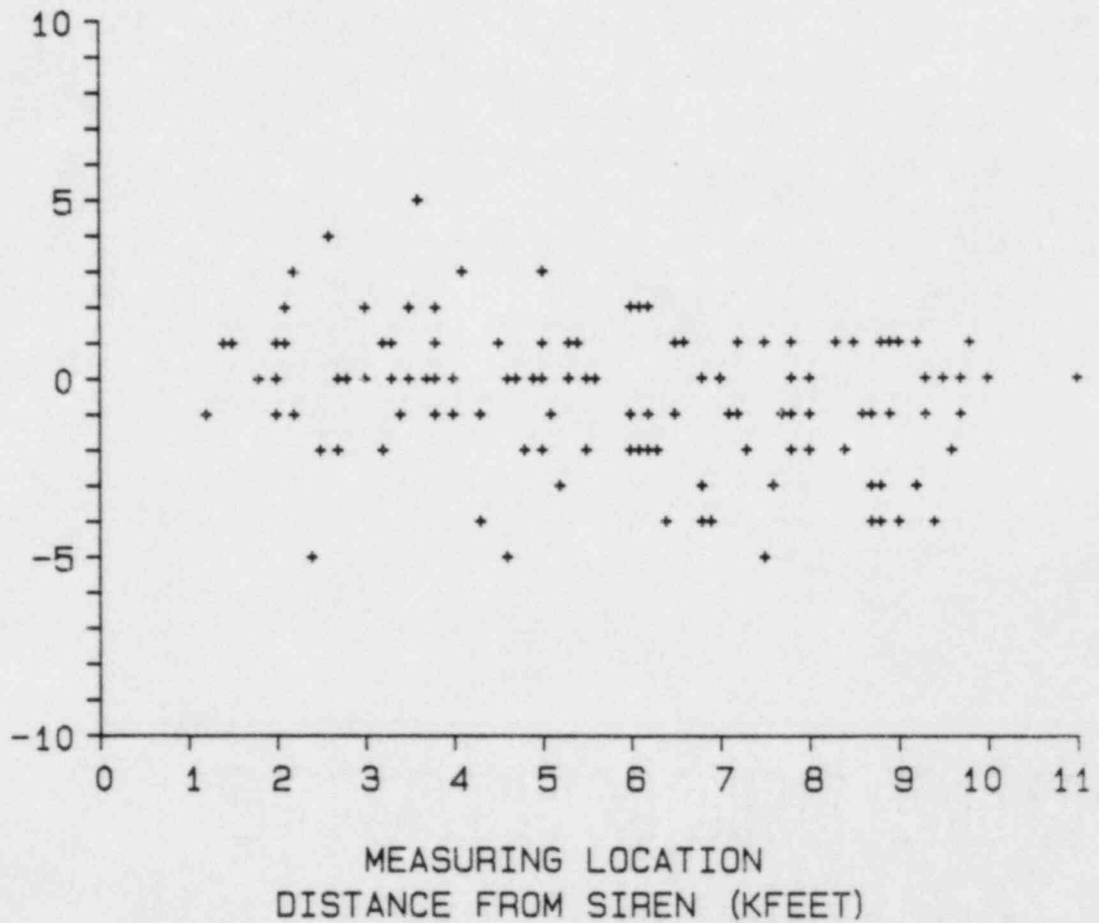


FIGURE 6: SPL DIFFERENCES AS A FUNCTION OF
DISTANCE FROM SIREN

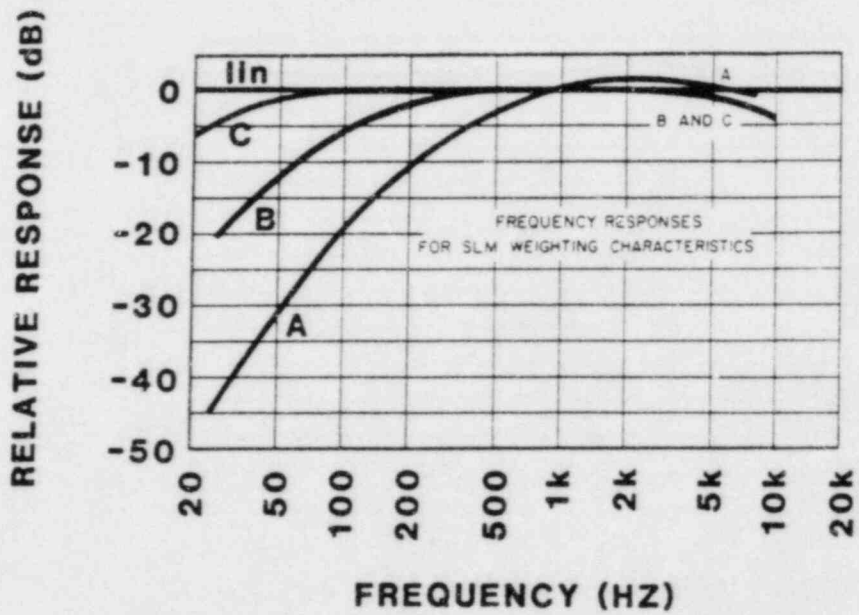


FIGURE 7: FREQUENCY-RESPONSE CHARACTERISTICS IN THE AMERICAN NATIONAL STANDARDS SPECIFICATION FOR SOUND-LEVEL METERS, ANSI-S1.4-1933

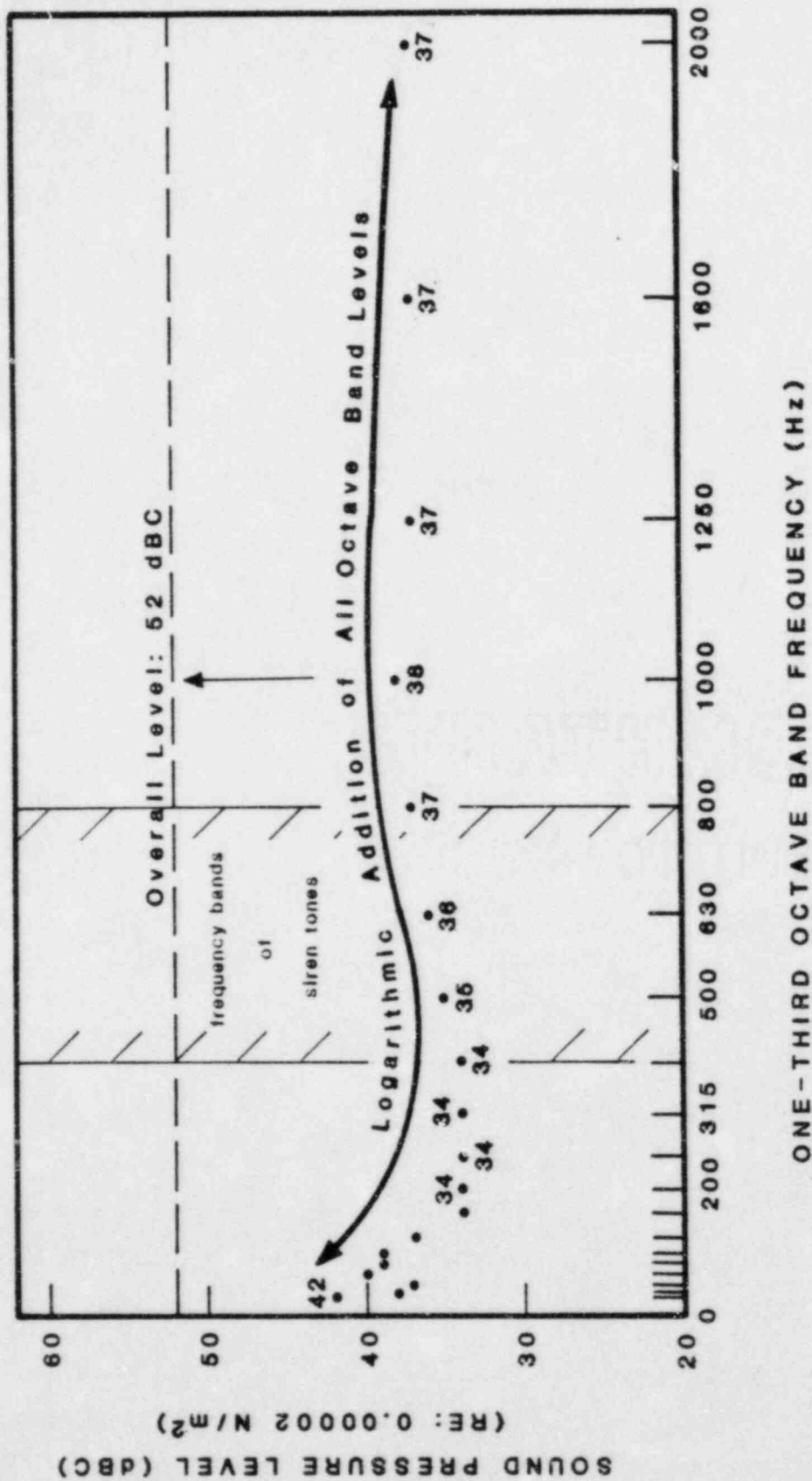


FIGURE 8 : COMPARISON BETWEEN ONE-THIRD OCTAVE BAND AND OVERALL dBC SOUND PRESSURE LEVEL





NOISE LEVEL (dB)

ACOUSTIC TECHNOLOGY INC.

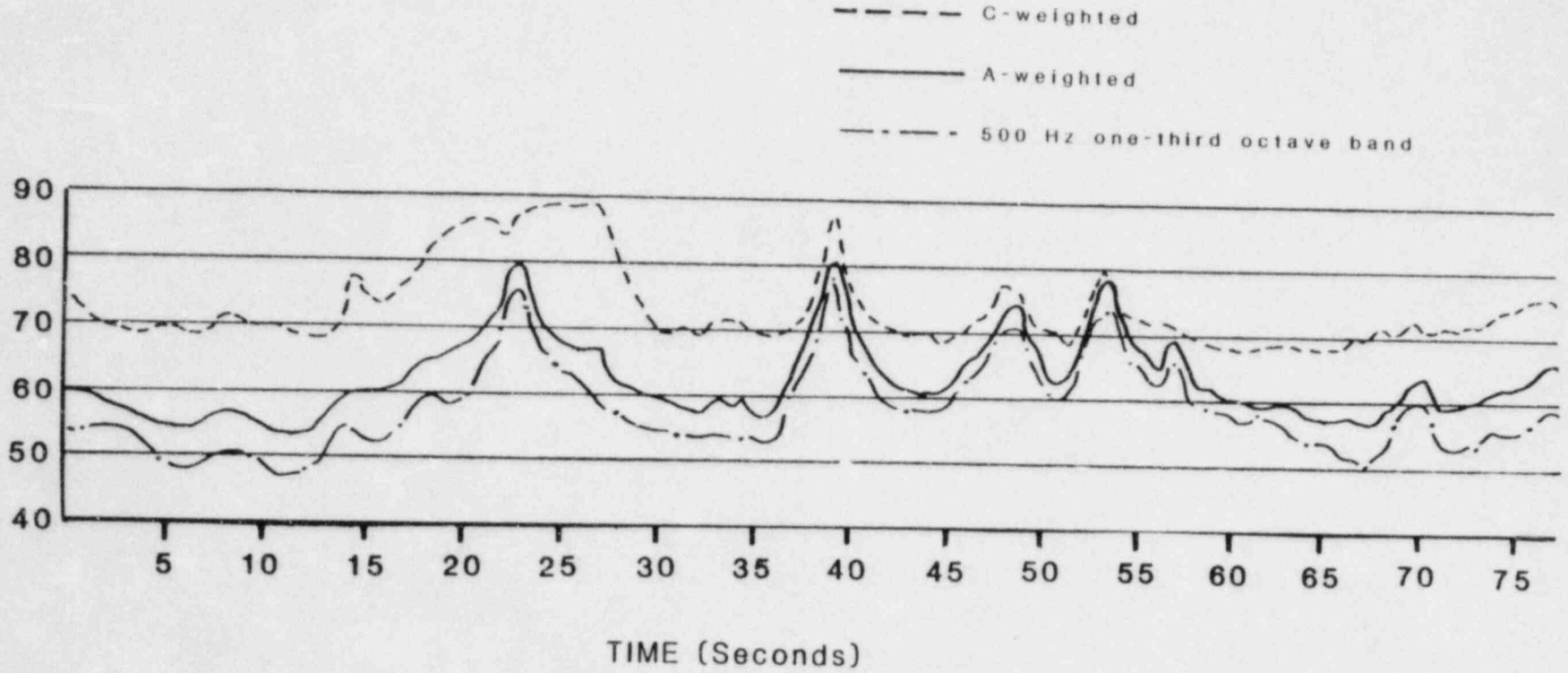
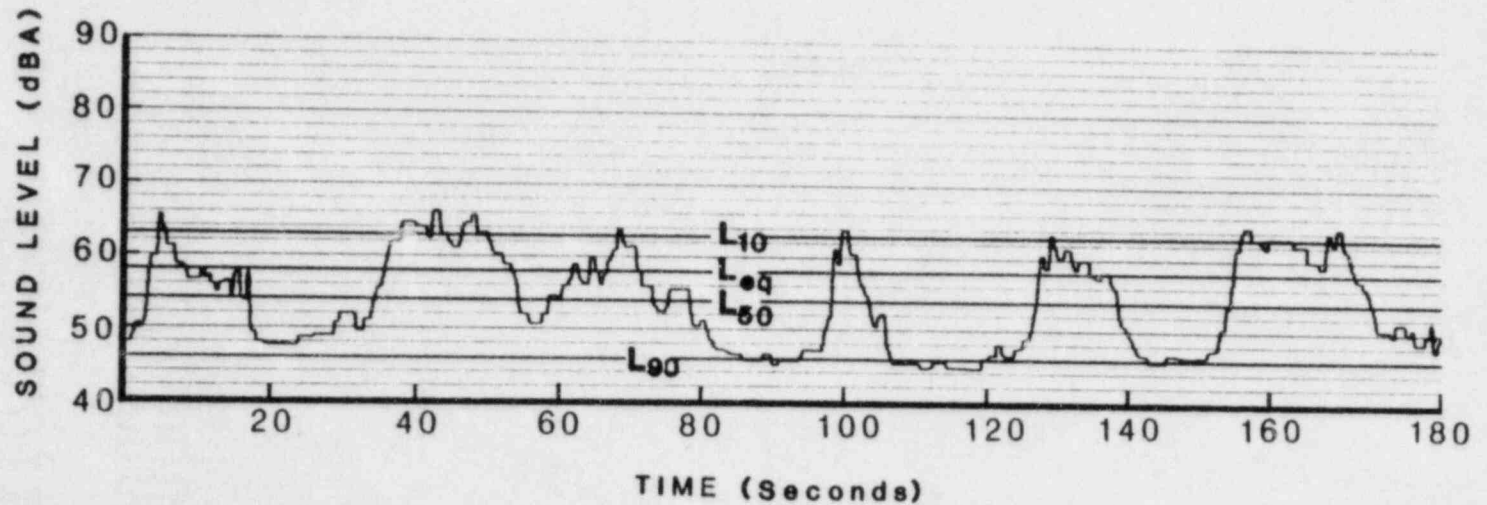


FIGURE 9: COMPARISON OF NOISE LEVEL VARIATIONS OF C-WEIGHTED, A-WEIGHTED, AND OCTAVE BAND MEASUREMENTS



Number of Samples: 1800

FIGURE 10: TYPICAL AMBIENT SOUND LEVEL VARIATION AS A FUNCTION OF TIME AND COMPARISON WITH STATISTICAL VALUES L_n AND L_{eq}



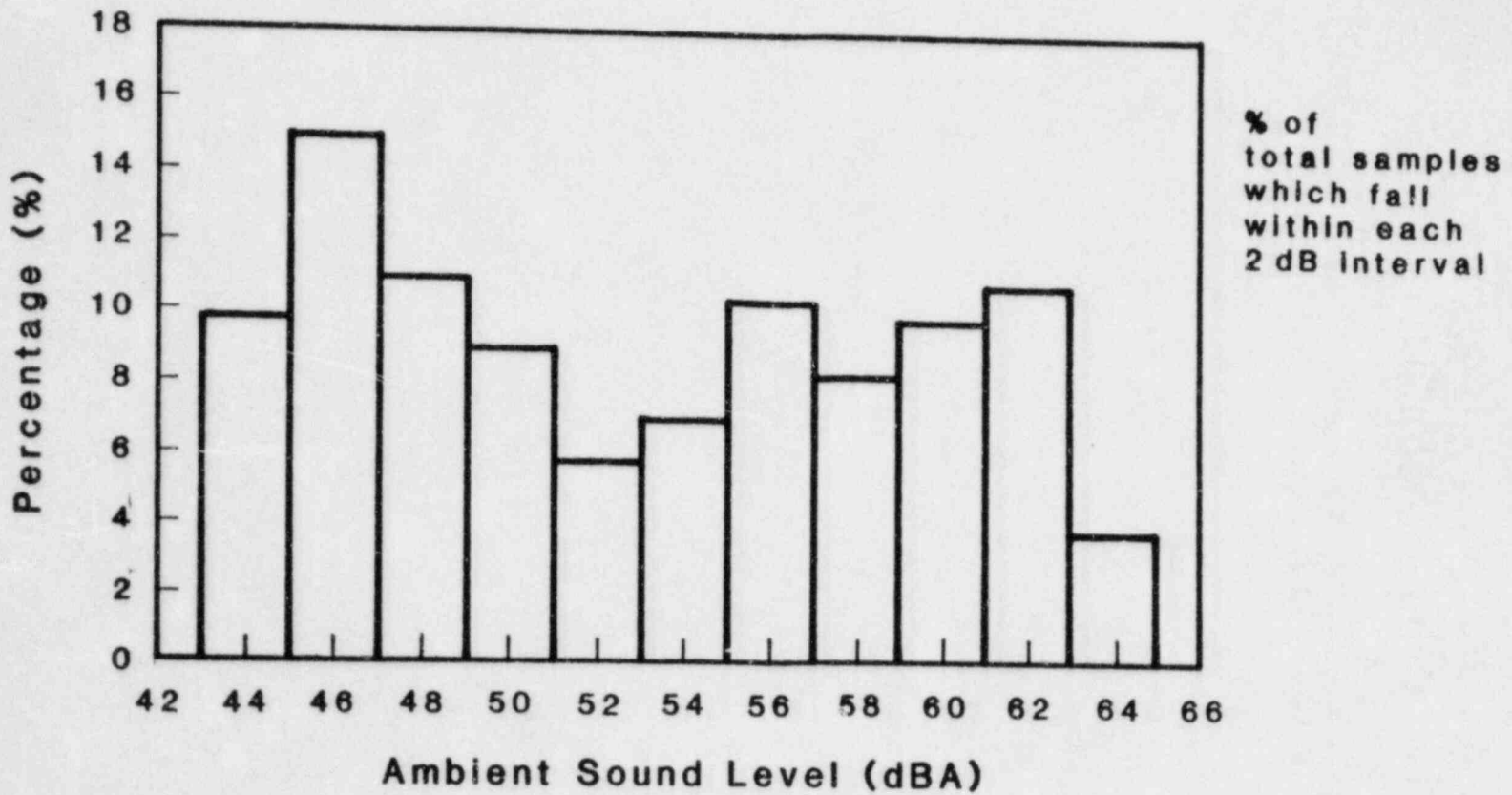


FIGURE 11: STATISTICAL DISTRIBUTION HISTOGRAM OF AMBIENT SOUND LEVEL VALUES

TABLE 1: SUMMARY OF DATA FOR ALL DIRECT AMBIENT NOISE MEASUREMENTS

MEASURING LOCATION	AMBIENT SOUND LEVEL		OVERALL IN dBA
	dB AT ONE-THIRD OCTAVE		
	BAND CENTER FREQUENCY 500 Hz	630 Hz	
M1	26	25	45
M2	45	45	52
M3	48	50	56
M4	27	28	41
M5	24	25	38
M6	37	40	52
M7	38	37	44
M8	35	35	55
M9	40	39	49
M10	40	39	52
M11	27	30	36
M12	35	35	45
M13	26	25	42
M14	33	34	45
M15	44	46	60
M16	41	40	50
M17	27	28	32
M18	28	30	34
M19	20	20	33
M20	32	34	48
M21	19	19	38
M22	20	20	30
M23	34	36	48
M24	19	20	29
M25	22	23	42
M26	27	28	45
M27	33	34	45
M28	31	34	42
M29	37	40	46
M30	32	34	48
M31	41	41	53
M32	26	27	40
M33	30	32	40
M34	38	36	48
M35	32	34	50
M36	34	33	53
M37	29	28	34
M38	25	26	33
M39	40	42	51
M40	49	48	53
M41	18	19	30
M42	37	37	46
M43	49	49	59
M44	34	36	44
M45	28	30	35



MEASURING LOCATION	AMBIENT SOUND LEVEL		OVERALL IN dBA
	dB AT ONE-THIRD OCTAVE		
	BAND CENTER FREQUENCY 500 Hz	630 Hz	
M46	34	33	52
M47	43	44	50
M48	45	46	55
M49	31	30	39
M50	23	25	35
M51	25	29	38
M52	24	22	33
M53	28	29	36
M54	37	38	45
M55	38	39	49
M56	33	33	44
M57	55	54	67
M58	39	39	47
M59	32	33	44
M60	33	34	44
M61	25	26	32
M62	33	34	41
M63	46	46	55
M64	40	40	56
M65	40	40	54
M66	48	47	57
M67	35	35	46
M68	24	25	31
M69	46	46	56
M70	38	38	48
M71	45	45	55
M72	37	38	45
M73	40	40	50
M74	55	55	65
M75	25	24	35
M76	24	23	35
M77	28	29	39
M78	30	31	37
M79	31	29	40

TABLE 2: SUMMARY OF STATISTICAL ANALYSES FOR AMBIENT NOISE SURVEY

MEASURING LOCATION	NUMBER OF SAMPLES*	AMBIENT SOUND LEVEL							
		630 Hz ONE-THIRD OCTAVE BAND (dB)				A-WEIGHTED OVERALL (dBA)			
		L ₉₀	L ₅₀	L ₁₀	L _{eq}	L ₉₀	L ₅₀	L ₁₀	L _{eq}
M1	900	24	25	31	28	39	41	44	45
M2	2400	40	51	61	57	53	63	71	68
M3	1400	40	44	53	49	49	52	64	60
M4	1200	23	28	32	29	41	50	65	58
M5	600	25	26	29	28	34	37	40	38
M6	1800	38	44	56	48	51	55	71	69
M7	1200	35	38	40	40	45	49	55	55
M8	1100	26	29	34	33	46	50	62	58
M9	900	35	39	49	50	49	51	57	52
M10	900	40	42	49	46	52	53	57	54
M11	700	21	25	30	29	32	36	38	38
M12	900	31	33	44	40	50	56	67	62
M13	800	23	26	32	30	42	53	64	62
M14	800	22	33	41	38	41	43	50	48
M15	1000	35	38	46	43	50	53	68	63
M16	800	30	34	44	43	40	51	66	58
M17	600	23	25	29	28	31	35	38	36
M18	600	20	25	34	31	29	34	38	36
M19	600	18	24	36	32	33	37	45	40
M20	1400	30	35	40	38	52	53	58	53
M21	700	19	28	32	32	38	41	57	54

*at 10 samples per second

<u>MEASURING LOCATION</u>	<u>NUMBER OF SAMPLES</u>	AMBIENT SOUND LEVEL							
		630 Hz ONE-THIRD OCTAVE BAND (dB)				A-WEIGHTED OVERALL (dBA)			
		L ₉₀	L ₅₀	L ₁₀	L _{eq}	L ₉₀	L ₅₀	L ₁₀	L _{eq}
M22	1000	19	23	29	28	29	41	55	50
M23	800	36	40	52	48	49	53	60	56
M24	900	18	20	28	26	30	43	64	56
M25	700	21	23	34	33	40	47	55	51
M26	1000	25	28	31	31	41	45	51	48
M27	800	30	34	39	37	41	45	50	49
M28	900	23	33	38	36	33	38	46	43
M29	600	28	33	40	40	37	46	58	52
M30	1200	23	31	36	33	38	41	49	42
M31	1100	37	40	49	46	51	52	59	56
M32	2000	23	27	34	33	36	46	60	52
M33	1300	31	36	40	38	39	44	52	50
M34	900	34	37	40	39	44	48	53	50
M35	1000	25	30	39	38	39	46	56	54
M36	1400	28	31	40	37	45	59	78	72
M37	900	21	26	29	27	28	29	34	34
M38	900	23	25	29	28	30	35	42	40
M39	1600	31	37	40	39	47	51	55	51
M40	1500	44	48	59	54	52	57	67	62
M41	700	19	24	30	28	28	30	37	35
M42	1000	35	37	39	37	45	47	49	48
M43	1400	40	48	64	58	50	59	73	68
M44	1000	34	36	38	36	43	45	51	47
M45	1000	22	28	38	36	31	35	41	39



MEASURING LOCATION	NUMBER OF SAMPLES	AMBIENT SOUND LEVEL							
		630 Hz ONE-THIRD OCTAVE BAND (dB)				A-WEIGHTED OVERALL (dBA)			
		L ₉₀	L ₅₀	L ₁₀	L _{eq}	L ₉₀	L ₅₀	L ₁₀	L _{eq}
M46	1300	32	39	44	41	51	53	61	56
M47	1000	41	43	45	43	47	49	51	49
M48	1000	37	41	50	46	48	51	65	59
M49	1000	29	31	52	46	38	40	57	52
M50	1000	24	29	37	34	35	38	42	39
M51	1000	25	28	32	29	36	38	40	38
M52	1000	21	22	23	22	32	33	35	33
M53	800	25	27	30	28	35	37	40	38
M54	1000	36	38	40	39	44	45	48	46
M55	1200	37	39	48	47	44	48	60	63
M56	1000	33	35	39	48	42	45	54	56
M57	1800	46	52	59	56	57	62	69	66
M58	1000	30	39	50	47	41	51	66	61
M59	1200	32	37	59	54	41	48	67	62
M60	900	28	32	40	35	46	49	58	53
M61	1000	21	24	26	24	38	41	42	42
M62	1100	32	33	37	39	39	41	43	50
M63	1300	44	45	50	47	54	55	59	56
M64	800	27	34	47	41	47	56	60	55
M65	1000	32	38	40	39	40	50	57	53
M66	1000	39	46	50	48	48	56	60	58
M67	1100	33	35	40	37	42	46	50	47
M68	1100	19	24	37	41	32	34	53	58
M69	1200	44	46	50	48	54	56	59	56

<u>MEASURING LOCATION</u>	<u>NUMBER OF SAMPLES</u>	AMBIENT SOUND LEVEL							
		630 Hz ONE-THIRD OCTAVE BAND (dB)				A-WEIGHTED OVERALL (dBA)			
		L ₉₀	L ₅₀	L ₁₀	L _{eq}	L ₉₀	L ₅₀	L ₁₀	L _{eq}
M70	1400	28	32	38	37	41	44	52	51
M71	1800	40	48	51	48	53	59	71	67
M72	1400	29	33	40	40	38	46	52	51
M73	1000	32	36	41	44	43	46	54	54
M74	1800	53	59	64	61	63	68	73	70
M75	1000	24	25	30	31	35	36	41	39
M76	1000	29	31	40	37	32	35	45	41
M77	1000	28	31	43	46	39	42	53	58
M78	1000	29	30	35	31	37	39	43	40
M79	900	27	28	29	29	36	37	38	38

TABLE 3: AMBIENT SURVEY DATA BY REGION

REGION	MEASURING LOCATION	630 HZ ONE-THIRD OCTAVE BAND		
		L ₁₀	L ₅₀	L ₉₀
1	M1	31	25	24
	M23	52	40	36
	M58	50	39	30
	M71	51	48	40
	Average Levels	<u>46</u>	<u>38</u>	<u>33</u>

2	M62	37	33	32
	M79	29	28	27
	Average Levels	<u>33</u>	<u>31</u>	<u>30</u>

3	M47	45	43	41
	M48	50	41	37
	M49	52	31	29
	Average Levels	<u>49</u>	<u>38</u>	<u>36</u>

4	M2	61	51	40
	M40	59	48	44
	M42	39	37	35
	M43	64	48	40
	M44	38	36	34
	M74	64	59	53
	Average Levels	<u>54</u>	<u>47</u>	<u>41</u>

5	M51	32	28	25
	M52	23	22	21
	M75	30	25	24
	M76	40	31	29
	M77	43	31	28
	M78	35	30	29
	M7	40	38	35
	Average Levels	<u>34</u>	<u>30</u>	<u>27</u>

6	M73	41	36	32

7	M59	59	37	32

8	M53	30	27	25



REGION	MEASURING LOCATION	630 HZ ONE-THIRD OCTAVE BAND		
		L ₁₀	L ₅₀	L ₉₀
9	M54	40	38	36
	M55	48	39	37
	M56	39	35	33
	M57	59	52	46
	M60	40	32	28
	M61	26	24	21
	M63	50	45	44
	M64	47	34	27
	M65	40	38	32
	M66	50	46	39
	M67	40	35	33
	Average Levels	<u>44</u>	<u>38</u>	<u>34</u>
10	M27	39	34	30
	M28	38	33	23
	M29	40	33	28
	M68	37	24	19
	M69	50	46	44
	M70	38	32	28
		Average Levels	<u>40</u>	<u>34</u>
11	M25	34	23	21
	M72	40	33	29
		Average Levels	<u>37</u>	<u>28</u>
12	M26	31	28	25
	M46	44	39	32
	M50	37	29	24
		Average Levels	<u>37</u>	<u>32</u>
13	M14	41	33	22
	M15	46	38	35
	M39	40	37	31
	M41	30	24	19
	M45	38	28	22
		Average Levels	<u>39</u>	<u>32</u>
14	M16	44	34	30
	M34	40	37	34
	M35	39	30	25
		Average Levels	<u>41</u>	<u>34</u>
15	M10	49	42	40
	M31	49	40	37
	M36	40	31	28
		Average Levels	<u>46</u>	<u>38</u>

REGION	MEASURING LOCATION	630 HZ ONE-THIRD OCTAVE BAND		
		L ₁₀	L ₅₀	L ₉₀
16	M9	49	39	35
	M11	30	25	21
	M12	44	33	31
	M13	32	26	23
	M30	36	31	23
	Average Levels	<u>38</u>	<u>31</u>	<u>27</u>

17	M3	53	44	40
	M8	34	29	26
	M20	40	35	30
	Average Levels	<u>42</u>	<u>35</u>	<u>30</u>

18	M17	29	25	23
	M38	29	25	23
	Average Levels	<u>29</u>	<u>25</u>	<u>23</u>

19	M24	28	20	18

20	M18	34	25	20
	M37	29	26	21
	Average Levels	<u>32</u>	<u>26</u>	<u>21</u>

21	M6	56	44	38
	M33	40	36	31
	Average Levels	<u>48</u>	<u>40</u>	<u>35</u>

22	M19	36	24	18
	M21	32	28	19
	M22	29	23	19
	M32	34	27	23
	Average Levels	<u>33</u>	<u>26</u>	<u>20</u>

23	M4	32	28	23
	M5	29	26	25
	Average Levels	<u>31</u>	<u>27</u>	<u>24</u>



APPENDIX 1: RESULTS OF ACOUSTIC COMPUTER
MODEL ANALYSIS

APPENDIX 1A: SIREN SOUND LEVELS IN TABULAR FORM

SIREN NUMBER CATAWBA-1
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	86.	79.	78.	70.	66.	66.	64.	62.	60.	59.	53.	53.	51.	50.	48.	46.
15 -	110.	102.	91.	88.	86.	82.	73.	74.	73.	61.	60.	67.	63.	60.	57.	56.	54.	52.	50.	48.
30 -	110.	102.	90.	94.	88.	84.	79.	72.	66.	64.	64.	64.	65.	61.	58.	49.	51.	51.	50.	50.
45 -	110.	102.	98.	84.	90.	84.	70.	78.	65.	66.	71.	68.	66.	63.	61.	59.	57.	55.	53.	51.
60 -	110.	102.	98.	94.	76.	87.	84.	80.	71.	76.	72.	68.	65.	63.	60.	58.	56.	55.	53.	51.
75 -	110.	102.	98.	93.	80.	74.	75.	80.	77.	75.	71.	70.	66.	63.	52.	59.	57.	55.	54.	52.
90 -	110.	102.	98.	94.	83.	88.	85.	82.	79.	76.	74.	71.	68.	66.	64.	61.	59.	58.	56.	54.
105 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	75.	72.	70.	68.	65.	62.	59.	57.	55.	54.	52.
120 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	72.	70.	67.	64.	62.	59.	57.	55.	54.	52.
135 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	72.	69.	67.	65.	59.	57.	55.	53.	51.	49.
150 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	72.	71.	68.	65.	61.	59.	57.	55.	53.	51.
165 -	110.	102.	98.	94.	84.	86.	84.	75.	75.	76.	74.	71.	67.	65.	63.	61.	59.	57.	55.	53.
180 -	110.	102.	98.	94.	90.	81.	82.	82.	79.	76.	74.	71.	68.	65.	61.	59.	57.	55.	54.	52.
195 -	110.	102.	98.	93.	84.	86.	80.	77.	76.	76.	73.	71.	68.	66.	64.	61.	59.	57.	55.	53.
210 -	110.	102.	98.	94.	90.	87.	84.	74.	78.	71.	72.	70.	68.	66.	64.	62.	60.	58.	56.	54.
225 -	110.	102.	98.	84.	90.	88.	85.	82.	79.	71.	70.	67.	65.	59.	61.	58.	56.	55.	53.	51.
240 -	110.	102.	98.	78.	90.	88.	85.	81.	76.	65.	68.	63.	62.	58.	57.	54.	52.	50.	49.	47.
255 -	110.	102.	98.	94.	90.	88.	84.	79.	77.	73.	69.	67.	64.	62.	58.	56.	54.	52.	50.	48.
270 -	110.	102.	98.	93.	83.	79.	80.	81.	78.	75.	72.	69.	65.	62.	58.	54.	52.	50.	49.	47.
285 -	110.	102.	98.	9.	90.	87.	84.	79.	76.	75.	71.	65.	61.	60.	57.	55.	53.	51.	49.	48.
300 -	110.	102.	98.	94.	90.	86.	84.	81.	77.	72.	69.	67.	62.	60.	57.	55.	53.	51.	49.	48.
315 -	110.	102.	98.	93.	82.	86.	84.	79.	75.	73.	71.	68.	63.	59.	56.	53.	51.	50.	48.	46.
330 -	110.	102.	97.	93.	84.	85.	81.	72.	74.	68.	63.	62.	53.	58.	53.	46.	47.	47.	46.	45.
345 -	110.	102.	97.	93.	84.	84.	79.	73.	72.	68.	66.	64.	60.	60.	57.	53.	54.	52.	50.	48.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-2
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	85.	82.	74.	68.	64.	64.	65.	62.	59.	53.	52.	50.	49.	47.	45.
15 -	110.	102.	98.	94.	90.	85.	82.	76.	69.	67.	65.	62.	53.	57.	53.	52.	50.	49.	47.	45.
30 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	70.	66.	63.	59.	60.	58.	42.	43.	42.	41.	40.
45 -	110.	102.	98.	93.	90.	85.	82.	78.	75.	70.	58.	65.	63.	54.	58.	57.	55.	53.	51.	49.
60 -	110.	102.	98.	93.	90.	85.	82.	78.	75.	72.	70.	64.	61.	51.	58.	58.	56.	55.	53.	51.
75 -	110.	102.	98.	94.	88.	84.	82.	78.	75.	72.	70.	67.	65.	62.	56.	45.	46.	47.	46.	45.
90 -	110.	102.	97.	93.	90.	81.	79.	71.	72.	62.	67.	56.	63.	57.	56.	55.	54.	54.	52.	50.
105 -	110.	102.	96.	90.	78.	84.	80.	74.	70.	68.	55.	61.	54.	56.	51.	49.	48.	46.	45.	44.
120 -	110.	102.	96.	90.	81.	80.	72.	75.	71.	67.	66.	62.	54.	57.	56.	52.	50.	49.	47.	45.
135 -	110.	102.	97.	90.	88.	82.	76.	75.	71.	70.	67.	65.	62.	53.	45.	44.	43.	42.	41.	40.
150 -	110.	102.	97.	91.	83.	80.	76.	72.	72.	59.	67.	65.	62.	51.	53.	48.	47.	45.	44.	42.
165 -	110.	102.	98.	90.	81.	82.	77.	70.	72.	68.	67.	65.	63.	60.	57.	43.	42.	41.	40.	39.
180 -	110.	102.	98.	93.	87.	82.	72.	73.	70.	68.	57.	55.	52.	52.	56.	45.	46.	45.	44.	42.
195 -	110.	102.	98.	94.	85.	83.	80.	75.	71.	67.	56.	64.	58.	56.	50.	50.	49.	48.	47.	45.
210 -	110.	102.	98.	94.	88.	85.	80.	75.	74.	71.	66.	62.	60.	52.	51.	51.	50.	49.	48.	46.
225 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	72.	70.	67.	63.	59.	57.	50.	50.	50.	49.	48.
240 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	72.	70.	67.	65.	62.	60.	57.	55.	54.	52.	50.
255 -	110.	102.	98.	94.	90.	85.	80.	76.	74.	71.	69.	62.	52.	52.	54.	53.	51.	50.	48.	46.
270 -	110.	102.	98.	94.	88.	84.	79.	74.	70.	66.	59.	58.	56.	54.	52.	51.	50.	48.	47.	45.
285 -	110.	102.	98.	94.	88.	83.	77.	74.	73.	70.	59.	53.	51.	49.	48.	47.	45.	44.	43.	41.
300 -	110.	102.	98.	94.	90.	85.	79.	72.	72.	71.	69.	57.	51.	52.	50.	44.	42.	41.	39.	38.
315 -	110.	102.	98.	94.	90.	81.	74.	75.	71.	72.	70.	52.	48.	45.	45.	42.	40.	39.	37.	36.
330 -	110.	102.	98.	94.	90.	85.	79.	73.	62.	67.	67.	58.	54.	52.	57.	54.	51.	49.	47.	45.
345 -	110.	102.	98.	94.	90.	85.	82.	78.	72.	67.	65.	65.	53.	47.	58.	39.	40.	39.	39.	38.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-3
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	90.	87.	82.	80.	76.	73.	71.	61.	59.	65.	63.	60.	59.	58.	56.	54.
15	110.	102.	98.	94.	90.	85.	81.	79.	72.	69.	71.	69.	67.	65.	62.	61.	59.	57.	55.	53.
30	110.	102.	98.	94.	90.	84.	81.	78.	75.	66.	71.	68.	65.	64.	57.	58.	58.	56.	55.	53.
45	110.	102.	98.	94.	82.	86.	82.	78.	75.	74.	66.	64.	64.	65.	63.	59.	58.	58.	56.	54.
60	110.	102.	97.	92.	81.	77.	78.	79.	77.	74.	71.	63.	62.	60.	60.	59.	58.	56.	54.	54.
75	110.	102.	98.	93.	90.	87.	79.	82.	78.	76.	74.	71.	68.	66.	63.	61.	59.	57.	55.	53.
90	110.	102.	98.	94.	90.	87.	84.	81.	72.	76.	72.	69.	67.	65.	61.	60.	58.	56.	54.	52.
105	110.	102.	98.	83.	83.	83.	85.	79.	79.	75.	72.	69.	67.	64.	61.	59.	57.	55.	53.	51.
120	110.	102.	98.	94.	90.	81.	85.	81.	78.	76.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.
135	110.	102.	98.	94.	85.	86.	83.	80.	77.	70.	72.	70.	68.	65.	63.	60.	58.	56.	55.	53.
150	110.	102.	98.	94.	90.	86.	83.	80.	77.	74.	71.	68.	67.	65.	62.	61.	59.	57.	55.	53.
165	110.	102.	98.	94.	90.	85.	82.	79.	76.	74.	72.	68.	65.	63.	60.	58.	56.	55.	53.	51.
180	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	67.	70.	67.	65.	63.	61.	59.	57.	55.	53.
195	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	72.	70.	68.	65.	62.	60.	58.	56.	54.	52.
210	110.	102.	98.	94.	90.	87.	85.	82.	78.	71.	74.	71.	68.	65.	62.	60.	58.	56.	54.	52.
225	110.	102.	98.	94.	90.	87.	84.	81.	78.	69.	73.	70.	62.	64.	61.	58.	56.	55.	53.	51.
240	110.	102.	98.	94.	90.	88.	84.	81.	78.	76.	74.	70.	68.	65.	61.	58.	56.	55.	53.	51.
255	110.	102.	98.	94.	90.	86.	83.	80.	77.	71.	55.	56.	59.	58.	58.	54.	54.	53.	52.	51.
270	110.	102.	98.	94.	90.	86.	83.	80.	77.	76.	70.	71.	68.	66.	64.	61.	59.	58.	56.	54.
285	110.	102.	98.	94.	90.	86.	83.	77.	77.	70.	72.	64.	63.	65.	62.	60.	58.	56.	55.	53.
300	110.	102.	98.	94.	90.	88.	84.	81.	77.	63.	72.	70.	66.	66.	64.	61.	59.	58.	56.	54.
315	110.	102.	98.	94.	89.	86.	84.	80.	71.	76.	74.	71.	68.	66.	64.	61.	59.	58.	56.	54.
330	110.	102.	98.	94.	90.	81.	80.	82.	77.	75.	67.	70.	68.	66.	64.	61.	59.	58.	56.	54.
345	110.	102.	98.	94.	90.	88.	82.	79.	76.	74.	72.	69.	68.	65.	63.	61.	59.	58.	56.	54.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-4
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	73.	70.	59.	60.	63.	61.	58.	56.	55.	53.	51.
15 -	110.	102.	98.	94.	89.	85.	83.	79.	75.	72.	58.	60.	62.	63.	60.	57.	55.	54.	52.	50.
30 -	110.	102.	98.	94.	89.	85.	83.	80.	75.	72.	57.	59.	63.	62.	60.	51.	53.	55.	54.	52.
45 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	71.	70.	67.	65.	56.	61.	59.	57.	56.	54.
60 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	74.	71.	38.	66.	64.	63.	60.	58.	56.	55.	53.
75 -	110.	102.	98.	94.	90.	85.	82.	78.	77.	71.	69.	67.	64.	63.	61.	58.	56.	54.	52.	50.
90 -	110.	102.	98.	93.	90.	86.	84.	79.	77.	70.	69.	63.	59.	53.	48.	47.	47.	46.	45.	44.
105 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	71.	69.	67.	65.	63.	61.	59.	57.	55.	53.
120 -	110.	102.	98.	93.	88.	83.	81.	73.	62.	59.	60.	58.	58.	57.	55.	53.	52.	50.	49.	48.
135 -	110.	102.	98.	93.	88.	83.	79.	76.	65.	64.	65.	63.	65.	61.	59.	59.	57.	55.	54.	52.
150 -	110.	102.	98.	92.	85.	76.	73.	74.	71.	72.	68.	65.	63.	63.	61.	57.	55.	53.	51.	49.
165 -	110.	102.	98.	88.	88.	83.	66.	64.	62.	60.	58.	56.	54.	52.	50.	47.	46.	44.	42.	41.
180 -	110.	102.	98.	89.	85.	83.	65.	63.	62.	60.	58.	56.	54.	53.	51.	49.	47.	45.	44.	42.
195 -	110.	102.	98.	92.	87.	83.	81.	78.	72.	73.	71.	69.	66.	64.	62.	60.	58.	56.	54.	52.
210 -	110.	102.	98.	93.	88.	85.	81.	76.	74.	66.	66.	68.	62.	61.	59.	57.	56.	54.	53.	51.
225 -	110.	102.	98.	91.	82.	81.	78.	77.	73.	66.	65.	67.	63.	58.	56.	55.	54.	53.	52.	50.
240 -	110.	102.	98.	92.	87.	78.	78.	76.	75.	73.	70.	68.	63.	64.	61.	60.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	74.	71.	67.	65.	63.	58.	55.	55.	54.	53.	51.
270 -	110.	102.	98.	93.	89.	85.	83.	79.	76.	68.	72.	66.	64.	63.	62.	61.	59.	58.	56.	54.
285 -	110.	102.	98.	93.	89.	86.	84.	81.	76.	75.	71.	69.	67.	62.	62.	59.	57.	55.	53.	51.
300 -	110.	102.	98.	93.	90.	86.	83.	78.	75.	71.	60.	62.	65.	60.	60.	58.	56.	55.	53.	51.
315 -	110.	102.	98.	94.	90.	85.	82.	77.	69.	68.	53.	54.	54.	53.	52.	53.	51.	50.	48.	46.
330 -	110.	102.	98.	94.	90.	85.	81.	74.	71.	59.	55.	55.	54.	54.	59.	37.	38.	37.	37.	36.
345 -	110.	102.	98.	94.	89.	85.	83.	79.	72.	64.	69.	64.	64.	60.	56.	55.	54.	53.	51.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-5
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	I DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	89.	85.	83.	76.	74.	70.	65.	55.	57.	58.	53.	51.	49.	48.	46.	45.
15 -	110.	102.	98.	94.	89.	83.	80.	76.	72.	67.	65.	62.	59.	57.	57.	54.	52.	50.	49.	47.
30 -	110.	102.	98.	94.	88.	82.	79.	74.	69.	67.	65.	62.	52.	57.	55.	50.	49.	47.	46.	45.
45 -	110.	102.	98.	94.	90.	84.	80.	74.	71.	69.	65.	65.	61.	60.	55.	50.	49.	47.	46.	45.
60 -	110.	102.	98.	94.	88.	83.	77.	73.	70.	67.	58.	58.	56.	53.	52.	50.	49.	48.	46.	45.
75 -	110.	102.	98.	93.	86.	80.	76.	73.	70.	61.	59.	57.	57.	56.	54.	52.	51.	49.	47.	46.
90 -	110.	102.	98.	92.	87.	75.	79.	76.	58.	57.	56.	55.	53.	53.	49.	46.	45.	43.	42.	40.
105 -	110.	102.	98.	94.	87.	84.	79.	74.	69.	67.	66.	60.	56.	56.	54.	53.	51.	50.	48.	47.
120 -	110.	102.	98.	92.	84.	79.	77.	73.	69.	67.	65.	62.	58.	58.	56.	52.	50.	49.	47.	45.
135 -	110.	102.	98.	92.	86.	83.	78.	74.	70.	67.	65.	61.	59.	52.	53.	51.	50.	49.	47.	45.
150 -	110.	102.	98.	94.	89.	83.	77.	70.	66.	66.	67.	63.	57.	60.	55.	47.	48.	48.	47.	46.
165 -	110.	102.	90.	94.	89.	85.	82.	79.	75.	71.	70.	67.	65.	62.	57.	54.	52.	50.	49.	47.
180 -	110.	102.	98.	94.	90.	85.	81.	77.	73.	71.	65.	58.	60.	57.	55.	51.	49.	48.	46.	45.
195 -	110.	102.	98.	94.	90.	86.	81.	78.	74.	70.	67.	62.	59.	57.	53.	52.	50.	49.	47.	45.
210 -	110.	102.	98.	94.	89.	85.	79.	72.	69.	67.	60.	61.	59.	57.	55.	53.	51.	50.	48.	46.
225 -	110.	102.	97.	91.	88.	84.	79.	72.	70.	66.	66.	65.	53.	46.	46.	47.	45.	44.	42.	41.
240 -	110.	102.	96.	89.	84.	80.	76.	72.	69.	67.	67.	65.	62.	59.	47.	46.	45.	44.	42.	41.
255 -	110.	102.	97.	89.	84.	80.	77.	72.	70.	66.	67.	64.	53.	58.	57.	54.	52.	50.	49.	47.
270 -	110.	102.	97.	89.	85.	80.	78.	74.	72.	70.	67.	61.	59.	57.	53.	52.	50.	49.	47.	45.
285 -	110.	102.	98.	89.	86.	82.	76.	74.	71.	66.	63.	62.	59.	56.	55.	49.	48.	47.	46.	44.
300 -	110.	102.	98.	93.	87.	75.	80.	76.	72.	68.	67.	62.	62.	57.	55.	52.	50.	49.	47.	45.
315 -	110.	102.	98.	94.	90.	86.	80.	78.	74.	71.	69.	66.	63.	60.	57.	56.	54.	52.	50.	48.
330 -	110.	102.	98.	94.	90.	86.	81.	78.	75.	73.	71.	68.	65.	63.	61.	58.	56.	55.	53.	51.
345 -	110.	102.	98.	94.	90.	86.	83.	79.	75.	71.	68.	58.	61.	58.	56.	53.	51.	50.	48.	46.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-6
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE |
 FROM EAST (DEG) | DISTANCE FROM SIREN (FEET)

	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	85.	75.	80.	77.	74.	72.	68.	67.	64.	62.	54.	59.	57.	55.	53.
15 -	110.	102.	98.	93.	90.	85.	82.	74.	77.	74.	72.	70.	68.	65.	63.	61.	59.	57.	55.	53.
30 -	110.	102.	98.	94.	90.	85.	81.	78.	76.	74.	74.	64.	65.	64.	65.	61.	60.	58.	55.	53.
45 -	110.	102.	98.	93.	89.	86.	83.	80.	76.	73.	70.	68.	65.	62.	61.	58.	56.	54.	53.	46.
60 -	110.	102.	98.	93.	84.	86.	81.	78.	74.	68.	64.	62.	66.	60.	59.	57.	57.	55.	51.	49.
75 -	110.	102.	98.	92.	88.	84.	81.	78.	76.	73.	70.	67.	64.	62.	51.	54.	55.	53.	53.	50.
90 -	110.	102.	98.	91.	86.	83.	80.	77.	76.	71.	67.	65.	63.	56.	55.	55.	53.	50.	42.	44.
105 -	110.	102.	98.	91.	85.	81.	79.	76.	72.	70.	68.	66.	62.	60.	58.	57.	54.	53.	50.	48.
120 -	110.	102.	98.	92.	87.	82.	79.	75.	72.	72.	62.	54.	52.	46.	49.	47.	40.	40.	39.	38.
135 -	110.	102.	98.	93.	88.	85.	79.	72.	74.	77.	53.	48.	43.	39.	37.	39.	43.	36.	29.	27.
150 -	110.	102.	98.	75.	90.	83.	79.	75.	70.	69.	67.	59.	52.	52.	49.	48.	47.	45.	44.	42.
165 -	110.	102.	98.	94.	89.	84.	79.	75.	73.	68.	66.	64.	61.	57.	56.	54.	53.	53.	50.	47.
180 -	110.	102.	98.	94.	89.	85.	81.	76.	74.	71.	69.	67.	64.	60.	53.	52.	52.	48.	48.	46.
195 -	110.	102.	98.	94.	90.	86.	81.	77.	75.	73.	65.	68.	65.	58.	55.	55.	54.	54.	54.	49.
210 -	110.	102.	98.	94.	90.	87.	82.	79.	77.	74.	71.	69.	66.	65.	63.	59.	57.	55.	53.	50.
225 -	110.	102.	98.	94.	90.	88.	83.	79.	71.	67.	72.	69.	66.	63.	60.	57.	55.	53.	49.	47.
240 -	110.	102.	98.	94.	90.	86.	84.	81.	78.	76.	71.	67.	65.	63.	60.	57.	55.	53.	52.	50.
255 -	110.	102.	98.	94.	90.	86.	83.	80.	78.	76.	72.	70.	67.	65.	62.	58.	55.	54.	52.	51.
270 -	110.	102.	98.	94.	90.	85.	83.	79.	77.	69.	70.	70.	66.	63.	60.	59.	56.	55.	53.	52.
285 -	110.	102.	98.	94.	90.	87.	84.	79.	77.	74.	72.	70.	68.	65.	63.	61.	59.	57.	54.	50.
300 -	110.	102.	98.	94.	89.	85.	82.	80.	77.	75.	71.	68.	67.	65.	63.	60.	59.	57.	55.	53.
315 -	110.	102.	98.	93.	90.	87.	84.	79.	77.	73.	70.	68.	65.	58.	60.	58.	52.	51.	49.	49.
330 -	110.	102.	98.	83.	90.	86.	83.	79.	76.	72.	64.	68.	66.	64.	61.	54.	56.	54.	52.	50.
345 -	110.	102.	98.	93.	89.	85.	82.	79.	77.	74.	71.	69.	60.	65.	61.	51.	58.	55.	53.	44.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAMBA-7
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	88.	90.	88.	85.	81.	78.	75.	72.	70.	67.	65.	60.	57.	55.	54.	52.	50.
15 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.
30 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	70.	68.	58.	60.	63.	60.	58.	56.	55.	53.
45 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	71.	68.	65.	63.	55.	57.	58.	56.	54.	52.
60 -	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	72.	70.	65.	62.	59.	53.	56.	55.	53.	51.
75 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	75.	72.	67.	65.	62.	59.	57.	55.	53.	51.	49.
90 -	110.	102.	98.	94.	89.	85.	82.	80.	77.	75.	72.	70.	66.	63.	60.	54.	57.	55.	54.	52.
105 -	110.	102.	98.	94.	89.	84.	82.	79.	71.	75.	70.	68.	65.	55.	57.	58.	58.	56.	55.	53.
120 -	110.	102.	98.	93.	88.	84.	81.	71.	76.	71.	69.	67.	65.	56.	61.	58.	56.	55.	53.	51.
135 -	110.	102.	98.	93.	88.	84.	80.	76.	73.	71.	69.	64.	64.	60.	58.	56.	54.	53.	51.	49.
150 -	110.	102.	98.	94.	88.	84.	79.	76.	74.	71.	69.	67.	63.	60.	57.	55.	53.	51.	49.	48.
165 -	110.	102.	98.	94.	89.	84.	79.	77.	73.	70.	67.	65.	62.	59.	56.	53.	51.	50.	48.	46.
180 -	110.	102.	98.	88.	90.	84.	76.	78.	74.	72.	69.	65.	62.	60.	57.	54.	52.	50.	49.	47.
195 -	110.	102.	98.	94.	90.	84.	81.	79.	76.	72.	70.	67.	65.	61.	57.	52.	50.	49.	47.	45.
210 -	110.	102.	98.	94.	90.	86.	82.	77.	73.	68.	66.	63.	55.	59.	56.	52.	50.	49.	47.	45.
225 -	110.	102.	98.	94.	90.	86.	83.	78.	74.	71.	69.	67.	63.	60.	57.	52.	50.	49.	47.	45.
240 -	110.	102.	98.	94.	90.	88.	82.	79.	76.	71.	67.	65.	62.	61.	56.	54.	52.	50.	49.	47.
255 -	110.	102.	98.	94.	90.	88.	85.	79.	75.	71.	69.	67.	65.	60.	53.	56.	54.	52.	50.	48.
270 -	110.	102.	98.	94.	90.	86.	84.	77.	78.	75.	72.	68.	64.	55.	57.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	94.	89.	86.	81.	71.	77.	74.	71.	69.	67.	65.	63.	60.	58.	56.	55.	53.
300 -	110.	102.	98.	94.	90.	84.	82.	78.	76.	72.	71.	67.	67.	65.	63.	60.	58.	56.	55.	53.
315 -	110.	102.	98.	94.	90.	86.	83.	73.	78.	75.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.
330 -	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	72.	70.	67.	65.	63.	59.	57.	55.	53.	51.
345 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	72.	70.	67.	63.	60.	58.	56.	54.	52.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-B
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	89.	85.	83.	79.	69.	67.	68.	68.	67.	65.	61.	55.	58.	56.	55.	53.
15 -	110.	102.	98.	94.	90.	86.	83.	79.	76.	74.	72.	65.	61.	65.	63.	54.	59.	58.	56.	54.
30 -	110.	102.	98.	94.	90.	88.	84.	80.	77.	69.	72.	68.	66.	64.	62.	60.	58.	56.	55.	53.
45 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	74.	71.	68.	55.	64.	60.	58.	56.	55.	53.
60 -	110.	102.	98.	94.	90.	87.	82.	80.	77.	73.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.
75 -	110.	102.	98.	93.	88.	85.	82.	80.	71.	69.	69.	70.	67.	65.	62.	59.	57.	55.	53.	51.
90 -	110.	102.	98.	94.	90.	85.	82.	75.	77.	75.	72.	68.	68.	65.	61.	59.	57.	55.	53.	51.
105 -	110.	102.	98.	94.	90.	87.	85.	82.	78.	75.	73.	70.	67.	65.	63.	61.	59.	57.	55.	53.
120 -	110.	102.	98.	94.	90.	88.	85.	81.	76.	74.	68.	65.	63.	65.	63.	60.	58.	56.	55.	53.
135 -	110.	102.	98.	94.	90.	88.	85.	81.	75.	72.	66.	61.	60.	58.	58.	57.	56.	55.	55.	53.
150 -	110.	102.	98.	94.	90.	87.	79.	81.	76.	72.	70.	68.	62.	63.	62.	54.	56.	55.	55.	53.
165 -	110.	102.	98.	94.	90.	86.	84.	80.	76.	72.	67.	61.	63.	61.	55.	55.	56.	54.	52.	50.
180 -	110.	102.	98.	93.	89.	86.	84.	81.	76.	72.	69.	66.	63.	59.	57.	56.	54.	52.	50.	48.
195 -	110.	102.	98.	92.	88.	84.	82.	78.	77.	73.	69.	65.	64.	60.	57.	56.	54.	52.	50.	48.
210 -	110.	102.	98.	92.	87.	83.	81.	77.	74.	71.	69.	63.	65.	61.	59.	58.	56.	54.	52.	50.
225 -	110.	102.	98.	94.	88.	83.	79.	75.	72.	71.	67.	65.	62.	59.	57.	52.	50.	49.	47.	45.
240 -	110.	102.	98.	93.	90.	85.	82.	78.	75.	71.	67.	65.	63.	60.	57.	53.	51.	50.	48.	46.
255 -	110.	102.	98.	94.	90.	87.	82.	78.	75.	72.	69.	67.	64.	58.	60.	58.	56.	55.	53.	51.
270 -	110.	102.	98.	94.	90.	86.	84.	80.	76.	72.	69.	66.	63.	62.	59.	57.	55.	54.	52.	50.
285 -	110.	102.	98.	94.	90.	87.	84.	80.	75.	74.	70.	67.	63.	61.	59.	57.	55.	54.	52.	50.
300 -	110.	102.	98.	94.	90.	88.	84.	79.	71.	74.	70.	67.	64.	62.	59.	58.	56.	54.	52.	50.
315 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	74.	70.	67.	65.	63.	55.	50.	52.	52.	51.	51.
330 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	71.	69.	67.	65.	63.	61.	59.	57.	55.	53.
345 -	110.	102.	98.	94.	90.	86.	83.	81.	78.	76.	71.	68.	65.	63.	61.	59.	57.	55.	54.	52.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAMBA-9
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	87.	84.	82.	79.	76.	73.	65.	65.	63.	63.	62.	60.	58.	56.	55.	53.
15 -	110.	102.	98.	94.	90.	87.	82.	79.	75.	72.	70.	68.	65.	63.	61.	56.	56.	56.	55.	53.
30 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	69.	65.	63.	61.	58.	51.	52.	54.	52.	50.
45 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	69.	65.	62.	60.	58.	54.	55.	53.	51.	49.
60 -	110.	102.	98.	94.	90.	87.	82.	78.	75.	71.	68.	65.	62.	60.	55.	53.	53.	52.	51.	50.
75 -	110.	102.	98.	94.	90.	86.	82.	77.	74.	71.	67.	65.	63.	61.	59.	55.	54.	54.	52.	50.
90 -	110.	102.	98.	94.	90.	86.	83.	79.	75.	72.	69.	65.	62.	60.	57.	56.	54.	52.	50.	48.
105 -	110.	102.	98.	94.	88.	83.	79.	76.	69.	71.	68.	64.	62.	60.	56.	53.	51.	50.	48.	46.
120 -	110.	102.	98.	93.	89.	84.	79.	74.	69.	67.	65.	61.	59.	57.	55.	53.	51.	50.	48.	46.
135 -	110.	102.	98.	92.	87.	82.	78.	75.	73.	71.	67.	64.	59.	57.	53.	48.	47.	46.	45.	44.
150 -	110.	102.	98.	93.	89.	84.	79.	72.	74.	69.	66.	63.	59.	57.	55.	52.	50.	49.	47.	45.
165 -	110.	102.	98.	93.	90.	85.	82.	79.	74.	71.	69.	65.	62.	60.	58.	56.	54.	53.	51.	49.
180 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	68.	67.	62.	62.	57.	55.	54.	52.	50.	49.	47.
195 -	110.	102.	98.	86.	89.	84.	79.	75.	73.	70.	66.	64.	62.	59.	56.	53.	51.	50.	49.	47.
210 -	110.	102.	98.	94.	89.	84.	79.	75.	72.	69.	67.	64.	62.	59.	57.	52.	50.	49.	47.	45.
225 -	110.	102.	98.	94.	89.	86.	82.	78.	76.	73.	69.	67.	63.	59.	55.	52.	50.	49.	47.	45.
240 -	110.	102.	98.	94.	90.	85.	82.	79.	75.	71.	67.	64.	61.	58.	56.	54.	52.	50.	48.	46.
255 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	70.	67.	65.	62.	60.	58.	56.	54.	53.	51.	49.
270 -	110.	102.	98.	94.	90.	86.	81.	77.	72.	71.	62.	66.	63.	60.	58.	56.	54.	52.	50.	48.
285 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	73.	71.	67.	65.	62.	59.	56.	54.	52.	50.	48.
300 -	110.	102.	98.	94.	90.	87.	84.	80.	76.	72.	63.	67.	63.	60.	57.	54.	52.	51.	49.	47.
315 -	110.	102.	98.	94.	90.	88.	84.	81.	77.	74.	70.	67.	64.	63.	60.	57.	55.	53.	51.	49.
330 -	110.	102.	98.	94.	90.	86.	82.	75.	77.	75.	72.	69.	67.	63.	59.	56.	54.	52.	50.	48.
345 -	110.	102.	98.	94.	89.	85.	82.	79.	77.	74.	72.	69.	66.	64.	61.	58.	56.	55.	53.	51.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-10
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	I DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	88.	85.	81.	78.	75.	73.	71.	67.	65.	62.	60.	57.	55.	54.	52.	50.
15 -	110.	102.	98.	93.	88.	85.	82.	78.	75.	72.	70.	60.	66.	63.	61.	58.	56.	55.	53.	51.
30 -	110.	102.	98.	92.	88.	86.	82.	78.	75.	67.	67.	65.	67.	63.	63.	61.	59.	57.	55.	53.
45 -	110.	102.	98.	93.	88.	84.	82.	72.	77.	73.	71.	69.	66.	58.	62.	54.	59.	57.	55.	53.
60 -	110.	102.	98.	93.	89.	85.	82.	79.	76.	66.	71.	69.	67.	65.	59.	61.	59.	57.	56.	54.
75 -	110.	102.	98.	94.	88.	85.	82.	78.	75.	73.	70.	68.	65.	59.	61.	51.	53.	54.	55.	53.
90 -	110.	102.	98.	94.	90.	86.	82.	80.	77.	73.	71.	68.	60.	59.	63.	61.	59.	57.	55.	53.
105 -	110.	102.	98.	94.	89.	85.	78.	79.	76.	74.	72.	70.	65.	65.	61.	58.	56.	55.	53.	51.
120 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	74.	66.	69.	65.	63.	61.	58.	56.	54.	52.	50.
135 -	110.	102.	98.	93.	89.	86.	83.	79.	76.	75.	67.	70.	65.	62.	59.	57.	55.	53.	51.	49.
150 -	110.	102.	98.	94.	90.	86.	83.	80.	62.	75.	72.	69.	66.	64.	61.	57.	55.	53.	51.	49.
165 -	110.	102.	98.	94.	90.	86.	84.	79.	76.	74.	69.	70.	67.	64.	61.	58.	56.	54.	52.	50.
180 -	110.	102.	98.	94.	90.	87.	82.	79.	76.	74.	71.	69.	67.	64.	61.	59.	57.	55.	54.	52.
195 -	110.	102.	98.	94.	90.	87.	82.	78.	76.	72.	70.	68.	66.	64.	61.	60.	58.	56.	54.	52.
210 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	71.	67.	66.	60.	58.	56.	56.	54.	52.	50.	48.
225 -	110.	102.	98.	94.	90.	85.	82.	77.	74.	69.	67.	64.	60.	60.	57.	55.	53.	51.	49.	48.
240 -	110.	102.	98.	94.	88.	84.	81.	77.	74.	70.	67.	65.	62.	61.	59.	55.	53.	51.	49.	48.
255 -	110.	102.	98.	94.	90.	85.	82.	77.	73.	70.	67.	65.	63.	57.	57.	55.	55.	54.	52.	50.
270 -	110.	102.	98.	94.	90.	85.	81.	77.	73.	70.	67.	65.	63.	60.	58.	56.	54.	52.	50.	48.
285 -	110.	102.	98.	94.	90.	86.	81.	76.	73.	70.	67.	66.	60.	57.	56.	55.	54.	53.	51.	50.
300 -	110.	102.	98.	94.	90.	85.	81.	76.	74.	71.	70.	67.	63.	61.	59.	58.	56.	55.	53.	51.
315 -	110.	102.	98.	94.	90.	87.	82.	79.	75.	73.	71.	68.	65.	64.	61.	58.	56.	55.	53.	51.
330 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	68.	65.	63.	61.	58.	58.	56.	55.	53.
345 -	110.	102.	98.	93.	88.	85.	83.	79.	76.	72.	70.	68.	65.	63.	61.	59.	57.	55.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-11
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	66.	63.	61.	59.	57.	55.	53.	51.	49.
15 - 110.	102.	98.	94.	90.	87.	83.	79.	76.	73.	69.	65.	63.	55.	55.	40.	41.	41.	41.	40.	40.
30 - 110.	102.	98.	94.	90.	87.	83.	79.	75.	71.	69.	66.	64.	62.	53.	54.	55.	55.	53.	51.	51.
45 - 110.	102.	98.	94.	90.	87.	83.	79.	76.	73.	70.	66.	62.	54.	59.	56.	54.	53.	51.	49.	49.
60 - 110.	102.	98.	93.	83.	87.	83.	79.	75.	71.	67.	62.	60.	59.	53.	53.	51.	50.	48.	48.	48.
75 - 110.	102.	98.	92.	88.	84.	74.	76.	77.	72.	69.	65.	62.	59.	57.	54.	52.	50.	49.	47.	47.
90 - 110.	102.	98.	92.	88.	85.	82.	78.	70.	74.	71.	68.	66.	63.	61.	56.	54.	53.	51.	49.	49.
105 - 110.	102.	97.	91.	80.	83.	81.	78.	71.	70.	71.	67.	65.	63.	59.	56.	54.	52.	50.	48.	48.
120 - 110.	102.	97.	91.	86.	83.	81.	71.	71.	70.	71.	68.	66.	63.	59.	56.	54.	53.	51.	49.	49.
135 - 110.	102.	98.	91.	88.	83.	70.	77.	73.	60.	62.	62.	61.	60.	59.	57.	57.	55.	53.	51.	51.
150 - 110.	102.	98.	92.	86.	83.	80.	76.	73.	69.	59.	66.	63.	60.	59.	54.	52.	50.	49.	47.	47.
165 - 110.	102.	98.	93.	88.	84.	80.	76.	74.	72.	70.	64.	65.	62.	59.	56.	54.	53.	51.	49.	49.
180 - 110.	102.	98.	93.	88.	85.	82.	80.	77.	74.	71.	67.	63.	59.	55.	53.	51.	50.	48.	46.	46.
195 - 110.	102.	98.	94.	90.	87.	83.	77.	74.	71.	69.	66.	65.	61.	59.	53.	51.	50.	48.	46.	46.
210 - 110.	102.	98.	94.	90.	85.	79.	74.	71.	68.	67.	63.	59.	57.	56.	51.	50.	49.	49.	48.	48.
225 - 110.	102.	91.	94.	90.	85.	82.	77.	75.	73.	69.	65.	63.	55.	57.	54.	52.	50.	49.	47.	47.
240 - 110.	102.	98.	94.	90.	87.	80.	74.	66.	68.	66.	63.	59.	59.	55.	51.	49.	48.	46.	45.	45.
255 - 110.	102.	98.	94.	90.	83.	79.	77.	74.	67.	69.	64.	58.	58.	56.	51.	50.	49.	47.	47.	47.
270 - 110.	102.	98.	88.	90.	85.	83.	80.	74.	70.	66.	63.	60.	57.	55.	53.	51.	50.	48.	46.	46.
285 - 110.	102.	98.	94.	90.	87.	83.	77.	74.	71.	70.	65.	61.	59.	57.	56.	54.	52.	50.	48.	48.
300 - 110.	102.	98.	94.	90.	87.	83.	78.	75.	72.	69.	66.	62.	59.	57.	55.	53.	51.	49.	48.	48.
315 - 110.	102.	98.	93.	80.	82.	83.	80.	77.	74.	71.	67.	65.	63.	58.	55.	53.	51.	49.	48.	48.
330 - 110.	102.	97.	93.	89.	85.	82.	78.	75.	74.	71.	68.	65.	61.	57.	55.	53.	51.	49.	48.	48.
345 - 110.	102.	97.	85.	85.	82.	83.	80.	76.	72.	70.	64.	66.	62.	59.	57.	55.	54.	52.	50.	50.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-12
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	65.	61.	57.	55.	51.	49.	48.	46.	45.
15 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	65.	61.	59.	52.	53.	52.	51.	51.	
30 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	73.	71.	68.	65.	61.	57.	52.	50.	49.	47.	40.	
45 - 110.	102.	98.	94.	89.	81.	83.	80.	77.	74.	69.	66.	65.	61.	59.	56.	54.	53.	51.	49.	
60 - 110.	102.	98.	94.	89.	84.	82.	76.	77.	74.	71.	65.	63.	57.	44.	49.	49.	48.	47.	46.	
75 - 110.	102.	98.	92.	88.	85.	77.	79.	77.	74.	71.	68.	66.	63.	61.	56.	54.	53.	51.	49.	
90 - 110.	102.	98.	94.	90.	86.	80.	77.	75.	72.	63.	65.	66.	63.	61.	59.	57.	55.	53.	51.	
105 - 110.	102.	98.	92.	87.	84.	79.	76.	64.	70.	69.	67.	63.	56.	59.	48.	50.	51.	50.	49.	
120 - 110.	102.	98.	90.	86.	82.	79.	75.	74.	69.	67.	66.	63.	61.	56.	57.	55.	54.	52.	50.	
135 - 110.	102.	98.	90.	86.	82.	79.	75.	73.	70.	69.	66.	62.	60.	57.	49.	50.	50.	49.	50.	
150 - 110.	102.	98.	90.	85.	76.	79.	74.	74.	64.	70.	66.	63.	59.	58.	54.	52.	50.	49.	47.	
165 - 110.	102.	98.	93.	88.	84.	82.	79.	73.	74.	71.	68.	66.	63.	60.	57.	55.	53.	51.	49.	
180 - 110.	102.	98.	94.	89.	85.	83.	80.	76.	72.	69.	67.	65.	60.	59.	59.	57.	55.	53.	51.	
195 - 110.	102.	98.	88.	90.	87.	83.	77.	74.	71.	69.	64.	61.	55.	58.	55.	53.	51.	49.	48.	
210 - 110.	102.	98.	94.	90.	87.	81.	78.	77.	70.	67.	65.	63.	61.	59.	57.	55.	54.	52.	50.	
225 - 110.	102.	98.	94.	90.	87.	83.	80.	75.	72.	69.	65.	62.	61.	51.	51.	51.	50.	50.	49.	
240 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	72.	69.	67.	64.	62.	57.	59.	57.	55.	53.	51.	
255 - 110.	102.	98.	94.	89.	81.	83.	80.	77.	73.	70.	68.	65.	63.	61.	58.	56.	54.	52.	50.	
270 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	66.	62.	59.	56.	54.	53.	51.	49.	
285 - 110.	102.	98.	93.	88.	86.	83.	80.	77.	74.	71.	68.	66.	62.	59.	54.	52.	50.	49.	47.	
300 - 110.	102.	98.	93.	88.	85.	78.	80.	77.	74.	71.	67.	64.	61.	57.	55.	53.	51.	49.	48.	
315 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	66.	63.	61.	59.	57.	55.	53.	51.	
330 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	61.	58.	45.	51.	50.	50.	49.	47.	
345 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	65.	59.	55.	53.	51.	50.	48.	46.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 775.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-13
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	91.	88.	83.	79.	75.	72.	69.	68.	65.	62.	59.	57.	54.	52.	50.	49.	47.
15 -	110.	102.	98.	93.	87.	82.	77.	73.	71.	69.	66.	63.	56.	55.	51.	51.	50.	49.	48.	47.
30 -	110.	102.	98.	94.	88.	83.	79.	75.	72.	69.	68.	64.	62.	60.	55.	53.	52.	51.	50.	49.
45 -	110.	102.	98.	94.	90.	84.	79.	76.	74.	72.	65.	66.	65.	62.	60.	58.	56.	55.	53.	51.
60 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	75.	71.	70.	67.	65.	62.	60.	58.	56.	54.	52.
75 -	110.	102.	98.	93.	83.	82.	84.	80.	76.	72.	70.	62.	66.	63.	61.	58.	56.	55.	53.	51.
90 -	110.	102.	98.	94.	90.	88.	84.	79.	77.	73.	71.	68.	66.	65.	61.	59.	57.	55.	54.	52.
105 -	110.	102.	98.	94.	88.	86.	82.	79.	77.	73.	67.	65.	62.	55.	59.	50.	50.	50.	49.	48.
120 -	110.	102.	98.	94.	90.	86.	81.	71.	71.	73.	70.	67.	65.	60.	58.	56.	54.	52.	50.	48.
135 -	110.	102.	98.	94.	90.	84.	80.	68.	75.	69.	68.	66.	62.	49.	51.	51.	51.	50.	50.	49.
150 -	110.	102.	97.	85.	86.	82.	80.	77.	74.	70.	66.	64.	59.	55.	56.	55.	53.	51.	49.	48.
165 -	110.	102.	97.	85.	86.	81.	74.	77.	74.	69.	66.	62.	61.	52.	55.	52.	50.	49.	47.	45.
180 -	110.	102.	97.	88.	84.	81.	77.	73.	69.	67.	65.	62.	59.	56.	53.	52.	50.	49.	47.	45.
195 -	110.	102.	97.	92.	87.	82.	79.	75.	73.	70.	67.	64.	61.	60.	58.	56.	54.	52.	50.	48.
210 -	110.	102.	98.	93.	89.	84.	80.	77.	74.	70.	69.	66.	63.	60.	59.	55.	53.	51.	49.	48.
225 -	110.	102.	98.	94.	90.	85.	80.	77.	74.	71.	64.	65.	62.	60.	56.	51.	49.	48.	46.	45.
240 -	110.	102.	98.	94.	90.	84.	78.	69.	66.	68.	69.	63.	58.	58.	51.	50.	49.	48.	47.	45.
255 -	110.	102.	98.	93.	88.	84.	79.	77.	73.	68.	66.	63.	58.	58.	56.	52.	50.	49.	47.	45.
270 -	110.	102.	98.	92.	85.	81.	77.	73.	69.	68.	66.	64.	61.	59.	56.	50.	48.	47.	45.	43.
285 -	110.	102.	98.	90.	85.	82.	80.	77.	73.	70.	66.	63.	60.	58.	53.	48.	47.	45.	44.	43.
300 -	110.	102.	98.	93.	86.	75.	79.	75.	72.	69.	67.	62.	59.	57.	53.	51.	49.	48.	46.	45.
315 -	110.	102.	98.	94.	88.	80.	79.	76.	67.	71.	69.	66.	62.	58.	57.	51.	50.	50.	49.	47.
330 -	110.	102.	98.	93.	89.	81.	83.	80.	77.	74.	70.	68.	66.	64.	61.	58.	56.	55.	53.	51.
345 -	110.	102.	97.	92.	88.	78.	81.	77.	74.	72.	67.	66.	63.	60.	49.	57.	55.	54.	52.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-14
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	88.	84.	80.	77.	75.	72.	70.	68.	65.	63.	61.	60.	58.	56.	54.	52.	
15 -	110.	102.	98.	94.	88.	84.	80.	78.	74.	72.	69.	68.	62.	63.	61.	59.	57.	55.	54.	52.	
30 -	110.	102.	98.	94.	88.	84.	80.	78.	74.	73.	70.	68.	65.	63.	61.	58.	56.	55.	53.	51.	
45 -	110.	102.	98.	94.	89.	85.	81.	78.	74.	72.	69.	66.	63.	61.	59.	57.	55.	53.	51.	49.	
60 -	110.	102.	98.	94.	90.	87.	83.	79.	77.	74.	71.	68.	65.	63.	61.	58.	56.	54.	52.	50.	
75 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.	
90 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	66.	64.	63.	57.	59.	57.	55.	53.	
105 -	110.	102.	98.	94.	89.	86.	82.	78.	75.	72.	70.	68.	66.	59.	62.	59.	57.	55.	53.	51.	
120 -	110.	102.	98.	94.	88.	85.	81.	78.	75.	73.	71.	69.	67.	63.	60.	57.	55.	53.	51.	49.	
135 -	110.	102.	98.	93.	88.	84.	81.	79.	74.	72.	70.	68.	65.	63.	60.	57.	55.	53.	51.	49.	
150 -	110.	102.	98.	93.	89.	84.	81.	78.	75.	72.	70.	67.	64.	62.	59.	57.	55.	53.	51.	49.	
165 -	110.	102.	98.	94.	89.	85.	82.	78.	74.	73.	71.	68.	66.	63.	60.	59.	57.	55.	53.	51.	
180 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	73.	70.	68.	65.	61.	60.	58.	58.	56.	55.	53.	
195 -	110.	102.	98.	93.	89.	86.	84.	81.	78.	75.	71.	68.	66.	64.	62.	58.	58.	56.	55.	53.	
210 -	110.	102.	98.	93.	89.	86.	83.	79.	74.	74.	66.	70.	67.	65.	62.	60.	58.	56.	54.	52.	
225 -	110.	102.	98.	94.	90.	86.	82.	79.	74.	73.	70.	68.	65.	63.	61.	58.	56.	55.	53.	51.	
240 -	110.	102.	98.	93.	88.	84.	81.	79.	74.	73.	69.	67.	65.	63.	60.	59.	57.	55.	53.	51.	
255 -	110.	102.	98.	94.	88.	85.	83.	78.	75.	73.	70.	68.	65.	63.	60.	59.	57.	55.	53.	51.	
270 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	72.	70.	68.	66.	61.	62.	59.	57.	55.	54.	52.	
285 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	70.	67.	64.	62.	60.	58.	56.	55.	53.	
300 -	110.	102.	98.	94.	90.	86.	81.	79.	77.	74.	71.	68.	66.	63.	61.	59.	57.	55.	53.	51.	
315 -	110.	102.	98.	94.	90.	85.	82.	79.	75.	72.	70.	68.	65.	63.	58.	60.	58.	56.	54.	52.	
330 -	110.	102.	98.	94.	89.	85.	81.	78.	74.	73.	70.	68.	66.	63.	60.	58.	56.	54.	52.	50.	
345 -	110.	102.	98.	94.	88.	84.	81.	78.	75.	73.	70.	68.	65.	62.	60.	58.	56.	54.	52.	50.	

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-15
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	88.	84.	81.	76.	74.	71.	66.	65.	63.	61.	61.	59.	57.	55.	53.	51.
15 -	110.	102.	98.	94.	90.	85.	82.	80.	76.	72.	64.	68.	65.	59.	58.	55.	56.	55.	55.	53.
30 -	110.	102.	98.	94.	90.	86.	83.	80.	76.	74.	71.	63.	62.	63.	63.	60.	59.	58.	56.	54.
45 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	72.	70.	68.	65.	60.	57.	55.	54.	52.	50.
60 -	110.	102.	98.	94.	90.	88.	80.	82.	77.	75.	67.	70.	67.	63.	63.	57.	55.	54.	52.	50.
75 -	110.	102.	98.	94.	90.	88.	85.	81.	77.	73.	69.	65.	58.	54.	59.	54.	52.	50.	49.	47.
90 -	110.	102.	98.	94.	90.	88.	85.	81.	76.	72.	70.	65.	61.	57.	56.	54.	52.	50.	49.	47.
105 -	110.	102.	98.	94.	90.	88.	85.	82.	77.	75.	67.	70.	67.	62.	60.	49.	50.	50.	49.	47.
120 -	110.	102.	98.	94.	90.	87.	85.	81.	78.	75.	73.	70.	67.	65.	63.	61.	59.	57.	55.	53.
135 -	110.	102.	98.	93.	90.	86.	83.	80.	76.	72.	69.	68.	65.	60.	58.	56.	55.	54.	53.	53.
150 -	110.	102.	98.	93.	89.	84.	73.	77.	74.	71.	69.	67.	65.	63.	60.	52.	54.	56.	54.	52.
165 -	110.	102.	98.	93.	88.	84.	81.	78.	74.	71.	68.	65.	59.	62.	58.	55.	54.	53.	54.	51.
180 -	110.	102.	98.	93.	88.	86.	81.	79.	74.	71.	69.	67.	64.	55.	59.	56.	54.	53.	51.	49.
195 -	110.	102.	98.	94.	90.	86.	82.	79.	75.	65.	70.	68.	66.	64.	60.	52.	54.	56.	54.	49.
210 -	110.	102.	98.	94.	90.	88.	81.	78.	67.	68.	72.	68.	65.	63.	61.	57.	55.	53.	51.	49.
225 -	110.	102.	98.	94.	90.	87.	83.	80.	78.	75.	72.	68.	64.	61.	57.	55.	53.	51.	49.	48.
240 -	110.	102.	98.	94.	90.	87.	84.	81.	76.	73.	71.	69.	65.	62.	59.	56.	54.	52.	50.	48.
255 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	74.	71.	68.	66.	63.	59.	57.	55.	53.	51.	49.
270 -	110.	102.	98.	94.	90.	86.	83.	81.	78.	75.	70.	62.	66.	63.	61.	58.	56.	54.	52.	50.
285 -	110.	102.	98.	94.	90.	87.	83.	80.	72.	74.	72.	69.	66.	58.	63.	60.	58.	56.	55.	53.
300 -	110.	102.	98.	94.	90.	86.	81.	78.	75.	72.	69.	67.	64.	63.	61.	57.	55.	54.	52.	50.
315 -	110.	102.	98.	93.	90.	84.	79.	77.	74.	72.	69.	67.	65.	63.	61.	57.	55.	54.	52.	50.
330 -	110.	102.	98.	93.	88.	84.	79.	77.	74.	62.	63.	64.	61.	63.	60.	59.	57.	55.	53.	51.
345 -	110.	102.	98.	93.	88.	84.	79.	76.	71.	71.	65.	63.	62.	58.	58.	56.	55.	54.	53.	51.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-16
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	92.	85.	72.	74.	74.	74.	67.	57.	57.	59.	56.	55.	55.	53.	51.	49.	48.	
15	- 110.	102.	89.	94.	86.	75.	81.	73.	70.	67.	67.	64.	61.	47.	48.	54.	52.	50.	49.	47.	
30	- 110.	102.	98.	94.	85.	74.	79.	77.	69.	68.	65.	62.	56.	54.	52.	50.	48.	47.	45.	44.	
45	- 110.	102.	98.	94.	87.	79.	72.	72.	69.	66.	65.	62.	54.	53.	51.	50.	49.	47.	46.	45.	
60	- 110.	102.	98.	88.	85.	79.	77.	65.	70.	60.	65.	63.	61.	47.	46.	47.	46.	44.	43.	42.	
75	- 110.	102.	94.	85.	84.	79.	77.	74.	72.	70.	67.	65.	62.	60.	49.	53.	51.	49.	47.	45.	
90	- 110.	102.	95.	91.	85.	80.	78.	72.	63.	62.	65.	61.	61.	48.	46.	50.	48.	47.	45.	43.	
105	- 110.	102.	96.	90.	84.	75.	73.	72.	71.	66.	63.	52.	57.	58.	55.	52.	51.	49.	48.	46.	
120	- 110.	102.	98.	93.	83.	81.	74.	70.	68.	67.	67.	61.	58.	58.	53.	52.	50.	49.	47.	45.	
135	- 110.	102.	98.	91.	83.	76.	71.	69.	68.	66.	57.	58.	57.	56.	53.	52.	50.	49.	47.	45.	
150	- 110.	102.	98.	90.	84.	74.	74.	70.	71.	68.	66.	61.	60.	56.	56.	52.	50.	49.	47.	45.	
165	- 110.	102.	98.	93.	86.	83.	70.	71.	76.	70.	65.	62.	58.	52.	56.	54.	52.	50.	49.	47.	
180	- 110.	102.	98.	92.	87.	83.	79.	77.	74.	71.	59.	67.	65.	57.	53.	52.	50.	49.	47.	45.	
195	- 110.	102.	98.	94.	88.	82.	76.	72.	70.	63.	57.	58.	59.	57.	54.	53.	51.	50.	49.	47.	
210	- 110.	102.	98.	93.	90.	85.	81.	76.	71.	70.	60.	60.	57.	56.	55.	55.	54.	52.	51.	49.	
225	- 110.	102.	98.	94.	90.	86.	79.	69.	68.	70.	57.	61.	61.	59.	60.	56.	54.	52.	50.	48.	
240	- 110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	72.	70.	65.	63.	59.	57.	55.	53.	51.	49.	
255	- 110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	72.	70.	67.	64.	62.	58.	56.	55.	53.	51.	
270	- 110.	102.	98.	94.	89.	86.	83.	80.	78.	75.	71.	70.	67.	65.	62.	60.	58.	56.	54.	52.	
285	- 110.	102.	98.	94.	90.	86.	83.	80.	78.	73.	71.	65.	57.	57.	54.	58.	56.	54.	52.	50.	
300	- 110.	102.	98.	94.	90.	87.	84.	81.	75.	66.	65.	62.	58.	60.	57.	56.	54.	52.	50.	48.	
315	- 110.	102.	98.	93.	90.	87.	84.	77.	74.	67.	65.	65.	63.	60.	51.	56.	54.	52.	50.	48.	
330	- 110.	102.	98.	94.	89.	79.	82.	79.	76.	73.	67.	63.	62.	60.	51.	48.	47.	45.	44.	42.	
345	- 110.	102.	98.	91.	86.	73.	79.	73.	69.	60.	66.	61.	59.	51.	51.	52.	50.	49.	47.	45.	

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-17
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	94.	90.	86.	81.	81.	82.	80.	76.	71.	69.	67.	65.	63.	61.	59.	57.	55.	53.
15 - 110.	94.	98.	94.	90.	86.	75.	81.	79.	77.	73.	69.	67.	64.	61.	58.	56.	55.	53.	51.	49.
30 - 110.	92.	98.	94.	90.	82.	83.	79.	77.	71.	67.	70.	66.	64.	61.	57.	55.	53.	51.	49.	47.
45 - 110.	102.	98.	94.	90.	80.	84.	80.	73.	76.	73.	69.	66.	56.	63.	61.	59.	57.	55.	53.	51.
60 - 110.	102.	98.	94.	90.	86.	82.	80.	77.	74.	71.	67.	60.	57.	61.	58.	56.	55.	53.	51.	49.
75 - 110.	102.	98.	94.	90.	86.	83.	78.	76.	74.	71.	68.	67.	58.	63.	61.	59.	57.	55.	53.	51.
90 - 110.	102.	98.	94.	90.	86.	83.	80.	72.	70.	72.	61.	67.	65.	63.	60.	58.	56.	55.	53.	51.
105 - 110.	102.	98.	94.	90.	80.	85.	82.	80.	76.	73.	70.	67.	65.	62.	59.	57.	55.	54.	52.	51.
120 - 110.	102.	90.	94.	90.	88.	75.	82.	78.	73.	69.	57.	56.	59.	56.	54.	54.	53.	52.	51.	50.
135 - 110.	102.	98.	94.	90.	80.	77.	82.	79.	75.	68.	71.	68.	66.	64.	60.	58.	56.	55.	53.	51.
150 - 110.	102.	98.	94.	90.	88.	84.	82.	78.	76.	72.	57.	60.	61.	61.	62.	60.	59.	57.	55.	53.
165 - 110.	102.	98.	94.	90.	88.	85.	76.	73.	77.	75.	72.	70.	67.	64.	61.	59.	58.	56.	54.	52.
180 - 110.	102.	98.	94.	90.	88.	75.	82.	69.	77.	75.	72.	70.	67.	64.	62.	60.	58.	56.	54.	52.
195 - 110.	102.	98.	94.	90.	81.	84.	81.	70.	71.	71.	72.	70.	67.	65.	62.	60.	59.	57.	55.	53.
210 - 110.	102.	98.	94.	90.	88.	84.	81.	77.	62.	64.	66.	69.	66.	64.	61.	59.	58.	56.	54.	52.
225 - 110.	102.	98.	94.	90.	85.	83.	72.	71.	68.	68.	68.	69.	66.	63.	60.	58.	56.	54.	52.	50.
240 - 110.	102.	98.	94.	90.	87.	83.	70.	71.	69.	68.	68.	69.	67.	64.	61.	59.	58.	56.	54.	52.
255 - 110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	74.	69.	70.	66.	63.	60.	58.	56.	55.	53.	51.
270 - 110.	102.	98.	94.	90.	88.	85.	81.	66.	69.	71.	72.	69.	67.	64.	61.	59.	58.	56.	54.	52.
285 - 110.	102.	98.	94.	90.	88.	80.	77.	80.	77.	75.	72.	69.	66.	63.	61.	59.	58.	56.	54.	52.
300 - 110.	102.	98.	94.	90.	88.	85.	74.	73.	77.	75.	72.	70.	67.	64.	61.	59.	57.	55.	53.	51.
315 - 110.	102.	98.	94.	90.	88.	70.	82.	79.	75.	72.	70.	66.	51.	52.	53.	54.	54.	54.	54.	54.
330 - 110.	102.	98.	94.	90.	88.	85.	81.	76.	68.	66.	65.	65.	64.	60.	60.	60.	60.	58.	57.	55.
345 - 110.	102.	85.	94.	90.	88.	85.	81.	78.	75.	72.	61.	62.	66.	64.	61.	59.	57.	56.	54.	52.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-18
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	84.	79.	76.	73.	71.	68.	65.	58.	61.	58.	56.	55.	53.	51.
15 -	110.	102.	98.	94.	89.	86.	82.	78.	76.	72.	69.	68.	62.	63.	61.	58.	56.	55.	53.	51.
30 -	110.	102.	98.	94.	89.	85.	81.	77.	74.	71.	69.	66.	64.	59.	57.	56.	57.	55.	53.	51.
45 -	110.	102.	98.	94.	88.	84.	82.	75.	73.	74.	71.	68.	66.	56.	63.	60.	58.	56.	54.	52.
60 -	110.	102.	98.	94.	88.	84.	75.	77.	74.	72.	67.	66.	64.	63.	57.	57.	55.	54.	52.	50.
75 -	110.	102.	98.	93.	88.	83.	80.	77.	72.	71.	61.	62.	62.	60.	58.	56.	54.	53.	52.	51.
90 -	110.	102.	98.	92.	87.	82.	79.	77.	73.	70.	69.	61.	59.	60.	60.	56.	56.	55.	53.	51.
105 -	110.	102.	98.	93.	88.	84.	75.	77.	74.	71.	69.	62.	63.	60.	54.	57.	55.	54.	52.	50.
120 -	110.	102.	98.	94.	90.	84.	82.	79.	75.	72.	68.	64.	59.	59.	51.	52.	51.	51.	49.	48.
135 -	110.	102.	98.	93.	83.	86.	82.	80.	76.	73.	70.	66.	63.	60.	50.	52.	52.	51.	51.	51.
150 -	110.	102.	98.	94.	90.	86.	83.	81.	77.	73.	71.	68.	65.	63.	54.	59.	57.	55.	54.	52.
165 -	110.	102.	98.	94.	89.	85.	83.	79.	72.	75.	72.	69.	67.	64.	63.	59.	57.	55.	54.	52.
180 -	110.	102.	98.	94.	89.	86.	81.	77.	74.	72.	67.	64.	60.	60.	61.	60.	58.	56.	54.	52.
195 -	110.	102.	98.	94.	89.	86.	76.	79.	76.	73.	71.	68.	66.	63.	61.	55.	58.	56.	54.	52.
210 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	65.	72.	70.	67.	64.	62.	60.	58.	56.	54.	52.
225 -	110.	102.	98.	94.	90.	88.	84.	82.	79.	76.	72.	70.	63.	64.	59.	48.	50.	51.	50.	49.
240 -	110.	102.	98.	94.	90.	87.	84.	79.	76.	74.	72.	65.	65.	51.	53.	52.	53.	53.	52.	52.
255 -	110.	102.	98.	94.	89.	86.	82.	75.	77.	75.	71.	69.	66.	65.	56.	57.	59.	57.	55.	53.
270 -	110.	102.	98.	94.	88.	84.	81.	78.	76.	73.	71.	69.	63.	63.	63.	59.	58.	58.	56.	54.
285 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	73.	71.	69.	67.	64.	56.	54.	55.	57.	56.	54.
300 -	110.	102.	98.	94.	90.	86.	82.	79.	71.	74.	70.	68.	65.	63.	61.	57.	55.	53.	51.	49.
315 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	75.	73.	70.	68.	64.	60.	58.	56.	55.	53.	51.
330 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	70.	72.	70.	68.	65.	63.	61.	59.	58.	56.	54.
345 -	110.	102.	98.	94.	90.	86.	83.	73.	77.	74.	71.	63.	67.	63.	53.	60.	58.	56.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

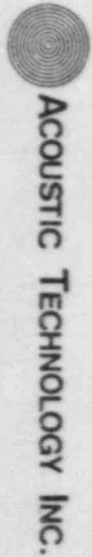
ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-19
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	98.	90.	86.	82.	78.	73.	69.	65.	62.	60.	57.	56.	51.	50.	48.	46.	44.	43.	41.	39.
15 -	98.	90.	86.	82.	78.	74.	70.	66.	63.	60.	57.	56.	53.	51.	47.	47.	45.	43.	41.	39.
30 -	98.	90.	86.	82.	78.	74.	71.	68.	65.	62.	59.	56.	55.	52.	51.	48.	46.	44.	42.	40.
45 -	98.	90.	86.	82.	76.	73.	69.	66.	64.	61.	58.	56.	53.	50.	49.	46.	44.	43.	41.	39.
60 -	98.	90.	86.	81.	76.	72.	69.	66.	63.	60.	57.	49.	53.	51.	47.	45.	43.	41.	39.	37.
75 -	98.	90.	86.	80.	74.	70.	68.	63.	60.	53.	52.	47.	49.	48.	47.	44.	42.	41.	39.	37.
90 -	98.	90.	86.	79.	74.	70.	67.	63.	62.	59.	54.	52.	51.	48.	45.	43.	41.	39.	37.	36.
105 -	98.	90.	86.	77.	72.	70.	67.	64.	59.	56.	57.	53.	50.	48.	45.	43.	41.	39.	37.	36.
120 -	98.	90.	86.	79.	74.	70.	67.	63.	62.	59.	55.	53.	51.	49.	45.	45.	43.	42.	40.	38.
135 -	98.	90.	86.	79.	76.	72.	68.	65.	62.	59.	55.	52.	48.	47.	45.	43.	41.	39.	37.	36.
150 -	98.	90.	86.	81.	76.	72.	69.	65.	62.	57.	55.	52.	47.	45.	45.	43.	41.	39.	37.	36.
165 -	98.	90.	86.	81.	77.	73.	69.	67.	64.	59.	55.	52.	47.	47.	41.	42.	40.	38.	37.	35.
180 -	98.	90.	86.	81.	78.	74.	70.	67.	62.	59.	56.	52.	49.	48.	46.	44.	42.	41.	39.	37.
195 -	98.	90.	86.	82.	78.	74.	71.	68.	64.	60.	56.	53.	51.	48.	47.	44.	42.	41.	39.	37.
210 -	98.	90.	86.	82.	77.	74.	71.	66.	63.	60.	56.	53.	51.	49.	47.	45.	43.	41.	39.	37.
225 -	98.	90.	86.	82.	78.	74.	71.	68.	64.	60.	57.	56.	52.	50.	47.	45.	43.	41.	39.	37.
240 -	98.	90.	86.	82.	77.	73.	69.	67.	60.	62.	59.	56.	54.	51.	49.	46.	44.	42.	40.	38.
255 -	98.	90.	86.	82.	78.	74.	70.	68.	64.	61.	59.	57.	54.	52.	51.	48.	46.	44.	43.	41.
270 -	98.	90.	86.	82.	77.	69.	70.	66.	63.	60.	57.	56.	53.	51.	47.	48.	46.	44.	42.	40.
285 -	98.	90.	86.	82.	78.	73.	69.	66.	64.	62.	59.	55.	53.	50.	48.	45.	43.	41.	39.	37.
300 -	98.	90.	86.	81.	76.	72.	69.	66.	63.	60.	58.	55.	52.	50.	47.	44.	42.	40.	38.	36.
315 -	98.	90.	86.	81.	76.	72.	68.	65.	62.	57.	56.	53.	49.	45.	44.	42.	40.	38.	37.	35.
330 -	98.	90.	86.	81.	76.	73.	69.	65.	60.	57.	55.	53.	50.	48.	45.	42.	40.	38.	37.	35.
345 -	98.	90.	86.	82.	77.	73.	69.	65.	62.	59.	57.	55.	53.	49.	42.	44.	42.	41.	39.	37.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %



SIREN NUMBER CATAWBA-20
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	85.	81.	78.	75.	71.	69.	64.	61.	60.	55.	54.	52.	50.	49.	47.
15 -	110.	102.	98.	94.	90.	85.	80.	75.	69.	67.	67.	65.	59.	58.	56.	44.	45.	44.	43.	42.
30 -	110.	102.	98.	94.	88.	83.	79.	76.	69.	68.	63.	62.	57.	58.	56.	51.	49.	48.	46.	45.
45 -	110.	102.	98.	93.	82.	84.	80.	75.	71.	68.	65.	61.	54.	50.	49.	49.	48.	47.	46.	45.
60 -	110.	102.	98.	91.	85.	76.	80.	76.	70.	66.	65.	61.	54.	55.	53.	52.	51.	50.	49.	47.
75 -	110.	102.	98.	93.	88.	79.	77.	74.	70.	66.	63.	62.	52.	52.	50.	50.	49.	48.	46.	45.
90 -	110.	102.	98.	93.	87.	81.	74.	77.	72.	69.	66.	62.	59.	59.	55.	52.	50.	49.	47.	45.
105 -	110.	102.	98.	91.	84.	77.	79.	75.	65.	62.	69.	63.	60.	62.	59.	57.	55.	54.	47.	45.
120 -	110.	102.	98.	94.	85.	82.	72.	74.	72.	68.	66.	64.	65.	55.	59.	58.	56.	55.	55.	50.
135 -	110.	102.	98.	94.	89.	85.	82.	79.	73.	72.	72.	70.	67.	65.	62.	59.	57.	55.	54.	53.
150 -	110.	102.	98.	94.	90.	87.	81.	68.	68.	68.	67.	67.	67.	64.	61.	58.	56.	55.	54.	52.
165 -	110.	102.	98.	94.	90.	84.	71.	71.	71.	71.	72.	69.	67.	64.	62.	60.	58.	56.	55.	51.
180 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	72.	70.	66.	63.	60.	58.	56.	55.	53.	51.
195 -	110.	102.	98.	86.	90.	88.	85.	81.	77.	73.	70.	68.	67.	62.	60.	57.	55.	54.	52.	50.
210 -	110.	102.	98.	94.	90.	88.	85.	81.	77.	72.	69.	66.	63.	60.	58.	56.	54.	52.	50.	48.
225 -	110.	102.	98.	94.	90.	88.	85.	81.	77.	73.	71.	68.	66.	61.	58.	55.	53.	51.	49.	48.
240 -	110.	102.	98.	94.	90.	88.	85.	81.	76.	73.	70.	68.	66.	63.	59.	56.	54.	53.	51.	49.
255 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	70.	68.	66.	63.	61.	58.	56.	54.	52.	50.
270 -	110.	102.	98.	94.	88.	85.	75.	73.	73.	75.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.
285 -	110.	102.	98.	94.	87.	82.	80.	77.	69.	67.	67.	64.	62.	63.	60.	49.	51.	52.	52.	52.
300 -	110.	102.	98.	94.	90.	85.	79.	68.	74.	63.	61.	66.	63.	62.	60.	50.	50.	50.	49.	48.
315 -	110.	102.	98.	94.	89.	86.	82.	78.	74.	69.	63.	53.	52.	52.	49.	50.	49.	48.	47.	46.
330 -	110.	102.	98.	91.	88.	84.	80.	73.	69.	60.	59.	59.	57.	55.	52.	53.	51.	50.	48.	47.
345 -	110.	102.	98.	93.	90.	85.	79.	76.	70.	61.	60.	59.	57.	54.	53.	52.	50.	49.	47.	46.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATANBA-21
 DUKE POWER COMPANY
 CATANBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	89.	86.	81.	78.	75.	73.	66.	65.	64.	64.	62.	60.	58.	56.	54.	52.
15 -	110.	102.	98.	93.	88.	85.	81.	78.	75.	72.	71.	67.	59.	59.	59.	59.	57.	55.	54.	52.
30 -	110.	102.	98.	93.	88.	85.	81.	78.	77.	71.	68.	70.	67.	65.	63.	61.	59.	57.	55.	53.
45 -	110.	102.	98.	93.	90.	86.	84.	79.	77.	74.	71.	63.	62.	63.	63.	61.	59.	57.	56.	54.
60 -	110.	102.	99.	94.	89.	86.	80.	81.	77.	74.	72.	70.	67.	65.	62.	60.	58.	56.	55.	53.
75 -	110.	102.	98.	94.	89.	85.	82.	74.	71.	75.	72.	70.	67.	64.	62.	60.	58.	56.	54.	52.
90 -	110.	102.	98.	94.	90.	88.	84.	79.	76.	66.	68.	69.	66.	64.	61.	59.	57.	55.	54.	52.
105 -	110.	102.	98.	93.	90.	85.	81.	78.	75.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.	51.
120 -	110.	102.	98.	93.	88.	84.	81.	79.	77.	74.	71.	60.	66.	56.	62.	60.	58.	56.	54.	52.
135 -	110.	102.	98.	92.	87.	83.	81.	71.	70.	73.	70.	69.	66.	62.	53.	57.	55.	54.	52.	50.
150 -	110.	102.	98.	93.	88.	86.	82.	79.	76.	72.	71.	66.	64.	63.	60.	58.	56.	55.	53.	51.
165 -	110.	102.	98.	94.	89.	84.	73.	79.	76.	71.	62.	61.	56.	56.	55.	55.	54.	53.	52.	51.
180 -	110.	102.	98.	94.	90.	85.	83.	76.	78.	75.	71.	69.	66.	63.	59.	53.	56.	55.	53.	51.
195 -	110.	102.	98.	94.	90.	83.	84.	78.	76.	67.	69.	67.	60.	63.	58.	58.	56.	55.	53.	51.
210 -	110.	102.	98.	94.	90.	87.	83.	77.	74.	63.	66.	67.	65.	62.	59.	57.	55.	54.	52.	50.
225 -	110.	102.	98.	92.	88.	84.	81.	77.	74.	71.	68.	66.	59.	59.	59.	56.	54.	53.	51.	49.
240 -	110.	102.	98.	93.	87.	82.	79.	77.	75.	72.	70.	67.	65.	62.	60.	58.	56.	55.	53.	51.
255 -	110.	102.	98.	93.	87.	82.	75.	74.	73.	69.	68.	66.	61.	59.	56.	54.	53.	52.	51.	49.
270 -	110.	102.	98.	94.	90.	85.	80.	77.	74.	71.	69.	63.	61.	60.	57.	57.	56.	55.	54.	52.
285 -	110.	102.	98.	94.	89.	86.	81.	78.	76.	70.	67.	65.	58.	54.	59.	57.	55.	53.	51.	49.
300 -	110.	102.	98.	94.	90.	86.	81.	77.	66.	71.	67.	66.	63.	60.	58.	56.	54.	52.	50.	48.
315 -	110.	102.	98.	94.	90.	86.	84.	74.	77.	73.	71.	69.	65.	61.	59.	57.	55.	54.	52.	50.
330 -	110.	102.	98.	93.	90.	85.	83.	80.	77.	74.	71.	67.	65.	63.	61.	58.	56.	55.	53.	51.
345 -	110.	102.	98.	94.	90.	86.	83.	80.	76.	74.	72.	69.	67.	63.	60.	54.	57.	55.	54.	52.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-22
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	88.	83.	79.	77.	74.	72.	70.	67.	65.	63.	60.	58.	56.	54.	52.	50.
15 -	110.	102.	96.	92.	88.	84.	81.	78.	76.	72.	69.	67.	64.	61.	59.	56.	54.	53.	51.	49.
30 -	110.	102.	96.	92.	88.	84.	81.	77.	74.	71.	69.	66.	63.	61.	59.	56.	54.	52.	50.	48.
45 -	110.	102.	97.	92.	88.	84.	79.	77.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	51.	49.
60 -	110.	102.	98.	92.	88.	84.	81.	77.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	51.	49.
75 -	110.	102.	98.	93.	90.	85.	80.	76.	73.	70.	69.	67.	64.	61.	59.	57.	55.	51.	49.	48.
90 -	110.	102.	98.	93.	84.	85.	80.	76.	73.	70.	69.	65.	63.	60.	58.	55.	53.	51.	49.	48.
105 -	110.	102.	98.	94.	90.	86.	81.	78.	75.	73.	70.	68.	65.	63.	60.	58.	56.	53.	52.	50.
120 -	110.	102.	98.	94.	90.	86.	83.	79.	76.	73.	70.	68.	64.	62.	59.	57.	54.	53.	51.	49.
135 -	110.	102.	98.	94.	90.	86.	83.	79.	75.	72.	69.	67.	65.	62.	60.	58.	55.	53.	51.	49.
150 -	110.	102.	98.	94.	90.	87.	83.	79.	75.	72.	69.	67.	65.	62.	60.	58.	55.	53.	51.	49.
165 -	110.	102.	98.	94.	90.	87.	83.	79.	75.	72.	70.	68.	65.	62.	60.	57.	55.	53.	51.	49.
180 -	110.	102.	98.	94.	90.	87.	83.	78.	75.	73.	71.	68.	65.	63.	61.	58.	56.	54.	53.	51.
195 -	110.	102.	98.	94.	90.	86.	84.	80.	77.	74.	71.	69.	66.	63.	60.	57.	54.	53.	52.	50.
210 -	110.	102.	98.	94.	90.	85.	83.	80.	76.	72.	70.	67.	64.	61.	59.	56.	54.	52.	51.	47.
225 -	110.	102.	98.	94.	90.	85.	83.	80.	76.	72.	70.	67.	64.	61.	59.	56.	54.	52.	51.	47.
240 -	110.	102.	98.	94.	90.	85.	82.	80.	77.	74.	71.	68.	65.	62.	59.	56.	54.	53.	51.	50.
255 -	110.	102.	98.	93.	88.	84.	74.	75.	77.	74.	71.	68.	65.	63.	61.	58.	54.	54.	50.	44.
270 -	110.	102.	98.	93.	89.	85.	82.	79.	77.	74.	70.	68.	64.	61.	59.	51.	54.	50.	47.	46.
285 -	110.	102.	98.	94.	90.	86.	82.	78.	70.	73.	69.	62.	65.	62.	60.	56.	55.	51.	48.	48.
300 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	71.	67.	65.	60.	57.	56.	52.	51.	50.	47.
315 -	110.	102.	98.	94.	88.	84.	81.	78.	74.	70.	67.	64.	61.	60.	57.	54.	45.	47.	47.	49.
330 -	110.	102.	98.	94.	88.	84.	80.	77.	74.	70.	67.	65.	63.	61.	59.	56.	55.	53.	52.	50.
345 -	110.	102.	98.	94.	88.	84.	80.	77.	75.	72.	69.	67.	64.	62.	60.	57.	56.	54.	52.	50.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-23
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																				
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	
0	110.	102.	98.	94.	89.	86.	84.	80.	77.	74.	71.	68.	65.	63.	61.	59.	57.	55.	54.	52.	
15	110.	102.	98.	94.	90.	85.	82.	79.	76.	74.	72.	72.	69.	67.	64.	61.	58.	56.	54.	52.	50.
30	110.	102.	98.	94.	88.	84.	82.	79.	77.	72.	72.	69.	67.	64.	61.	58.	56.	55.	53.	51.	
45	110.	102.	98.	94.	88.	84.	81.	78.	76.	74.	71.	68.	66.	63.	60.	57.	55.	54.	52.	50.	
60	110.	102.	98.	93.	88.	84.	81.	78.	76.	74.	71.	68.	66.	63.	60.	57.	55.	54.	52.	50.	
75	110.	102.	98.	93.	88.	85.	82.	79.	76.	72.	70.	67.	65.	60.	61.	59.	57.	55.	54.	52.	50.
90	110.	102.	98.	93.	88.	84.	80.	77.	75.	69.	69.	65.	61.	61.	59.	57.	55.	54.	52.	50.	
105	110.	102.	98.	93.	88.	83.	80.	77.	74.	71.	69.	66.	63.	60.	57.	55.	53.	51.	49.	48.	
120	110.	102.	98.	92.	87.	83.	79.	77.	74.	71.	67.	65.	61.	61.	58.	56.	54.	53.	51.	49.	
135	110.	102.	98.	92.	87.	83.	81.	77.	74.	71.	69.	66.	64.	62.	59.	56.	54.	53.	51.	49.	
150	110.	102.	98.	92.	88.	85.	82.	78.	75.	71.	69.	66.	63.	60.	58.	56.	54.	52.	50.	49.	
165	110.	102.	98.	93.	88.	84.	82.	79.	76.	72.	71.	68.	65.	62.	60.	57.	55.	53.	51.	49.	
180	110.	102.	98.	93.	88.	84.	81.	78.	76.	73.	71.	67.	64.	62.	60.	57.	55.	53.	51.	49.	
195	110.	102.	98.	93.	89.	84.	81.	78.	76.	73.	71.	67.	64.	62.	59.	57.	55.	53.	51.	49.	
210	110.	102.	98.	93.	89.	84.	81.	78.	76.	73.	71.	68.	65.	62.	59.	56.	54.	53.	51.	49.	
225	110.	102.	98.	93.	88.	84.	81.	77.	74.	72.	70.	68.	66.	63.	61.	57.	55.	54.	52.	50.	
240	110.	102.	98.	93.	88.	84.	81.	77.	75.	72.	69.	66.	64.	63.	61.	57.	55.	53.	51.	49.	
255	110.	102.	98.	93.	88.	84.	81.	77.	75.	72.	69.	66.	64.	63.	61.	57.	55.	54.	52.	50.	
270	110.	102.	98.	93.	87.	83.	79.	77.	73.	71.	67.	65.	63.	62.	58.	56.	54.	52.	50.	48.	
285	110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	68.	65.	63.	62.	58.	57.	55.	53.	51.	49.	
300	110.	102.	98.	93.	89.	84.	80.	77.	74.	71.	68.	65.	63.	62.	58.	58.	56.	54.	52.	50.	
315	110.	102.	98.	94.	89.	84.	81.	77.	74.	72.	69.	66.	63.	61.	59.	58.	56.	54.	52.	50.	
330	110.	102.	98.	94.	89.	84.	81.	77.	75.	73.	69.	67.	65.	63.	59.	57.	55.	53.	51.	49.	
345	110.	102.	98.	94.	90.	86.	81.	79.	75.	74.	70.	68.	63.	64.	61.	59.	57.	55.	53.	51.	

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER

CATAMBA-24

NUKE POWER COMPANY
CATAMBA NUCLEAR POWER STATION
SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110	102	98	94	89	85	82	78	75	72	70	68	65	62	61	59	57	55	53	51
15	110	102	98	93	90	85	82	79	74	73	70	67	65	63	61	59	57	55	53	51
30	110	102	98	93	89	85	82	78	75	72	70	67	65	63	61	58	56	54	52	50
45	110	102	98	94	88	85	82	78	74	72	70	68	65	63	61	58	56	55	53	51
60	110	102	98	93	88	84	81	78	74	72	69	67	65	63	61	58	57	55	54	50
75	110	102	98	93	88	84	81	77	74	71	69	66	63	61	59	56	54	53	51	49
90	110	102	98	93	89	85	81	77	74	71	69	67	65	63	61	57	55	53	51	49
105	110	102	98	93	88	85	82	77	74	72	70	68	65	63	60	57	55	54	52	50
120	110	102	98	93	88	84	81	76	74	71	69	67	65	63	60	58	56	54	52	50
135	110	102	98	93	88	85	81	78	76	73	71	67	64	62	59	57	55	53	51	49
150	110	102	98	93	89	85	81	78	75	72	69	66	63	61	59	56	54	53	51	49
165	110	102	98	93	88	84	80	77	75	72	69	66	63	60	58	56	54	52	50	48
180	110	102	98	93	88	84	81	77	75	72	69	67	65	62	60	57	55	54	52	50
195	110	102	98	93	89	85	81	77	74	71	69	67	65	62	59	56	54	53	51	49
210	110	102	98	93	89	85	80	77	74	71	69	67	65	62	59	56	54	53	51	49
225	110	102	98	93	89	85	81	77	75	71	69	67	65	63	60	57	55	54	52	50
240	110	102	98	94	90	85	81	78	76	71	69	67	65	63	61	59	57	55	53	51
255	110	102	98	93	88	84	81	78	75	72	70	68	65	63	61	58	56	54	52	50
270	110	102	98	93	88	84	81	78	75	73	70	67	65	63	61	59	57	55	53	51
285	110	102	98	93	88	84	81	78	75	72	70	68	65	63	61	58	56	54	52	50
300	110	102	98	94	89	85	82	78	75	72	70	68	65	63	61	58	56	54	52	50
315	110	102	98	94	90	86	82	79	76	73	70	67	65	63	60	57	55	54	52	50
330	110	102	98	94	89	85	82	78	76	72	70	67	65	62	60	58	56	54	52	50
345	110	102	98	94	89	85	81	78	75	72	69	67	65	63	60	58	56	55	53	51

SIREN NOISEL
SIREN HEIGHT
WEATHER SEASON
WIND DIRECTION
WIND SPEED
MEAN TEMPERATURE
MEAN RELATIVE HUMIDITY

F5C THUNDERBOLT
50.
FEET
AVERAGE SUMMER
225.0 DEGREES CLOCKWISE FROM NORTH
6.7 MPH
77.4 DEGREES FAHRENHEIT
54.0 %

SIREN NUMBER CATAWBA-25
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	I DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	82.	78.	74.	71.	69.	66.	65.	61.	58.	56.	55.	53.	51.	
15 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	73.	71.	69.	67.	63.	60.	56.	54.	52.	50.	48.
30 -	110.	102.	98.	93.	84.	84.	79.	69.	74.	71.	64.	60.	65.	61.	59.	56.	55.	54.	54.	52.
45 -	110.	102.	98.	94.	88.	84.	81.	75.	69.	62.	64.	67.	63.	56.	59.	57.	55.	53.	51.	49.
60 -	110.	102.	98.	93.	88.	84.	81.	76.	73.	63.	67.	64.	60.	59.	57.	51.	51.	50.	49.	47.
75 -	110.	102.	98.	93.	87.	83.	80.	74.	71.	61.	62.	65.	58.	57.	56.	51.	50.	49.	47.	47.
90 -	110.	102.	96.	93.	88.	83.	79.	75.	71.	66.	63.	61.	59.	57.	48.	49.	48.	47.	46.	44.
105 -	110.	102.	98.	93.	89.	84.	80.	77.	74.	69.	65.	61.	59.	57.	55.	51.	45.	48.	46.	45.
120 -	110.	102.	98.	94.	90.	85.	80.	77.	73.	69.	68.	62.	58.	57.	55.	45.	46.	45.	45.	43.
135 -	110.	102.	98.	94.	89.	85.	81.	77.	75.	71.	67.	64.	62.	58.	56.	54.	52.	50.	48.	48.
150 -	110.	102.	98.	94.	89.	85.	82.	78.	74.	71.	68.	65.	63.	60.	59.	57.	55.	53.	51.	49.
165 -	110.	102.	98.	94.	90.	86.	81.	77.	75.	71.	69.	67.	64.	62.	61.	58.	56.	54.	52.	50.
180 -	110.	102.	98.	94.	90.	85.	81.	78.	75.	72.	69.	67.	65.	63.	60.	58.	56.	55.	53.	51.
195 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	73.	70.	67.	64.	62.	59.	57.	55.	53.	51.	49.
210 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	70.	68.	65.	63.	60.	57.	55.	54.	52.	50.
225 -	110.	102.	98.	94.	90.	86.	84.	79.	76.	73.	70.	68.	65.	63.	60.	57.	55.	54.	52.	50.
240 -	110.	102.	98.	94.	90.	86.	82.	80.	77.	74.	71.	68.	65.	63.	61.	58.	56.	55.	53.	51.
255 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	73.	71.	69.	67.	64.	61.	59.	57.	55.	53.	51.
270 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	73.	71.	69.	66.	64.	61.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.
300 -	110.	102.	98.	93.	89.	85.	82.	78.	75.	72.	70.	67.	65.	62.	59.	57.	55.	53.	51.	49.
315 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	70.	67.	65.	63.	61.	59.	57.	55.	53.	51.
330 -	110.	102.	98.	93.	89.	85.	81.	78.	75.	73.	70.	67.	65.	60.	61.	59.	57.	55.	54.	52.
345 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	73.	71.	68.	66.	64.	62.	60.	58.	56.	55.	53.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAMBA-26
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE		DISTANCE FROM SIREN (FEET)																			
FROM EAST (DEG)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	92.	88.	82.	77.	75.	70.	70.	66.	64.	64.	59.	60.	57.	53.	51.	50.	48.	46.
15	- 110.	102.	98.	92.	86.	82.	77.	73.	70.	68.	64.	62.	58.	58.	53.	52.	50.	49.	47.	45.	47.
30	- 110.	102.	98.	93.	85.	80.	79.	74.	71.	66.	66.	64.	50.	58.	57.	54.	52.	50.	49.	47.	47.
45	- 110.	102.	98.	94.	89.	83.	79.	73.	69.	67.	63.	63.	61.	58.	51.	47.	46.	44.	43.	42.	42.
60	- 110.	102.	98.	93.	88.	85.	79.	73.	71.	68.	57.	61.	54.	57.	52.	50.	48.	47.	45.	44.	44.
75	- 110.	102.	98.	93.	90.	84.	81.	77.	72.	56.	56.	55.	54.	52.	50.	49.	47.	46.	44.	43.	43.
90	- 110.	102.	98.	93.	90.	85.	79.	76.	74.	71.	68.	56.	65.	60.	58.	52.	50.	49.	47.	45.	45.
105	- 110.	102.	98.	93.	90.	86.	82.	78.	70.	70.	71.	68.	66.	63.	61.	58.	56.	54.	52.	50.	50.
120	- 110.	102.	98.	94.	90.	85.	82.	72.	74.	66.	69.	65.	60.	57.	47.	54.	52.	50.	49.	47.	47.
135	- 110.	102.	98.	94.	90.	88.	84.	80.	77.	75.	70.	62.	64.	63.	60.	54.	52.	50.	49.	47.	47.
150	- 110.	102.	98.	94.	90.	84.	81.	72.	76.	72.	69.	57.	65.	63.	60.	58.	56.	54.	52.	50.	50.
165	- 110.	102.	98.	94.	90.	82.	72.	77.	73.	66.	63.	63.	62.	61.	61.	58.	56.	55.	53.	51.	51.
180	- 110.	102.	98.	94.	89.	83.	81.	77.	75.	71.	67.	64.	61.	59.	57.	54.	52.	50.	49.	47.	47.
195	- 110.	102.	98.	93.	88.	85.	81.	78.	75.	67.	67.	69.	67.	64.	62.	60.	58.	56.	54.	52.	52.
210	- 110.	102.	98.	93.	89.	85.	81.	78.	75.	74.	68.	66.	63.	61.	59.	56.	54.	53.	51.	49.	49.
225	- 110.	102.	98.	93.	90.	85.	83.	79.	77.	73.	71.	68.	65.	63.	61.	54.	55.	56.	54.	52.	52.
240	- 110.	102.	98.	94.	90.	86.	82.	79.	75.	72.	69.	67.	65.	62.	60.	58.	56.	55.	53.	51.	51.
255	- 110.	102.	98.	94.	90.	85.	82.	78.	75.	71.	65.	66.	63.	61.	59.	56.	54.	52.	50.	48.	48.
270	- 110.	102.	98.	94.	89.	85.	81.	78.	75.	71.	68.	66.	64.	62.	59.	56.	54.	53.	51.	49.	49.
285	- 110.	102.	98.	94.	88.	84.	81.	77.	74.	71.	69.	67.	65.	62.	59.	57.	55.	54.	52.	50.	50.
300	- 110.	102.	98.	94.	88.	84.	80.	77.	74.	71.	69.	66.	64.	62.	60.	57.	55.	54.	52.	50.	50.
315	- 110.	102.	98.	93.	88.	84.	80.	76.	74.	71.	69.	66.	65.	62.	59.	57.	55.	53.	51.	49.	49.
330	- 110.	102.	98.	93.	88.	84.	79.	77.	74.	71.	69.	66.	65.	62.	59.	57.	55.	53.	51.	49.	49.
345	- 110.	102.	98.	93.	87.	83.	79.	76.	74.	72.	69.	65.	63.	61.	59.	57.	55.	53.	51.	49.	49.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-27
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	88.	84.	79.	77.	75.	71.	68.	65.	63.	60.	57.	55.	53.	51.	49.
15 -	110.	102.	98.	94.	90.	86.	84.	81.	77.	74.	71.	68.	66.	63.	60.	58.	56.	54.	52.	50.
30 -	110.	102.	98.	94.	90.	88.	85.	81.	77.	74.	71.	68.	65.	62.	60.	57.	55.	54.	52.	50.
45 -	110.	102.	98.	94.	90.	81.	85.	81.	77.	74.	71.	68.	67.	64.	61.	58.	56.	54.	52.	50.
60 -	110.	102.	98.	94.	90.	86.	84.	76.	77.	74.	71.	68.	67.	64.	61.	58.	56.	54.	52.	50.
75 -	110.	102.	98.	93.	88.	80.	79.	80.	74.	75.	70.	68.	65.	63.	55.	58.	56.	54.	52.	50.
90 -	110.	102.	98.	91.	88.	80.	82.	79.	66.	67.	66.	67.	67.	65.	63.	61.	59.	57.	55.	53.
105 -	110.	102.	98.	93.	90.	86.	82.	79.	77.	71.	69.	68.	68.	64.	59.	48.	50.	51.	50.	49.
120 -	110.	102.	98.	94.	90.	85.	83.	80.	78.	75.	73.	70.	66.	63.	57.	55.	53.	51.	49.	48.
135 -	110.	102.	98.	94.	90.	87.	83.	80.	78.	75.	73.	70.	65.	64.	56.	56.	56.	57.	55.	53.
150 -	110.	102.	98.	94.	88.	77.	77.	80.	74.	76.	73.	68.	66.	57.	56.	55.	55.	54.	54.	54.
165 -	110.	102.	98.	94.	90.	87.	80.	77.	74.	69.	67.	52.	50.	49.	48.	46.	45.	44.	43.	42.
180 -	110.	102.	98.	94.	88.	77.	81.	77.	73.	66.	65.	58.	57.	57.	56.	42.	43.	43.	42.	42.
195 -	110.	102.	98.	91.	88.	78.	79.	77.	73.	70.	60.	66.	62.	60.	59.	52.	52.	51.	51.	51.
210 -	110.	102.	97.	92.	87.	84.	82.	76.	75.	73.	71.	68.	59.	58.	61.	59.	57.	55.	53.	51.
225 -	110.	102.	97.	92.	88.	85.	80.	73.	67.	66.	63.	57.	52.	50.	51.	50.	49.	48.	47.	45.
240 -	110.	102.	98.	93.	88.	84.	81.	75.	69.	59.	57.	59.	59.	53.	50.	48.	48.	47.	46.	45.
255 -	110.	102.	98.	93.	88.	84.	81.	76.	69.	67.	66.	61.	59.	58.	51.	50.	49.	48.	47.	46.
270 -	110.	102.	98.	93.	89.	84.	80.	77.	74.	71.	68.	62.	60.	59.	54.	51.	50.	49.	48.	47.
285 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	67.	65.	63.	61.	58.	56.	54.	53.	51.	49.
300 -	110.	102.	98.	94.	89.	85.	81.	77.	75.	72.	69.	66.	63.	61.	59.	56.	54.	53.	51.	49.
315 -	110.	102.	98.	94.	89.	85.	82.	78.	76.	74.	70.	67.	64.	61.	59.	56.	54.	53.	51.	49.
330 -	110.	102.	98.	94.	90.	87.	82.	78.	77.	73.	70.	67.	65.	62.	59.	56.	54.	53.	51.	49.
345 -	110.	102.	98.	94.	90.	86.	79.	79.	77.	75.	71.	68.	65.	64.	59.	57.	55.	54.	52.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-2B
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)										DISTANCE FROM SIREN (FEET)									
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	93.	88.	84.	81.	78.	77.	74.	72.	67.	68.	65.	63.	61.	59.	57.	55.	53.
15 -	110.	102.	97.	92.	87.	84.	81.	78.	75.	73.	71.	62.	62.	61.	60.	61.	59.	57.	55.	53.
30 -	110.	102.	97.	93.	89.	85.	82.	78.	76.	73.	71.	69.	67.	65.	63.	61.	59.	57.	55.	53.
45 -	110.	102.	98.	93.	90.	84.	81.	78.	75.	71.	61.	61.	60.	63.	59.	56.	55.	54.	53.	53.
60 -	110.	102.	98.	93.	88.	84.	79.	75.	72.	64.	60.	66.	64.	60.	57.	56.	54.	52.	50.	48.
75 -	110.	102.	98.	93.	87.	84.	79.	68.	68.	71.	69.	63.	62.	55.	54.	56.	54.	52.	50.	48.
90 -	110.	102.	98.	93.	88.	86.	74.	77.	74.	68.	67.	65.	57.	60.	56.	55.	53.	51.	49.	48.
105 -	110.	102.	98.	94.	90.	88.	83.	79.	75.	72.	63.	65.	65.	61.	59.	52.	53.	52.	51.	51.
120 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	73.	70.	68.	65.	61.	58.	56.	54.	52.	50.
135 -	110.	102.	98.	86.	85.	88.	85.	82.	78.	76.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.
150 -	110.	102.	98.	94.	90.	88.	85.	80.	77.	73.	70.	68.	58.	63.	61.	57.	55.	53.	51.	49.
165 -	110.	102.	98.	94.	90.	78.	78.	82.	77.	73.	71.	68.	65.	62.	59.	57.	55.	53.	51.	49.
180 -	110.	102.	98.	94.	90.	81.	80.	82.	78.	74.	72.	68.	66.	64.	61.	57.	55.	53.	51.	49.
195 -	110.	102.	98.	93.	88.	84.	76.	70.	71.	70.	69.	70.	68.	63.	61.	57.	55.	53.	51.	49.
210 -	110.	102.	98.	93.	88.	85.	83.	80.	70.	76.	73.	70.	67.	63.	61.	58.	56.	54.	52.	50.
225 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	75.	73.	70.	68.	65.	61.	58.	56.	55.	53.	51.
240 -	110.	102.	98.	94.	90.	85.	83.	81.	78.	76.	73.	70.	68.	63.	61.	59.	57.	55.	54.	52.
255 -	110.	102.	98.	94.	88.	85.	82.	80.	75.	73.	71.	66.	67.	63.	51.	53.	54.	54.	55.	53.
270 -	110.	102.	98.	94.	88.	84.	81.	79.	74.	71.	65.	65.	63.	58.	55.	56.	55.	55.	53.	51.
285 -	110.	102.	98.	94.	87.	83.	81.	77.	70.	68.	60.	61.	60.	60.	57.	47.	48.	48.	48.	47.
300 -	110.	102.	98.	92.	86.	81.	78.	66.	67.	71.	67.	65.	58.	60.	53.	49.	49.	49.	48.	48.
315 -	110.	102.	98.	93.	88.	83.	79.	72.	74.	71.	69.	62.	59.	56.	55.	54.	54.	51.	50.	49.
330 -	110.	102.	97.	88.	84.	85.	80.	77.	75.	72.	68.	68.	55.	57.	57.	59.	57.	55.	53.	51.
345 -	110.	102.	97.	85.	88.	85.	82.	75.	77.	72.	63.	63.	59.	59.	58.	58.	57.	57.	55.	53.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %



ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-29
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	70.	62.	62.	63.	61.	58.	56.	54.	52.	50.	
15	- 110.	102.	98.	94.	90.	85.	81.	78.	75.	71.	61.	60.	59.	61.	58.	54.	52.	50.	49.	47.	
30	- 110.	102.	98.	94.	88.	84.	79.	77.	74.	72.	68.	65.	62.	61.	60.	58.	56.	55.	53.	51.	
45	- 110.	102.	97.	92.	87.	83.	81.	77.	75.	73.	65.	65.	64.	63.	61.	58.	56.	55.	53.	51.	
60	- 110.	102.	98.	92.	86.	81.	74.	76.	69.	68.	67.	64.	61.	60.	58.	57.	55.	54.	52.	51.	
75	- 110.	102.	98.	93.	86.	81.	74.	76.	73.	69.	68.	60.	61.	61.	57.	44.	46.	46.	46.	46.	
90	- 110.	102.	98.	92.	88.	85.	81.	77.	73.	70.	66.	62.	58.	58.	52.	51.	49.	48.	46.	45.	
105	- 110.	102.	98.	94.	90.	86.	81.	77.	73.	69.	66.	64.	61.	57.	57.	53.	51.	50.	48.	46.	
120	- 110.	102.	98.	94.	90.	84.	80.	77.	70.	71.	69.	67.	61.	63.	60.	57.	57.	55.	54.	52.	
135	- 110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	71.	69.	66.	64.	61.	58.	56.	55.	53.	51.	
150	- 110.	102.	98.	94.	90.	88.	83.	80.	77.	74.	70.	67.	63.	61.	52.	50.	50.	50.	50.	49.	
165	- 110.	102.	98.	94.	90.	88.	84.	80.	77.	73.	70.	67.	63.	58.	57.	54.	52.	50.	49.	47.	
180	- 110.	102.	98.	94.	90.	85.	82.	77.	70.	69.	66.	62.	59.	50.	53.	53.	51.	50.	48.	46.	
195	- 110.	102.	98.	94.	90.	86.	82.	77.	74.	70.	69.	65.	60.	57.	55.	52.	50.	49.	47.	45.	
210	- 110.	102.	98.	94.	90.	84.	80.	76.	74.	71.	67.	64.	61.	58.	57.	53.	51.	50.	48.	46.	
225	- 110.	102.	98.	94.	88.	84.	79.	76.	72.	69.	67.	60.	58.	56.	59.	56.	54.	52.	50.	48.	
240	- 110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	69.	67.	62.	61.	57.	53.	51.	50.	48.	46.	
255	- 110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	72.	69.	66.	64.	54.	57.	59.	57.	56.	54.	
270	- 110.	102.	98.	94.	90.	88.	84.	81.	77.	74.	72.	69.	67.	67.	62.	60.	58.	56.	55.	53.	
285	- 110.	102.	98.	94.	90.	87.	84.	80.	77.	74.	70.	65.	52.	53.	54.	54.	53.	53.	51.	50.	
300	- 110.	102.	98.	94.	89.	81.	80.	81.	76.	72.	65.	64.	61.	46.	45.	45.	45.	44.	43.	41.	
315	- 110.	102.	98.	94.	90.	88.	84.	80.	77.	74.	69.	62.	63.	62.	59.	56.	52.	50.	48.	46.	
330	- 110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	70.	68.	63.	62.	59.	56.	54.	53.	51.	49.	
345	- 110.	102.	98.	86.	82.	82.	84.	81.	78.	75.	72.	69.	67.	64.	62.	60.	58.	56.	54.	52.	

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-30
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE		DISTANCE FROM SIREN (FEET)																			
FROM EAST (DEG)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	94.	90.	87.	84.	82.	78.	76.	72.	69.	65.	62.	60.	56.	53.	51.	43.	45.	
15	- 110.	102.	98.	94.	89.	81.	84.	78.	78.	75.	71.	68.	63.	60.	58.	54.	49.	48.	49.	47.	
30	- 110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	71.	68.	64.	62.	60.	56.	53.	43.	46.	43.	
45	- 110.	102.	98.	94.	90.	85.	75.	73.	75.	74.	70.	67.	64.	61.	58.	55.	54.	47.	44.	42.	
60	- 110.	102.	98.	94.	90.	86.	84.	81.	78.	75.	71.	68.	65.	63.	61.	57.	54.	52.	51.	49.	
75	- 110.	102.	98.	94.	90.	86.	84.	81.	77.	73.	69.	65.	63.	60.	59.	54.	51.	49.	46.	45.	
90	- 110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	71.	68.	65.	61.	57.	53.	51.	50.	45.	47.	
105	- 110.	102.	98.	94.	90.	85.	83.	80.	77.	75.	71.	62.	65.	62.	58.	57.	53.	52.	49.	45.	
120	- 110.	102.	98.	94.	88.	84.	80.	77.	74.	64.	69.	67.	57.	58.	60.	58.	56.	48.	50.	52.	
135	- 110.	102.	98.	91.	87.	82.	78.	69.	65.	68.	68.	63.	63.	62.	53.	56.	55.	53.	50.	46.	
150	- 110.	102.	98.	92.	84.	81.	79.	73.	71.	71.	67.	64.	55.	60.	59.	56.	51.	51.	50.	48.	
165	- 110.	102.	98.	92.	85.	81.	79.	73.	74.	70.	67.	65.	63.	59.	57.	55.	52.	43.	50.	47.	
180	- 110.	102.	98.	93.	85.	79.	77.	73.	70.	67.	65.	63.	60.	57.	55.	52.	47.	45.	43.	43.	
195	- 110.	102.	98.	93.	86.	83.	78.	75.	73.	69.	67.	63.	61.	59.	55.	51.	47.	48.	45.	45.	
210	- 110.	102.	98.	94.	89.	85.	79.	76.	74.	68.	70.	65.	63.	59.	53.	51.	49.	48.	47.	46.	
225	- 110.	102.	98.	94.	90.	86.	80.	76.	74.	72.	70.	65.	62.	60.	57.	52.	50.	50.	49.	44.	
240	- 110.	102.	98.	93.	83.	87.	82.	78.	75.	73.	71.	67.	63.	60.	57.	54.	52.	50.	48.	47.	
255	- 110.	102.	98.	94.	90.	87.	83.	78.	76.	74.	71.	64.	60.	60.	57.	53.	51.	49.	50.	47.	
270	- 110.	102.	98.	94.	90.	86.	84.	81.	76.	71.	67.	65.	59.	55.	54.	54.	54.	53.	51.	49.	
285	- 110.	102.	98.	94.	90.	87.	84.	80.	75.	71.	68.	61.	59.	57.	56.	58.	55.	54.	50.	49.	
300	- 110.	102.	98.	94.	90.	88.	83.	78.	75.	71.	68.	65.	59.	55.	55.	54.	53.	55.	52.	50.	
315	- 110.	102.	98.	94.	90.	88.	83.	78.	74.	71.	69.	67.	61.	58.	56.	55.	53.	53.	52.	51.	
330	- 110.	102.	98.	94.	90.	88.	83.	80.	77.	74.	71.	70.	64.	50.	54.	52.	54.	55.	54.	50.	
345	- 110.	102.	98.	94.	90.	88.	85.	81.	77.	75.	73.	68.	65.	63.	60.	58.	57.	54.	52.	49.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-31
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	81.	84.	77.	66.	65.	70.	68.	65.	64.	60.	60.	58.	56.	54.	52.
15 -	110.	102.	98.	94.	90.	88.	85.	80.	71.	76.	73.	70.	67.	64.	62.	59.	57.	55.	53.	51.
30 -	110.	102.	98.	94.	90.	81.	84.	80.	77.	75.	72.	70.	67.	65.	63.	61.	59.	57.	56.	54.
45 -	110.	102.	98.	94.	90.	81.	84.	79.	76.	74.	72.	69.	67.	64.	61.	58.	56.	55.	53.	51.
60 -	110.	102.	98.	94.	90.	88.	84.	80.	76.	72.	70.	68.	64.	63.	60.	57.	55.	53.	51.	49.
75 -	110.	102.	98.	94.	90.	85.	76.	79.	76.	72.	69.	65.	63.	58.	54.	53.	53.	52.	51.	50.
90 -	110.	102.	98.	94.	89.	86.	83.	78.	74.	71.	69.	66.	63.	62.	60.	58.	56.	54.	52.	50.
105 -	110.	102.	98.	94.	88.	78.	81.	77.	74.	71.	67.	65.	63.	62.	57.	56.	54.	53.	51.	49.
120 -	110.	102.	98.	93.	88.	84.	80.	77.	75.	72.	70.	67.	65.	63.	58.	57.	55.	54.	52.	50.
135 -	110.	102.	98.	92.	86.	82.	79.	77.	72.	71.	67.	66.	60.	59.	59.	56.	54.	52.	50.	48.
150 -	110.	102.	98.	93.	86.	82.	79.	77.	73.	71.	69.	67.	61.	57.	53.	52.	50.	49.	47.	45.
165 -	110.	102.	98.	93.	88.	85.	80.	76.	72.	68.	66.	63.	60.	58.	56.	55.	53.	51.	49.	48.
180 -	110.	102.	98.	94.	88.	84.	80.	77.	73.	70.	67.	65.	62.	61.	58.	57.	55.	53.	51.	49.
195 -	110.	102.	98.	94.	88.	84.	80.	77.	75.	72.	68.	65.	64.	57.	60.	56.	54.	52.	50.	48.
210 -	110.	102.	98.	94.	88.	84.	81.	78.	74.	72.	70.	68.	65.	62.	58.	56.	54.	52.	50.	48.
225 -	110.	102.	98.	94.	88.	85.	80.	77.	75.	73.	69.	68.	65.	63.	59.	56.	54.	52.	50.	48.
240 -	110.	102.	98.	94.	90.	86.	81.	77.	75.	72.	71.	69.	65.	62.	60.	56.	54.	53.	51.	49.
255 -	110.	102.	98.	94.	90.	87.	82.	78.	75.	72.	71.	69.	67.	63.	60.	58.	56.	54.	52.	50.
270 -	110.	102.	98.	94.	90.	85.	78.	80.	77.	75.	72.	69.	67.	65.	62.	60.	58.	56.	54.	52.
285 -	110.	102.	98.	94.	89.	86.	82.	78.	75.	73.	71.	68.	65.	63.	57.	59.	57.	55.	54.	52.
300 -	110.	102.	98.	94.	89.	85.	81.	79.	75.	72.	69.	67.	65.	63.	59.	57.	55.	54.	52.	50.
315 -	110.	102.	98.	94.	89.	85.	83.	80.	76.	73.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
330 -	110.	102.	98.	94.	90.	85.	81.	79.	77.	74.	69.	68.	67.	64.	62.	58.	56.	54.	52.	50.
345 -	110.	102.	98.	94.	84.	85.	81.	78.	72.	71.	71.	67.	65.	63.	62.	60.	58.	56.	54.	52.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATANBA-32
 DUKE POWER COMPANY
 CATANBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	88.	83.	81.	76.	75.	71.	68.	65.	62.	60.	54.	54.	54.	54.	52.
15 -	110.	102.	98.	94.	90.	86.	82.	80.	76.	73.	70.	67.	60.	62.	58.	56.	54.	53.	51.	49.
30 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	74.	71.	68.	64.	60.	58.	55.	53.	51.	49.	48.
45 -	110.	102.	98.	94.	90.	87.	83.	78.	74.	69.	58.	58.	60.	62.	59.	55.	53.	51.	49.	48.
60 -	110.	102.	98.	94.	90.	88.	84.	80.	76.	72.	70.	65.	62.	59.	56.	53.	51.	50.	48.	46.
75 -	110.	102.	98.	94.	89.	86.	82.	80.	75.	72.	69.	67.	63.	60.	58.	56.	54.	53.	51.	49.
90 -	110.	102.	98.	93.	89.	85.	82.	79.	76.	73.	70.	66.	64.	62.	60.	56.	54.	53.	51.	49.
105 -	110.	102.	98.	94.	89.	84.	80.	78.	75.	71.	67.	64.	55.	56.	59.	55.	53.	51.	49.	48.
120 -	110.	102.	98.	94.	89.	84.	80.	77.	72.	68.	67.	62.	59.	58.	56.	53.	51.	50.	48.	46.
135 -	110.	102.	98.	94.	88.	83.	78.	72.	69.	66.	53.	54.	56.	56.	53.	53.	51.	50.	48.	46.
150 -	110.	102.	98.	94.	88.	83.	77.	74.	70.	67.	66.	57.	56.	54.	54.	53.	52.	50.	49.	48.
165 -	110.	102.	98.	94.	88.	84.	78.	71.	73.	67.	63.	62.	58.	58.	58.	55.	54.	53.	51.	50.
180 -	110.	102.	98.	94.	89.	85.	79.	73.	75.	67.	64.	66.	65.	61.	61.	57.	55.	53.	51.	49.
195 -	110.	102.	98.	94.	90.	87.	82.	79.	77.	75.	72.	68.	65.	62.	59.	56.	54.	53.	51.	49.
210 -	110.	102.	98.	94.	90.	80.	84.	79.	77.	75.	69.	68.	65.	62.	59.	57.	55.	54.	52.	50.
225 -	110.	102.	98.	94.	90.	88.	84.	79.	76.	74.	72.	68.	65.	63.	60.	58.	56.	55.	53.	51.
240 -	110.	102.	98.	94.	90.	88.	85.	81.	76.	73.	72.	66.	66.	64.	62.	60.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	74.	66.	70.	67.	65.	61.	58.	56.	54.	52.	50.
270 -	110.	102.	98.	94.	90.	88.	84.	80.	78.	75.	72.	70.	67.	65.	63.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	94.	90.	87.	84.	79.	76.	74.	71.	60.	67.	61.	60.	60.	58.	56.	55.	53.
300 -	110.	102.	98.	94.	90.	85.	82.	79.	75.	73.	70.	68.	65.	63.	61.	57.	58.	56.	54.	52.
315 -	110.	102.	98.	93.	89.	85.	81.	79.	75.	72.	70.	68.	66.	64.	62.	59.	57.	55.	53.	51.
330 -	110.	102.	98.	94.	90.	86.	82.	80.	73.	75.	72.	70.	67.	64.	61.	58.	56.	55.	53.	51.
345 -	110.	102.	98.	94.	78.	81.	85.	81.	78.	74.	71.	68.	66.	63.	61.	55.	58.	56.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-33
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	94.	90.	86.	82.	80.	74.	75.	70.	68.	65.	59.	61.	58.	56.	55.	53.	51.	
15	- 110.	102.	98.	94.	90.	85.	82.	72.	77.	73.	71.	68.	65.	62.	60.	57.	55.	54.	52.	50.	
30	- 110.	102.	98.	94.	89.	84.	82.	75.	76.	72.	69.	67.	63.	62.	60.	58.	56.	54.	52.	50.	
45	- 110.	102.	98.	94.	90.	84.	81.	79.	75.	71.	69.	67.	63.	60.	57.	51.	52.	53.	51.	49.	
60	- 110.	102.	98.	93.	88.	84.	81.	76.	75.	72.	70.	67.	63.	59.	57.	55.	53.	51.	49.	48.	
75	- 110.	102.	98.	93.	86.	82.	80.	76.	74.	71.	67.	64.	61.	58.	57.	55.	53.	51.	49.	48.	
90	- 110.	102.	98.	93.	87.	83.	79.	73.	74.	71.	68.	67.	64.	61.	57.	54.	52.	50.	49.	47.	
105	- 110.	102.	98.	92.	88.	84.	81.	79.	73.	60.	64.	66.	63.	54.	59.	56.	54.	53.	51.	49.	
120	- 110.	102.	98.	94.	88.	85.	77.	79.	74.	71.	70.	68.	64.	54.	60.	58.	56.	54.	52.	50.	
135	- 110.	102.	98.	94.	90.	88.	82.	78.	76.	70.	71.	68.	60.	65.	62.	60.	58.	56.	54.	52.	
150	- 110.	102.	98.	94.	85.	88.	82.	78.	75.	73.	63.	62.	66.	63.	60.	58.	56.	54.	52.	50.	
165	- 110.	102.	98.	94.	90.	87.	82.	80.	76.	74.	72.	65.	65.	64.	54.	60.	58.	56.	54.	52.	
180	- 110.	102.	98.	94.	90.	88.	85.	81.	77.	73.	71.	69.	62.	65.	61.	59.	57.	55.	53.	51.	
195	- 110.	102.	98.	94.	90.	86.	83.	72.	75.	74.	72.	65.	65.	66.	63.	61.	59.	57.	55.	53.	
210	- 110.	102.	98.	94.	90.	85.	83.	80.	73.	71.	73.	70.	67.	60.	60.	62.	60.	58.	56.	54.	
225	- 110.	102.	98.	93.	88.	85.	81.	78.	76.	73.	71.	69.	62.	63.	61.	60.	58.	56.	54.	52.	
240	- 110.	102.	98.	93.	90.	86.	82.	79.	76.	74.	72.	65.	63.	63.	62.	60.	58.	56.	54.	52.	
255	- 110.	102.	98.	94.	90.	86.	84.	80.	77.	76.	72.	69.	67.	65.	53.	56.	57.	58.	56.	55.	
270	- 110.	102.	98.	94.	90.	88.	84.	80.	77.	75.	72.	70.	67.	65.	64.	56.	58.	58.	57.	55.	
285	- 110.	102.	98.	94.	90.	86.	84.	80.	77.	75.	64.	66.	65.	66.	63.	62.	60.	58.	56.	55.	
300	- 110.	102.	98.	94.	90.	87.	85.	82.	79.	75.	72.	69.	66.	64.	62.	60.	58.	56.	54.	52.	
315	- 110.	102.	98.	94.	90.	88.	84.	80.	78.	75.	71.	68.	65.	63.	61.	58.	56.	55.	53.	51.	
330	- 110.	102.	98.	94.	90.	88.	84.	80.	76.	73.	71.	68.	66.	64.	61.	60.	58.	56.	54.	52.	
345	- 110.	102.	98.	94.	90.	87.	83.	79.	76.	74.	71.	69.	67.	65.	61.	59.	57.	55.	53.	51.	

SIREN MODEL	FSC THUNDERROLLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-34
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	90.	86.	83.	74.	78.	75.	72.	70.	68.	65.	63.	61.	59.	57.	55.	54.
15	110.	102.	98.	94.	90.	87.	83.	81.	73.	71.	73.	69.	69.	66.	64.	61.	59.	57.	55.	53.
30	110.	102.	98.	94.	90.	87.	84.	81.	77.	75.	68.	71.	67.	65.	62.	54.	59.	57.	56.	52.
45	110.	102.	98.	94.	90.	88.	85.	82.	80.	77.	74.	70.	68.	64.	61.	58.	43.	46.	50.	52.
60	110.	102.	98.	94.	90.	88.	84.	81.	78.	70.	74.	70.	68.	66.	62.	60.	56.	55.	54.	45.
75	110.	102.	98.	94.	90.	87.	84.	75.	79.	76.	69.	71.	68.	65.	63.	61.	58.	55.	53.	50.
90	110.	102.	98.	94.	90.	87.	85.	82.	77.	70.	66.	67.	68.	66.	62.	59.	57.	55.	45.	52.
105	110.	102.	98.	94.	90.	88.	84.	82.	77.	74.	72.	67.	63.	63.	64.	61.	57.	49.	45.	46.
120	110.	102.	98.	94.	90.	87.	82.	79.	77.	74.	66.	65.	67.	60.	64.	62.	58.	48.	50.	51.
135	110.	102.	98.	94.	90.	87.	82.	78.	76.	73.	71.	62.	66.	63.	61.	51.	56.	50.	48.	44.
150	110.	102.	98.	94.	89.	85.	82.	78.	75.	72.	69.	67.	64.	62.	59.	45.	52.	50.	48.	46.
165	110.	102.	98.	94.	88.	84.	81.	77.	74.	71.	69.	66.	63.	61.	59.	56.	53.	53.	42.	49.
180	110.	102.	98.	94.	90.	85.	81.	79.	75.	72.	70.	63.	64.	64.	60.	60.	54.	52.	49.	47.
195	110.	102.	98.	94.	90.	85.	83.	80.	77.	73.	71.	69.	64.	61.	54.	54.	54.	55.	52.	48.
210	110.	102.	98.	94.	88.	75.	76.	73.	72.	72.	72.	68.	65.	62.	60.	57.	54.	53.	52.	48.
225	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	73.	68.	65.	63.	61.	59.	56.	53.	45.	51.
240	110.	102.	98.	94.	90.	88.	85.	82.	79.	75.	72.	70.	66.	63.	60.	57.	54.	54.	45.	46.
255	110.	102.	98.	94.	90.	88.	85.	82.	78.	76.	73.	70.	67.	65.	62.	61.	59.	57.	56.	54.
270	110.	102.	98.	94.	90.	88.	85.	81.	78.	74.	71.	68.	66.	63.	61.	58.	47.	49.	49.	50.
285	110.	102.	98.	94.	90.	88.	85.	82.	77.	74.	71.	70.	63.	65.	61.	59.	57.	55.	54.	45.
300	110.	102.	98.	94.	90.	87.	76.	77.	80.	77.	73.	71.	68.	66.	63.	61.	58.	55.	54.	51.
315	110.	102.	98.	94.	85.	87.	84.	82.	78.	75.	73.	70.	68.	66.	63.	61.	59.	56.	55.	48.
330	110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	61.	63.	66.	58.	61.	55.	57.	49.	54.	53.
345	110.	102.	98.	94.	90.	86.	82.	79.	77.	73.	70.	68.	67.	64.	61.	58.	57.	52.	53.	51.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-35
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	94.	90.	85.	83.	80.	76.	73.	71.	69.	63.	65.	61.	61.	59.	57.	55.	53.	
15 - 110.	102.	98.	94.	90.	85.	82.	77.	69.	67.	65.	66.	62.	60.	61.	61.	59.	57.	55.	53.	
30 - 110.	102.	98.	94.	90.	87.	83.	79.	77.	73.	71.	66.	62.	63.	62.	59.	57.	55.	54.	52.	
45 - 110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	73.	70.	67.	63.	61.	58.	56.	54.	52.	50.	
60 - 110.	102.	98.	94.	90.	86.	83.	79.	68.	71.	71.	68.	66.	64.	60.	56.	54.	53.	51.	49.	
75 - 110.	102.	98.	94.	90.	87.	84.	81.	78.	76.	72.	68.	66.	63.	59.	56.	54.	52.	50.	48.	
90 - 110.	102.	98.	93.	90.	86.	84.	81.	78.	76.	72.	70.	66.	62.	59.	56.	54.	52.	50.	48.	
105 - 110.	102.	98.	92.	88.	84.	81.	71.	76.	74.	71.	64.	67.	63.	60.	57.	55.	53.	51.	49.	
120 - 110.	102.	98.	93.	90.	82.	83.	79.	74.	70.	63.	59.	60.	55.	57.	58.	56.	54.	52.	50.	
135 - 110.	102.	98.	94.	90.	85.	80.	77.	75.	73.	68.	65.	67.	63.	61.	59.	57.	55.	54.	52.	
150 - 110.	102.	98.	94.	88.	83.	79.	77.	69.	69.	65.	68.	65.	61.	60.	56.	54.	53.	51.	49.	
165 - 110.	102.	98.	94.	86.	82.	75.	73.	70.	69.	68.	68.	65.	61.	57.	55.	53.	51.	49.	48.	
180 - 110.	102.	98.	92.	85.	83.	75.	77.	73.	71.	69.	63.	65.	61.	54.	57.	55.	54.	52.	50.	
195 - 110.	102.	98.	91.	86.	82.	79.	77.	73.	71.	68.	61.	64.	58.	56.	53.	51.	50.	48.	46.	
210 - 110.	102.	98.	91.	86.	83.	79.	77.	74.	71.	69.	65.	62.	58.	55.	52.	50.	49.	47.	45.	
225 - 110.	102.	98.	92.	88.	84.	81.	78.	75.	72.	69.	65.	62.	59.	56.	53.	51.	50.	48.	46.	
240 - 110.	102.	98.	93.	88.	85.	82.	79.	75.	71.	68.	66.	63.	60.	59.	57.	55.	54.	52.	50.	
255 - 110.	102.	98.	93.	88.	85.	82.	79.	76.	73.	70.	66.	62.	59.	57.	54.	52.	50.	49.	47.	
270 - 110.	102.	98.	94.	88.	84.	82.	79.	77.	73.	69.	66.	64.	61.	57.	55.	53.	51.	49.	48.	
285 - 110.	102.	98.	94.	90.	86.	82.	79.	77.	73.	70.	68.	65.	61.	57.	56.	54.	52.	50.	48.	
300 - 110.	102.	98.	94.	90.	86.	83.	80.	78.	74.	71.	67.	65.	62.	59.	56.	54.	52.	50.	48.	
315 - 110.	102.	98.	94.	90.	87.	84.	80.	77.	73.	70.	67.	65.	62.	51.	53.	53.	53.	54.	52.	
330 - 110.	102.	98.	94.	90.	87.	84.	81.	77.	74.	71.	67.	57.	56.	61.	58.	56.	55.	53.	51.	
345 - 110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	72.	69.	66.	64.	63.	59.	57.	55.	54.	52.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-36
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	89.	86.	83.	80.	77.	73.	71.	69.	64.	65.	63.	61.	59.	57.	55.	53.
15	110.	102.	98.	94.	90.	87.	83.	80.	78.	75.	72.	69.	67.	64.	61.	59.	57.	55.	53.	51.
30	110.	102.	98.	94.	90.	86.	83.	80.	77.	73.	71.	68.	65.	63.	56.	59.	57.	55.	53.	51.
45	110.	102.	98.	94.	90.	85.	82.	79.	76.	73.	71.	68.	65.	62.	60.	52.	52.	52.	51.	51.
60	110.	102.	98.	94.	90.	87.	84.	81.	77.	73.	71.	68.	60.	64.	62.	59.	57.	55.	54.	52.
75	110.	102.	98.	93.	90.	84.	81.	74.	71.	69.	68.	67.	67.	65.	63.	60.	58.	56.	54.	52.
90	110.	102.	98.	94.	88.	85.	77.	75.	75.	75.	72.	68.	65.	62.	60.	58.	56.	55.	53.	51.
105	110.	102.	98.	94.	90.	88.	84.	79.	76.	74.	71.	68.	65.	63.	58.	56.	54.	52.	50.	48.
120	110.	102.	98.	94.	90.	87.	83.	80.	75.	72.	68.	66.	63.	60.	59.	53.	53.	54.	52.	50.
135	110.	102.	98.	94.	90.	86.	82.	79.	75.	71.	69.	66.	63.	62.	56.	56.	56.	55.	53.	51.
150	110.	102.	98.	94.	90.	85.	81.	77.	74.	71.	69.	67.	64.	63.	60.	57.	55.	53.	51.	49.
165	110.	102.	98.	94.	90.	85.	80.	77.	74.	70.	68.	66.	64.	62.	59.	56.	54.	52.	50.	48.
180	110.	102.	98.	94.	88.	84.	81.	77.	74.	72.	70.	67.	65.	62.	59.	57.	55.	53.	51.	49.
195	110.	102.	98.	93.	88.	85.	81.	78.	76.	73.	71.	68.	66.	63.	59.	58.	56.	54.	52.	50.
210	110.	102.	98.	94.	88.	85.	82.	78.	75.	73.	66.	68.	66.	64.	61.	58.	56.	55.	53.	51.
225	110.	102.	98.	94.	89.	85.	82.	79.	75.	72.	71.	68.	66.	62.	60.	58.	57.	57.	56.	54.
240	110.	102.	98.	94.	88.	85.	82.	78.	75.	72.	70.	68.	65.	63.	60.	58.	58.	56.	55.	53.
255	110.	102.	98.	94.	90.	85.	82.	80.	77.	73.	71.	68.	67.	65.	62.	60.	58.	56.	54.	52.
270	110.	102.	98.	94.	90.	87.	83.	79.	76.	73.	71.	70.	65.	63.	61.	56.	58.	56.	54.	52.
285	110.	102.	98.	94.	90.	87.	84.	80.	77.	75.	72.	70.	68.	64.	62.	60.	58.	56.	55.	53.
300	110.	102.	98.	94.	90.	86.	84.	81.	77.	75.	72.	70.	68.	65.	62.	60.	58.	56.	54.	52.
315	110.	102.	98.	94.	90.	85.	82.	80.	77.	75.	72.	69.	67.	64.	62.	56.	59.	57.	55.	53.
330	110.	102.	98.	94.	90.	86.	83.	80.	77.	74.	71.	68.	65.	58.	48.	59.	57.	55.	54.	52.
345	110.	102.	98.	93.	90.	86.	83.	79.	76.	73.	70.	67.	65.	63.	61.	56.	56.	56.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-37
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	83.	85.	81.	78.	76.	74.	70.	67.	64.	62.	59.	58.	56.	54.	52.	50.
15 -	110.	102.	98.	93.	88.	85.	82.	79.	77.	74.	72.	68.	65.	63.	61.	58.	56.	54.	52.	50.
30 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	63.	60.	64.	60.	59.	59.	57.	55.	53.	51.
45 -	110.	102.	98.	94.	89.	85.	82.	80.	77.	75.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.
60 -	110.	102.	98.	94.	89.	85.	81.	78.	77.	73.	70.	68.	66.	64.	61.	59.	57.	55.	54.	52.
75 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
90 -	110.	102.	98.	93.	89.	85.	82.	79.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.
105 -	110.	102.	98.	93.	88.	84.	81.	77.	72.	69.	67.	64.	61.	59.	57.	54.	52.	50.	49.	47.
120 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.	48.
135 -	110.	102.	98.	91.	86.	83.	80.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.	48.
150 -	110.	102.	98.	91.	86.	83.	81.	74.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.
165 -	110.	102.	98.	93.	89.	84.	81.	77.	74.	71.	68.	65.	63.	62.	61.	59.	58.	58.	56.	54.
180 -	110.	102.	98.	93.	89.	85.	82.	78.	75.	72.	70.	67.	65.	62.	60.	57.	55.	54.	52.	50.
195 -	110.	102.	98.	93.	88.	85.	82.	79.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.
210 -	110.	102.	98.	94.	90.	88.	84.	81.	77.	75.	72.	69.	67.	64.	62.	60.	58.	56.	54.	52.
225 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
240 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	90.	87.	82.	79.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.
270 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	74.	71.	69.	67.	65.	62.	60.	58.	56.	54.	52.
285 -	110.	102.	98.	93.	88.	84.	81.	78.	76.	73.	70.	67.	65.	63.	60.	59.	57.	55.	53.	51.
300 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	69.	68.	62.	63.	61.	59.	57.	55.	53.	51.
315 -	110.	102.	98.	93.	88.	84.	81.	79.	76.	73.	71.	69.	67.	64.	62.	59.	57.	55.	54.	52.
330 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	73.	71.	68.	65.	62.	59.	58.	56.	54.	52.	50.
345 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-38
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	72.	69.	66.	63.	62.	60.	58.	56.	54.	52.	50.
15 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	71.	68.	67.	58.	60.	57.	45.	45.	45.	45.	44.
30 -	110.	102.	98.	94.	90.	85.	81.	77.	74.	71.	69.	65.	60.	59.	53.	54.	52.	50.	49.	47.
45 -	110.	102.	98.	94.	90.	87.	81.	77.	74.	70.	66.	62.	59.	56.	55.	50.	49.	48.	47.	45.
60 -	110.	102.	98.	94.	90.	85.	80.	77.	72.	69.	67.	64.	59.	56.	55.	53.	51.	50.	48.	46.
75 -	110.	102.	98.	94.	90.	86.	81.	77.	73.	69.	67.	64.	60.	57.	55.	54.	52.	50.	49.	47.
90 -	110.	102.	98.	94.	90.	85.	81.	77.	75.	72.	69.	65.	62.	58.	55.	54.	52.	50.	49.	47.
105 -	110.	102.	97.	93.	87.	78.	81.	77.	73.	71.	67.	62.	59.	56.	53.	52.	50.	49.	47.	45.
120 -	110.	102.	97.	91.	85.	81.	78.	75.	74.	68.	67.	64.	62.	59.	56.	53.	51.	50.	48.	46.
135 -	110.	102.	97.	91.	88.	83.	80.	74.	70.	68.	67.	64.	60.	58.	53.	52.	50.	49.	47.	45.
150 -	110.	102.	98.	94.	90.	85.	79.	75.	72.	69.	67.	65.	60.	56.	55.	52.	50.	49.	47.	45.
165 -	110.	102.	98.	93.	86.	82.	79.	75.	73.	65.	67.	65.	61.	60.	55.	56.	54.	52.	50.	48.
180 -	110.	102.	98.	91.	86.	84.	81.	78.	75.	66.	69.	66.	64.	63.	59.	56.	54.	52.	50.	48.
195 -	110.	102.	98.	92.	87.	83.	80.	78.	70.	70.	67.	66.	66.	63.	59.	56.	54.	53.	51.	49.
210 -	110.	102.	98.	93.	88.	84.	81.	79.	76.	74.	70.	67.	64.	55.	59.	58.	56.	54.	52.	50.
225 -	110.	102.	98.	94.	88.	84.	81.	78.	76.	74.	68.	68.	65.	63.	61.	58.	56.	54.	52.	50.
240 -	110.	102.	98.	94.	88.	84.	82.	79.	76.	74.	72.	69.	65.	63.	60.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	88.	84.	81.	78.	75.	73.	71.	64.	64.	65.	62.	59.	57.	55.	53.	51.
270 -	110.	102.	98.	94.	89.	86.	81.	78.	70.	73.	68.	66.	67.	63.	58.	56.	54.	52.	50.	48.
283 -	110.	102.	98.	94.	90.	87.	83.	78.	75.	73.	71.	65.	63.	62.	62.	58.	56.	55.	53.	51.
300 -	110.	102.	98.	94.	90.	87.	84.	78.	75.	73.	71.	69.	63.	62.	62.	58.	56.	54.	52.	50.
315 -	110.	102.	98.	94.	90.	86.	83.	81.	78.	75.	72.	70.	67.	65.	61.	51.	53.	54.	55.	53.
330 -	110.	102.	98.	94.	90.	88.	84.	80.	76.	72.	71.	68.	66.	63.	61.	59.	57.	55.	54.	52.
345 -	110.	102.	98.	94.	90.	88.	84.	78.	74.	71.	68.	65.	64.	62.	59.	58.	56.	54.	52.	50.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-39
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	88.	84.	82.	78.	75.	73.	66.	69.	65.	62.	60.	57.	55.	54.	52.	50.
15 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	74.	71.	67.	64.	61.	59.	56.	54.	53.	51.	49.
30 -	110.	102.	98.	94.	90.	87.	83.	79.	75.	71.	63.	67.	63.	60.	57.	54.	54.	53.	51.	49.
45 -	110.	102.	98.	94.	90.	85.	83.	79.	75.	71.	63.	67.	63.	60.	57.	56.	54.	53.	51.	49.
60 -	110.	102.	98.	94.	90.	85.	81.	77.	75.	72.	67.	64.	60.	57.	55.	52.	50.	49.	47.	45.
75 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	72.	69.	67.	62.	61.	57.	56.	54.	52.	50.	48.
90 -	110.	102.	98.	94.	90.	86.	82.	77.	75.	73.	69.	67.	64.	60.	57.	56.	54.	52.	50.	48.
105 -	110.	102.	98.	94.	90.	86.	83.	79.	75.	71.	69.	67.	63.	61.	60.	57.	55.	54.	52.	50.
120 -	110.	102.	98.	92.	88.	83.	79.	77.	74.	72.	70.	66.	62.	60.	55.	53.	51.	50.	48.	46.
135 -	110.	102.	98.	92.	87.	81.	78.	74.	71.	68.	66.	63.	62.	58.	56.	52.	50.	49.	47.	45.
150 -	110.	102.	98.	93.	88.	83.	80.	78.	74.	71.	67.	65.	62.	54.	59.	54.	53.	54.	52.	50.
155 -	110.	102.	98.	93.	90.	85.	83.	78.	75.	71.	69.	64.	64.	55.	61.	58.	56.	55.	53.	51.
180 -	110.	102.	98.	94.	90.	85.	82.	74.	77.	72.	70.	68.	64.	63.	59.	57.	55.	54.	52.	50.
195 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	74.	71.	68.	65.	62.	58.	56.	54.	53.	51.	49.
210 -	110.	102.	98.	94.	90.	87.	83.	78.	75.	71.	69.	64.	65.	60.	57.	50.	51.	53.	51.	49.
225 -	110.	102.	98.	94.	90.	87.	82.	80.	77.	74.	70.	66.	63.	60.	57.	52.	50.	49.	47.	45.
240 -	110.	102.	98.	94.	90.	86.	82.	77.	75.	71.	65.	67.	65.	63.	61.	57.	55.	54.	52.	50.
255 -	110.	102.	98.	94.	90.	87.	83.	78.	75.	71.	67.	65.	63.	61.	59.	56.	54.	53.	51.	49.
270 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	74.	70.	67.	65.	61.	56.	55.	53.	51.	49.	48.
285 -	110.	102.	98.	94.	90.	88.	84.	81.	76.	73.	69.	65.	62.	59.	58.	53.	54.	53.	51.	49.
300 -	110.	102.	98.	94.	90.	88.	84.	79.	76.	72.	71.	68.	65.	61.	59.	57.	55.	54.	52.	50.
315 -	110.	102.	98.	94.	90.	88.	82.	79.	75.	73.	70.	67.	65.	61.	59.	57.	55.	54.	52.	50.
330 -	110.	102.	98.	94.	90.	87.	84.	81.	76.	74.	71.	68.	64.	62.	57.	56.	55.	55.	54.	52.
345 -	110.	102.	98.	94.	90.	86.	82.	74.	77.	75.	72.	70.	67.	64.	61.	59.	57.	55.	54.	52.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-40
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	74.	72.	69.	66.	58.	62.	59.	57.	55.	54.	52.
15 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	75.	72.	69.	67.	65.	63.	60.	58.	56.	55.	53.
30 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	75.	63.	66.	68.	65.	63.	60.	58.	56.	55.	53.
45 -	110.	102.	98.	94.	89.	85.	82.	80.	76.	73.	71.	69.	65.	63.	61.	59.	57.	55.	53.	51.
60 -	110.	102.	98.	94.	89.	86.	83.	78.	76.	74.	72.	70.	65.	65.	63.	61.	59.	57.	55.	53.
75 -	110.	102.	98.	94.	90.	85.	83.	76.	78.	73.	71.	71.	68.	66.	64.	61.	59.	57.	56.	54.
90 -	110.	102.	98.	94.	90.	88.	85.	81.	78.	74.	71.	69.	67.	65.	62.	60.	58.	56.	54.	52.
105 -	110.	102.	98.	94.	90.	87.	82.	79.	76.	72.	70.	68.	66.	62.	55.	54.	54.	54.	53.	52.
120 -	110.	102.	98.	94.	89.	85.	81.	79.	77.	72.	72.	69.	66.	63.	61.	52.	53.	53.	53.	53.
135 -	110.	102.	98.	93.	88.	85.	82.	78.	68.	73.	70.	68.	65.	63.	56.	58.	56.	54.	52.	50.
150 -	110.	102.	98.	93.	88.	84.	81.	78.	76.	74.	70.	67.	63.	60.	58.	56.	54.	52.	50.	48.
165 -	110.	102.	98.	92.	88.	84.	81.	77.	74.	71.	69.	65.	62.	60.	57.	54.	52.	50.	49.	47.
180 -	110.	102.	98.	93.	89.	86.	81.	77.	74.	72.	69.	65.	62.	60.	57.	56.	54.	53.	51.	49.
195 -	110.	102.	98.	94.	90.	86.	82.	79.	75.	73.	70.	68.	65.	62.	59.	58.	56.	54.	52.	50.
210 -	110.	102.	98.	94.	90.	88.	84.	79.	76.	72.	69.	57.	62.	63.	61.	60.	58.	56.	54.	52.
225 -	110.	102.	98.	94.	90.	86.	83.	77.	78.	74.	70.	68.	66.	64.	63.	60.	58.	56.	55.	53.
240 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	74.	72.	68.	67.	64.	63.	61.	59.	57.	55.	53.
255 -	110.	102.	98.	93.	89.	85.	82.	79.	77.	75.	72.	68.	67.	65.	63.	61.	59.	57.	55.	53.
270 -	110.	102.	98.	93.	89.	86.	83.	80.	77.	75.	72.	69.	66.	65.	63.	61.	59.	57.	55.	53.
285 -	110.	102.	98.	94.	90.	87.	83.	80.	76.	73.	70.	68.	66.	62.	61.	59.	57.	55.	54.	52.
300 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	73.	71.	69.	67.	64.	63.	61.	59.	57.	55.	53.
315 -	110.	102.	98.	94.	88.	85.	83.	80.	77.	74.	71.	69.	66.	63.	53.	57.	58.	56.	55.	53.
330 -	110.	102.	98.	93.	88.	85.	81.	78.	76.	72.	70.	67.	65.	63.	58.	59.	57.	55.	54.	52.
345 -	110.	102.	98.	93.	89.	85.	81.	79.	76.	73.	70.	67.	65.	62.	60.	59.	57.	55.	53.	51.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-41
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	94.	86.	82.	79.	73.	72.	69.	63.	61.	59.	57.	56.	55.	53.	52.	51.	49.	
15	- 110.	102.	96.	94.	89.	83.	78.	74.	72.	71.	65.	62.	61.	60.	58.	57.	55.	54.	52.	50.	
30	- 110.	102.	98.	87.	88.	84.	80.	76.	74.	71.	68.	65.	63.	60.	57.	56.	54.	52.	50.	48.	
45	- 110.	102.	98.	94.	89.	86.	82.	77.	74.	72.	66.	68.	63.	62.	59.	57.	55.	53.	51.	49.	
60	- 110.	102.	98.	94.	90.	86.	81.	77.	75.	72.	69.	67.	65.	57.	55.	56.	56.	54.	54.	52.	
75	- 110.	102.	98.	94.	90.	87.	84.	81.	78.	73.	69.	63.	62.	63.	60.	59.	57.	55.	53.	51.	
90	- 110.	102.	98.	93.	89.	86.	83.	79.	76.	68.	68.	65.	65.	64.	61.	53.	55.	56.	55.	53.	
105	- 110.	102.	98.	93.	88.	85.	82.	78.	76.	74.	66.	70.	67.	63.	60.	58.	56.	54.	52.	50.	
120	- 110.	102.	98.	94.	90.	86.	82.	75.	77.	75.	72.	68.	66.	63.	59.	57.	55.	53.	51.	49.	
135	- 110.	102.	98.	94.	90.	86.	83.	73.	76.	73.	70.	68.	66.	63.	60.	57.	55.	53.	51.	49.	
150	- 110.	102.	98.	93.	90.	82.	83.	81.	77.	74.	70.	67.	64.	62.	58.	56.	54.	52.	50.	48.	
165	- 110.	102.	98.	93.	80.	84.	81.	79.	76.	72.	69.	67.	63.	62.	57.	54.	52.	50.	49.	47.	
180	- 110.	102.	97.	88.	89.	84.	80.	77.	74.	70.	67.	64.	60.	58.	55.	54.	52.	50.	49.	47.	
195	- 110.	102.	98.	94.	88.	84.	80.	77.	72.	69.	67.	60.	59.	56.	57.	55.	53.	51.	49.	48.	
210	- 110.	102.	98.	93.	88.	84.	82.	78.	75.	71.	69.	62.	60.	58.	60.	58.	56.	54.	52.	50.	
225	- 110.	102.	98.	93.	89.	85.	81.	78.	75.	72.	71.	68.	66.	63.	57.	60.	58.	56.	54.	52.	
240	- 110.	102.	98.	94.	89.	84.	80.	77.	74.	71.	68.	66.	61.	60.	59.	57.	55.	53.	51.	49.	
255	- 110.	102.	98.	93.	87.	82.	79.	75.	74.	67.	67.	65.	63.	62.	58.	58.	56.	54.	52.	50.	
270	- 110.	102.	97.	91.	86.	80.	79.	75.	72.	71.	66.	64.	63.	60.	59.	56.	54.	54.	52.	50.	
285	- 110.	102.	97.	89.	84.	81.	77.	73.	71.	69.	67.	64.	61.	57.	55.	53.	51.	50.	48.	46.	
300	- 110.	102.	95.	89.	84.	80.	79.	75.	70.	70.	68.	66.	63.	60.	58.	56.	54.	53.	51.	49.	
315	- 110.	102.	94.	88.	80.	81.	79.	73.	71.	68.	68.	65.	62.	62.	58.	56.	54.	54.	52.	50.	
330	- 110.	101.	94.	85.	86.	79.	79.	74.	72.	69.	67.	66.	63.	60.	57.	55.	53.	51.	49.	48.	
345	- 110.	102.	96.	85.	87.	81.	78.	76.	74.	68.	66.	66.	63.	62.	58.	55.	53.	51.	49.	48.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-42
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																				
	110	102	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	
0	110	102	98	93	88	84	81	77	75	72	69	67	62	60	58	54	52	51	49	47			
15	110	102	98	93	88	84	79	75	72	70	67	65	60	59	56	54	52	50	49	47			
30	110	102	98	93	88	84	79	75	72	69	66	64	61	59	56	54	52	50	49	47			
45	110	102	98	93	88	84	80	76	72	69	66	62	60	56	55	49	48	47	46	44			
60	110	102	98	94	89	84	80	76	72	69	66	63	59	57	56	54	52	51	49	47			
75	110	102	98	94	88	83	79	75	72	70	65	62	60	56	56	54	52	51	49	47			
90	110	102	98	94	89	84	80	78	74	71	66	64	63	60	58	56	54	52	51	49	47		
105	110	102	98	94	90	86	82	78	74	71	66	64	63	60	58	56	54	52	50	48			
120	110	102	98	94	90	85	81	78	75	73	68	59	64	61	60	56	54	52	50	48			
135	110	102	98	94	90	86	82	80	77	74	71	68	66	63	61	58	56	54	52	50			
150	110	102	98	94	90	87	83	79	75	72	70	68	66	63	61	59	57	55	53	51			
165	110	102	98	94	90	88	84	80	77	73	69	65	62	61	59	56	54	52	51	49			
180	110	102	98	94	90	83	84	81	76	72	69	66	65	62	61	59	56	54	52	51	49		
195	110	102	98	94	90	88	84	79	74	71	67	65	62	59	57	54	52	50	48	46			
210	110	102	98	94	90	88	84	80	77	72	68	65	62	61	56	53	53	52	51	49	47		
225	110	102	98	94	90	88	83	78	76	72	70	66	63	61	54	52	53	52	51	50			
240	110	102	98	94	90	88	85	81	77	73	69	66	64	59	61	56	55	55	53	52	51	51	
255	110	102	98	94	90	88	84	81	77	73	70	68	64	62	59	57	55	54	52	50			
270	110	102	98	94	90	86	83	81	78	75	72	70	67	63	61	60	58	56	54	52			
285	110	102	98	94	90	85	83	79	77	74	71	69	67	65	61	59	57	55	53	51	49		
300	110	102	98	94	90	85	81	78	75	73	71	69	67	63	60	57	55	54	52	50			
315	110	102	98	94	90	84	81	79	77	72	72	68	65	62	60	57	55	54	52	50			
330	110	102	98	94	90	85	81	77	75	66	71	68	65	63	59	56	54	52	50	48			
345	110	102	98	94	89	84	81	79	72	74	70	67	63	60	57	56	54	52	50	48			

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50 FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-43
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVEL

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	93.	87.	83.	80.	77.	75.	72.	69.	67.	64.	62.	59.	56.	54.	53.	51.	49.	
15 - 110.	102.	98.	93.	88.	84.	81.	77.	74.	72.	70.	67.	63.	61.	59.	56.	54.	53.	51.	49.	
30 - 110.	102.	98.	94.	88.	85.	81.	78.	76.	73.	70.	67.	65.	63.	60.	58.	56.	54.	52.	50.	
45 - 110.	102.	98.	93.	89.	85.	82.	79.	76.	73.	71.	67.	66.	64.	58.	59.	58.	56.	54.	52.	50.
60 - 110.	102.	98.	93.	89.	85.	82.	79.	77.	73.	70.	67.	65.	62.	60.	58.	56.	54.	52.	50.	
75 - 110.	102.	98.	93.	88.	85.	82.	78.	75.	72.	69.	66.	63.	59.	57.	56.	54.	52.	50.	48.	
90 - 110.	102.	98.	92.	88.	84.	80.	77.	72.	69.	68.	65.	61.	59.	56.	56.	54.	52.	50.	48.	
105 - 110.	102.	97.	91.	86.	82.	78.	74.	72.	69.	66.	62.	59.	57.	55.	51.	50.	48.	47.	45.	
120 - 110.	102.	97.	91.	86.	82.	80.	75.	72.	63.	68.	65.	63.	60.	56.	54.	52.	50.	48.	47.	
135 - 110.	102.	98.	93.	88.	85.	81.	75.	72.	69.	58.	60.	59.	58.	59.	53.	51.	49.	48.	46.	
150 - 110.	102.	97.	93.	89.	86.	82.	77.	75.	69.	71.	66.	64.	60.	58.	55.	53.	51.	49.	47.	
165 - 110.	102.	97.	92.	82.	86.	82.	80.	73.	75.	71.	67.	66.	64.	60.	56.	54.	52.	51.	49.	
180 - 110.	102.	97.	93.	88.	84.	81.	78.	76.	73.	71.	69.	67.	63.	60.	58.	56.	54.	52.	50.	
195 - 110.	102.	98.	92.	86.	83.	80.	77.	74.	72.	70.	66.	63.	61.	60.	57.	56.	55.	55.	53.	
210 - 110.	102.	98.	93.	86.	84.	81.	75.	75.	71.	69.	66.	60.	56.	61.	57.	57.	55.	53.	52.	
225 - 110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	67.	67.	63.	62.	59.	57.	55.	53.	51.	49.	
240 - 110.	102.	98.	93.	90.	86.	81.	77.	74.	71.	68.	65.	62.	58.	57.	55.	53.	51.	49.	47.	
255 - 110.	102.	98.	94.	88.	85.	83.	79.	74.	71.	68.	65.	63.	62.	55.	56.	54.	53.	51.	49.	
270 - 110.	102.	98.	93.	88.	84.	82.	79.	77.	75.	71.	67.	64.	62.	61.	54.	54.	54.	54.	52.	
285 - 110.	102.	98.	93.	89.	86.	83.	78.	75.	72.	71.	68.	62.	58.	58.	57.	56.	55.	55.	53.	
300 - 110.	102.	98.	94.	89.	85.	80.	77.	74.	71.	69.	62.	61.	62.	60.	57.	55.	54.	52.	50.	
315 - 110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	69.	67.	64.	62.	60.	58.	56.	54.	52.	50.	
330 - 110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	70.	68.	65.	63.	61.	59.	57.	55.	53.	52.	
345 - 110.	102.	98.	93.	87.	84.	80.	77.	74.	71.	69.	64.	64.	61.	59.	54.	54.	55.	53.	51.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-44
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	87.	82.	80.	77.	73.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
15 -	110.	102.	98.	94.	90.	86.	83.	79.	75.	71.	69.	67.	65.	63.	58.	57.	55.	53.	51.	49.
30 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	64.	60.	59.	60.	61.	58.	56.	55.	53.	51.
45 -	110.	102.	98.	94.	89.	84.	81.	77.	74.	72.	66.	67.	65.	62.	59.	53.	56.	55.	53.	51.
60 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	54.	52.	50.
75 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	69.	65.	62.	60.	58.	56.	54.	53.	51.	49.
90 -	110.	102.	98.	94.	88.	84.	81.	78.	75.	70.	67.	65.	63.	61.	57.	54.	52.	50.	49.	47.
105 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	70.	67.	65.	63.	62.	56.	57.	55.	54.	52.	50.
120 -	110.	102.	98.	94.	89.	82.	83.	79.	76.	73.	71.	69.	65.	62.	58.	55.	53.	51.	49.	48.
135 -	110.	102.	98.	94.	90.	86.	79.	80.	78.	75.	71.	67.	65.	63.	60.	57.	55.	54.	52.	50.
150 -	110.	102.	98.	94.	90.	86.	83.	81.	78.	74.	71.	68.	66.	64.	62.	60.	58.	56.	54.	52.
165 -	110.	102.	98.	94.	90.	86.	83.	81.	78.	75.	72.	69.	67.	65.	63.	60.	58.	56.	55.	53.
180 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	72.	70.	68.	65.	63.	60.	58.	56.	54.	52.
195 -	110.	102.	98.	94.	90.	86.	83.	80.	78.	75.	72.	70.	68.	65.	63.	61.	59.	57.	55.	53.
210 -	110.	102.	98.	94.	90.	86.	84.	79.	76.	73.	71.	68.	67.	65.	63.	61.	59.	57.	55.	53.
225 -	110.	102.	98.	94.	90.	85.	82.	78.	76.	73.	71.	68.	66.	63.	61.	60.	58.	56.	54.	52.
240 -	110.	102.	98.	94.	90.	85.	82.	78.	76.	74.	71.	68.	65.	64.	59.	58.	58.	56.	55.	53.
255 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	73.	71.	66.	67.	65.	62.	60.	58.	56.	55.	53.
270 -	110.	102.	98.	94.	89.	85.	82.	78.	76.	74.	71.	67.	65.	63.	61.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	73.	71.	68.	66.	64.	61.	59.	57.	55.	53.	52.
300 -	110.	102.	98.	94.	90.	88.	83.	80.	76.	74.	71.	69.	66.	58.	56.	60.	59.	57.	55.	53.
315 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	69.	67.	65.	62.	60.	58.	56.	54.	52.
330 -	110.	102.	98.	94.	90.	86.	83.	81.	77.	75.	72.	69.	66.	63.	61.	58.	56.	54.	52.	50.
345 -	110.	102.	98.	94.	90.	88.	84.	80.	77.	73.	71.	68.	66.	63.	60.	56.	54.	53.	51.	49.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-45
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																	
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	90.	87.	83.	81.	77.	74.	70.	68.	65.	62.	59.	57.	55.	53.	51.	49.
15 -	110.	102.	98.	93.	90.	85.	82.	80.	77.	74.	70.	67.	64.	61.	59.	57.	55.	54.	52.	50.
30 -	110.	102.	98.	93.	88.	84.	81.	74.	76.	72.	70.	67.	63.	60.	58.	56.	54.	52.	50.	48.
45 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	69.	67.	63.	61.	59.	57.	55.	54.	52.	50.
60 -	110.	102.	98.	93.	87.	82.	79.	76.	74.	71.	67.	65.	63.	61.	56.	55.	54.	54.	52.	50.
75 -	110.	102.	98.	93.	87.	83.	79.	77.	75.	72.	70.	65.	63.	61.	59.	53.	53.	52.	51.	50.
90 -	110.	102.	98.	94.	89.	84.	80.	77.	74.	72.	70.	68.	64.	62.	62.	59.	57.	55.	54.	52.
105 -	110.	102.	98.	94.	90.	84.	79.	75.	73.	71.	68.	67.	61.	59.	58.	56.	55.	55.	53.	51.
120 -	110.	102.	98.	94.	89.	84.	81.	77.	73.	71.	66.	65.	64.	62.	60.	59.	57.	55.	53.	51.
135 -	110.	102.	98.	94.	90.	85.	80.	76.	74.	71.	69.	67.	65.	63.	59.	56.	54.	52.	50.	48.
150 -	110.	102.	98.	94.	90.	85.	81.	77.	75.	71.	68.	65.	63.	60.	58.	55.	53.	52.	50.	48.
165 -	110.	102.	98.	94.	90.	85.	81.	77.	75.	72.	70.	67.	65.	63.	60.	58.	56.	54.	52.	50.
180 -	110.	102.	98.	94.	90.	85.	82.	78.	76.	73.	71.	69.	66.	62.	59.	57.	55.	53.	51.	50.
195 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	74.	70.	66.	63.	60.	58.	56.	54.	52.	50.	48.
210 -	110.	102.	98.	94.	90.	88.	83.	80.	77.	73.	70.	68.	65.	61.	59.	57.	55.	53.	51.	50.
225 -	110.	102.	98.	94.	90.	86.	84.	81.	77.	73.	70.	67.	64.	62.	59.	57.	55.	53.	51.	50.
240 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	71.	68.	65.	62.	60.	59.	57.	55.	53.	51.
255 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	74.	71.	69.	67.	64.	61.	59.	57.	56.	54.	52.
270 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	72.	69.	67.	64.	62.	60.	58.	56.	55.	53.
285 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	74.	70.	68.	66.	63.	61.	60.	58.	56.	54.	52.
300 -	110.	102.	98.	94.	89.	85.	82.	78.	75.	72.	70.	68.	66.	63.	61.	59.	57.	55.	53.	51.
315 -	110.	102.	98.	94.	89.	85.	81.	78.	76.	74.	71.	69.	67.	65.	63.	60.	58.	56.	55.	53.
330 -	110.	102.	98.	93.	89.	85.	81.	79.	76.	73.	71.	69.	64.	64.	61.	59.	57.	55.	53.	51.
345 -	110.	102.	98.	93.	89.	85.	82.	79.	77.	75.	71.	68.	65.	63.	61.	59.	57.	55.	53.	51.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-46
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	88.	85.	81.	77.	75.	73.	70.	67.	64.	62.	59.	57.	55.	54.	52.
15 -	110.	102.	98.	94.	90.	88.	85.	81.	79.	76.	72.	69.	67.	63.	61.	60.	58.	56.	54.	52.
30 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	71.	68.	67.	64.	61.	60.	58.	56.	53.	51.
45 -	110.	102.	98.	94.	89.	86.	80.	78.	78.	75.	72.	69.	65.	63.	60.	59.	57.	55.	53.	51.
60 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	76.	72.	69.	66.	63.	60.	59.	57.	55.	53.	51.
75 -	110.	102.	98.	94.	90.	88.	84.	80.	77.	69.	72.	70.	67.	65.	61.	60.	58.	56.	54.	52.
90 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	61.	68.	65.	63.	62.	58.	58.	56.	55.	53.
105 -	110.	102.	98.	94.	90.	85.	81.	79.	77.	74.	71.	67.	63.	62.	60.	54.	53.	53.	52.	52.
120 -	110.	102.	98.	94.	88.	85.	81.	78.	77.	73.	69.	66.	63.	62.	55.	55.	54.	55.	53.	51.
135 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	69.	65.	63.	60.	58.	54.	55.	53.	51.	50.
150 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	69.	67.	65.	62.	60.	58.	56.	54.	52.	50.
165 -	110.	102.	98.	93.	89.	86.	82.	78.	75.	72.	69.	67.	61.	63.	61.	57.	58.	56.	54.	52.
180 -	110.	102.	98.	94.	90.	87.	82.	80.	76.	72.	70.	68.	65.	62.	60.	53.	57.	55.	53.	51.
195 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	73.	71.	68.	66.	64.	61.	59.	57.	55.	53.	51.
210 -	110.	102.	98.	94.	90.	87.	84.	81.	76.	73.	70.	68.	65.	63.	62.	55.	55.	55.	55.	53.
225 -	110.	102.	98.	94.	90.	86.	83.	81.	77.	73.	71.	68.	65.	63.	57.	56.	56.	56.	55.	53.
240 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	75.	72.	69.	66.	64.	62.	60.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	90.	87.	82.	78.	76.	73.	71.	68.	66.	63.	61.	60.	58.	56.	54.	52.
270 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	73.	71.	69.	67.	63.	63.	61.	59.	57.	55.	53.
285 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	72.	70.	67.	64.	62.	60.	58.	56.	55.	53.
300 -	110.	102.	98.	94.	90.	85.	82.	79.	74.	75.	72.	70.	65.	63.	62.	58.	58.	56.	55.	53.
315 -	110.	102.	98.	94.	89.	85.	81.	79.	77.	73.	70.	68.	66.	63.	61.	59.	57.	55.	54.	52.
330 -	110.	102.	98.	94.	90.	85.	81.	79.	76.	73.	71.	68.	65.	61.	62.	58.	58.	56.	55.	53.
345 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	71.	69.	62.	63.	63.	60.	58.	56.	55.	53.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-47
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	72.	69.	65.	63.	61.	55.	56.	54.	53.	51.	49.
15 -	110.	102.	98.	93.	88.	84.	76.	78.	75.	72.	70.	68.	64.	60.	57.	54.	52.	50.	49.	47.
30 -	110.	102.	98.	93.	87.	77.	77.	79.	74.	71.	68.	65.	63.	56.	57.	56.	54.	52.	50.	48.
45 -	110.	102.	98.	91.	86.	76.	81.	77.	76.	73.	68.	65.	61.	59.	57.	54.	52.	50.	49.	47.
60 -	110.	102.	98.	92.	87.	85.	79.	75.	74.	67.	68.	65.	63.	59.	57.	54.	52.	50.	49.	47.
75 -	110.	102.	98.	92.	87.	84.	79.	75.	71.	68.	67.	62.	63.	60.	57.	53.	51.	50.	48.	46.
90 -	110.	102.	98.	93.	88.	84.	80.	77.	72.	68.	65.	62.	61.	57.	53.	52.	50.	49.	47.	45.
105 -	110.	102.	98.	93.	86.	84.	79.	76.	70.	67.	66.	64.	61.	60.	57.	54.	52.	50.	49.	47.
120 -	110.	102.	98.	91.	86.	82.	80.	76.	72.	67.	65.	62.	61.	54.	52.	51.	50.	49.	48.	47.
135 -	110.	102.	97.	92.	88.	85.	79.	76.	71.	67.	65.	64.	57.	54.	52.	52.	51.	50.	48.	47.
150 -	110.	102.	97.	91.	87.	85.	82.	76.	71.	67.	65.	64.	58.	54.	52.	52.	51.	50.	48.	47.
165 -	110.	102.	97.	91.	87.	85.	77.	77.	74.	69.	68.	59.	61.	58.	56.	55.	54.	53.	51.	51.
180 -	110.	102.	98.	91.	87.	84.	81.	75.	76.	72.	71.	68.	66.	63.	59.	51.	52.	52.	53.	51.
195 -	110.	102.	98.	93.	88.	84.	80.	78.	75.	73.	71.	68.	65.	63.	61.	58.	56.	54.	52.	50.
210 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	74.	71.	68.	65.	60.	57.	54.	52.	50.	49.	47.
225 -	110.	102.	98.	93.	88.	86.	83.	80.	76.	74.	72.	69.	66.	62.	60.	58.	56.	55.	53.	51.
240 -	110.	102.	98.	93.	90.	85.	81.	79.	76.	74.	72.	69.	66.	62.	60.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	88.	84.	82.	76.	76.	73.	71.	69.	67.	65.	61.	58.	56.	54.	52.	50.
270 -	110.	102.	98.	93.	88.	85.	81.	78.	74.	72.	70.	68.	64.	63.	57.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	93.	88.	84.	81.	77.	74.	71.	69.	67.	64.	62.	59.	56.	54.	53.	51.	49.
300 -	110.	102.	98.	93.	90.	85.	81.	77.	75.	72.	70.	67.	64.	62.	59.	57.	55.	53.	51.	49.
315 -	110.	102.	98.	93.	87.	84.	81.	78.	75.	72.	70.	68.	66.	62.	60.	60.	58.	56.	54.	52.
330 -	110.	102.	98.	93.	88.	83.	81.	74.	71.	70.	71.	68.	65.	62.	60.	59.	57.	55.	53.	51.
345 -	110.	102.	98.	94.	90.	85.	82.	80.	77.	72.	68.	65.	63.	62.	53.	55.	56.	54.	52.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-4B
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	92.	87.	83.	79.	76.	72.	69.	66.	63.	59.	57.	55.	52.	50.	49.	47.	45.	
15 -	110.	102.	97.	91.	87.	84.	80.	75.	71.	67.	65.	62.	59.	56.	53.	52.	50.	49.	47.	45.	
30 -	110.	102.	97.	92.	88.	82.	79.	73.	69.	66.	66.	63.	60.	58.	56.	53.	51.	50.	48.	46.	
45 -	110.	102.	98.	93.	88.	83.	80.	77.	72.	69.	66.	63.	59.	57.	55.	52.	50.	49.	47.	45.	
60 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	69.	66.	63.	59.	57.	55.	52.	50.	49.	47.	45.	
75 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	67.	62.	59.	57.	55.	52.	50.	49.	47.	45.	
90 -	110.	102.	98.	94.	88.	84.	79.	74.	70.	67.	65.	64.	57.	56.	57.	52.	50.	49.	47.	45.	
105 -	110.	102.	98.	94.	88.	85.	81.	76.	71.	69.	65.	65.	61.	60.	56.	54.	52.	50.	49.	47.	
120 -	110.	102.	98.	94.	89.	84.	79.	76.	74.	71.	69.	67.	62.	60.	55.	57.	55.	53.	51.	49.	
135 -	110.	102.	98.	94.	90.	84.	79.	77.	74.	71.	69.	67.	65.	63.	59.	54.	52.	50.	49.	47.	
150 -	110.	102.	98.	94.	90.	85.	80.	77.	68.	68.	70.	65.	61.	59.	57.	56.	54.	52.	50.	48.	
165 -	110.	102.	98.	94.	90.	85.	81.	79.	77.	73.	70.	68.	63.	60.	58.	54.	52.	50.	49.	47.	
180 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	72.	69.	66.	63.	61.	59.	57.	55.	54.	52.	50.	
195 -	110.	102.	98.	94.	90.	86.	81.	78.	76.	74.	70.	68.	65.	63.	61.	59.	57.	55.	54.	52.	
210 -	110.	102.	98.	94.	90.	85.	82.	78.	76.	73.	70.	67.	65.	60.	61.	59.	57.	55.	53.	51.	
225 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.	51.	
240 -	110.	102.	98.	93.	88.	84.	81.	77.	74.	72.	70.	67.	65.	63.	61.	60.	58.	56.	54.	52.	
255 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	62.	64.	66.	63.	60.	58.	56.	54.	52.	50.	
270 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	73.	71.	68.	65.	62.	59.	56.	54.	53.	51.	49.	
285 -	110.	102.	98.	93.	88.	85.	82.	79.	76.	73.	71.	68.	65.	62.	59.	57.	55.	53.	51.	49.	
300 -	110.	102.	98.	93.	88.	84.	82.	78.	75.	71.	68.	64.	61.	59.	57.	54.	52.	50.	49.	47.	
315 -	110.	102.	98.	93.	88.	84.	81.	78.	74.	69.	66.	63.	60.	58.	56.	49.	50.	49.	50.	48.	
330 -	110.	102.	98.	92.	88.	83.	80.	77.	74.	69.	66.	63.	60.	58.	55.	54.	52.	50.	49.	47.	
345 -	110.	102.	98.	92.	88.	82.	79.	76.	72.	69.	66.	64.	60.	58.	56.	53.	51.	50.	48.	46.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAMBA-49
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	89.	85.	81.	78.	74.	71.	69.	66.	63.	60.	58.	55.	53.	51.	49.	48.
15 -	110.	102.	98.	93.	88.	84.	80.	75.	72.	69.	67.	64.	61.	59.	56.	54.	52.	50.	49.	47.
30 -	110.	102.	98.	93.	88.	84.	79.	73.	70.	66.	63.	61.	59.	57.	55.	52.	50.	49.	47.	45.
45 -	110.	102.	98.	92.	88.	83.	79.	74.	70.	67.	65.	62.	61.	54.	53.	51.	50.	49.	48.	47.
60 -	110.	102.	98.	93.	87.	83.	79.	73.	69.	67.	65.	61.	59.	55.	53.	50.	49.	48.	46.	45.
75 -	110.	102.	98.	92.	86.	82.	78.	73.	69.	66.	65.	60.	58.	56.	54.	52.	51.	49.	48.	46.
90 -	110.	102.	98.	91.	86.	82.	78.	73.	70.	67.	65.	62.	59.	57.	55.	52.	50.	49.	47.	45.
105 -	110.	102.	98.	91.	86.	82.	78.	73.	70.	67.	65.	63.	60.	57.	55.	52.	50.	49.	47.	45.
120 -	110.	102.	98.	92.	87.	82.	79.	75.	71.	67.	65.	64.	58.	59.	57.	52.	50.	49.	47.	45.
135 -	110.	102.	98.	93.	88.	83.	79.	77.	74.	70.	67.	65.	64.	62.	59.	57.	55.	53.	51.	49.
150 -	110.	102.	98.	93.	88.	84.	81.	77.	75.	71.	68.	66.	63.	61.	59.	56.	54.	53.	51.	49.
165 -	110.	102.	98.	93.	88.	84.	81.	78.	76.	72.	69.	67.	64.	62.	60.	57.	55.	54.	52.	50.
180 -	110.	102.	98.	93.	88.	84.	80.	77.	75.	73.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.
195 -	110.	102.	98.	93.	88.	84.	79.	76.	69.	67.	66.	64.	62.	61.	59.	57.	56.	56.	54.	52.
210 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	67.	65.	65.	65.	62.	60.	58.	56.	54.	52.	50.
225 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	70.	67.	64.	62.	59.	57.	55.	53.	51.	49.
240 -	110.	102.	98.	94.	89.	85.	81.	77.	74.	71.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	89.	85.	82.	79.	75.	72.	69.	67.	64.	62.	60.	57.	55.	54.	52.	50.
270 -	110.	102.	98.	94.	89.	85.	81.	78.	76.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.	51.
285 -	110.	102.	98.	94.	89.	85.	82.	78.	75.	72.	70.	68.	65.	63.	61.	59.	57.	55.	53.	51.
300 -	110.	102.	98.	93.	89.	85.	81.	78.	76.	73.	71.	68.	66.	64.	62.	60.	58.	56.	54.	52.
315 -	110.	102.	98.	93.	89.	85.	82.	78.	75.	72.	69.	67.	65.	63.	60.	58.	56.	55.	53.	51.
330 -	110.	102.	98.	93.	89.	85.	81.	78.	75.	72.	70.	67.	65.	62.	61.	55.	57.	55.	54.	52.
345 -	110.	102.	98.	93.	89.	85.	82.	79.	76.	73.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-50
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)			DISTANCE FROM SIREN (FEET)																
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	89.	86.	83.	79.	76.	73.	69.	67.	65.	63.	61.	59.	57.	55.	53.	51.
15	110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	70.	68.	65.	63.	61.	59.	57.	55.	54.	52.
30	110.	102.	98.	94.	89.	85.	82.	77.	76.	73.	70.	68.	66.	64.	61.	60.	58.	56.	54.	52.
45	110.	102.	98.	94.	89.	85.	81.	77.	74.	71.	69.	67.	65.	63.	59.	55.	53.	51.	49.	48.
60	110.	102.	98.	93.	87.	83.	81.	75.	70.	67.	67.	59.	61.	57.	55.	54.	52.	50.	49.	47.
75	110.	102.	98.	92.	86.	81.	79.	75.	71.	67.	67.	59.	61.	57.	55.	54.	52.	50.	49.	47.
90	110.	102.	98.	92.	86.	80.	72.	75.	70.	68.	66.	64.	61.	60.	57.	56.	54.	52.	50.	48.
105	110.	102.	98.	93.	87.	82.	77.	75.	70.	67.	66.	64.	60.	60.	56.	54.	52.	51.	49.	49.
120	110.	102.	97.	89.	86.	82.	79.	74.	71.	67.	66.	62.	59.	57.	51.	49.	49.	48.	47.	46.
135	110.	102.	96.	89.	84.	80.	79.	75.	71.	67.	63.	62.	60.	56.	54.	53.	52.	50.	49.	47.
150	110.	102.	96.	90.	85.	81.	77.	73.	71.	67.	65.	61.	58.	57.	53.	50.	49.	48.	46.	45.
165	110.	102.	97.	91.	86.	83.	79.	75.	70.	66.	65.	61.	58.	57.	53.	51.	49.	48.	46.	45.
180	110.	102.	98.	92.	88.	84.	79.	74.	70.	67.	65.	63.	60.	59.	57.	54.	52.	50.	49.	47.
195	110.	102.	98.	93.	88.	84.	78.	74.	70.	67.	65.	62.	59.	57.	57.	54.	52.	50.	49.	47.
210	110.	102.	98.	92.	86.	82.	79.	73.	70.	67.	65.	63.	61.	59.	57.	55.	53.	51.	49.	48.
225	110.	102.	98.	93.	87.	82.	78.	74.	70.	67.	66.	62.	59.	57.	55.	54.	52.	50.	49.	48.
240	110.	102.	98.	92.	86.	83.	79.	73.	70.	67.	66.	62.	59.	57.	55.	54.	52.	50.	49.	47.
255	110.	102.	97.	91.	85.	80.	77.	73.	70.	67.	63.	62.	56.	54.	53.	51.	50.	49.	47.	47.
270	110.	102.	97.	91.	86.	81.	77.	72.	70.	67.	65.	62.	59.	58.	53.	51.	50.	48.	47.	45.
285	110.	102.	97.	93.	87.	82.	78.	75.	72.	67.	65.	63.	61.	59.	57.	53.	52.	50.	49.	48.
300	110.	102.	98.	94.	87.	84.	80.	78.	74.	71.	67.	62.	60.	59.	57.	53.	51.	50.	48.	46.
315	110.	102.	98.	94.	88.	84.	81.	78.	74.	71.	67.	65.	62.	60.	57.	54.	52.	50.	49.	47.
330	110.	102.	98.	94.	89.	84.	81.	79.	75.	72.	69.	65.	62.	59.	57.	55.	53.	51.	49.	48.
345	110.	102.	98.	94.	90.	86.	83.	79.	75.	71.	69.	62.	63.	61.	57.	54.	52.	50.	49.	47.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-51
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	92.	87.	84.	81.	78.	75.	72.	70.	65.	66.	63.	60.	58.	56.	55.	54.	52.
15 -	110.	102.	97.	91.	86.	84.	79.	77.	73.	70.	67.	66.	64.	62.	59.	57.	56.	54.	53.	50.
30 -	110.	102.	97.	91.	86.	84.	80.	76.	72.	69.	63.	66.	63.	59.	57.	53.	54.	50.	49.	42.
45 -	110.	102.	97.	90.	86.	82.	79.	76.	73.	71.	68.	65.	61.	59.	57.	54.	52.	51.	49.	47.
60 -	110.	102.	97.	89.	84.	80.	77.	74.	72.	68.	67.	64.	61.	60.	54.	53.	53.	51.	51.	46.
75 -	110.	102.	97.	89.	84.	80.	78.	75.	70.	71.	68.	65.	63.	61.	59.	56.	54.	54.	51.	49.
90 -	110.	102.	97.	90.	85.	81.	79.	75.	73.	71.	67.	64.	62.	60.	59.	58.	54.	52.	49.	47.
105 -	110.	102.	97.	91.	87.	82.	79.	76.	74.	71.	68.	65.	62.	60.	56.	57.	52.	50.	48.	47.
120 -	110.	102.	97.	91.	87.	84.	80.	77.	74.	69.	67.	64.	61.	59.	55.	54.	52.	49.	47.	45.
135 -	110.	102.	98.	92.	87.	84.	81.	78.	74.	71.	69.	64.	62.	60.	57.	53.	52.	48.	46.	48.
150 -	110.	102.	98.	92.	88.	84.	80.	77.	75.	69.	67.	65.	61.	60.	58.	53.	51.	50.	51.	47.
165 -	110.	102.	98.	93.	88.	84.	80.	77.	75.	69.	67.	67.	64.	62.	59.	58.	52.	52.	52.	50.
180 -	110.	102.	98.	93.	89.	85.	80.	77.	74.	71.	68.	67.	64.	57.	56.	56.	56.	48.	48.	51.
195 -	110.	102.	98.	93.	89.	85.	81.	79.	75.	72.	69.	67.	65.	62.	60.	58.	56.	50.	48.	50.
210 -	110.	102.	98.	94.	90.	85.	82.	79.	76.	68.	71.	68.	66.	64.	62.	60.	57.	55.	54.	52.
225 -	110.	102.	98.	94.	90.	86.	83.	79.	76.	74.	70.	68.	65.	63.	60.	58.	54.	55.	54.	52.
240 -	110.	102.	98.	93.	88.	85.	80.	78.	76.	73.	69.	67.	65.	63.	61.	58.	56.	55.	53.	51.
255 -	110.	102.	97.	91.	87.	84.	82.	78.	74.	71.	69.	67.	65.	63.	60.	59.	57.	55.	53.	51.
270 -	110.	102.	97.	91.	86.	84.	81.	75.	72.	71.	69.	64.	64.	60.	60.	57.	55.	53.	51.	48.
285 -	110.	102.	97.	91.	87.	84.	79.	75.	72.	69.	67.	65.	63.	60.	59.	57.	55.	53.	51.	50.
300 -	110.	102.	97.	91.	86.	82.	79.	75.	72.	69.	67.	65.	63.	60.	59.	56.	54.	53.	52.	50.
315 -	110.	102.	97.	91.	86.	82.	79.	75.	72.	69.	66.	62.	59.	58.	57.	52.	52.	50.	49.	48.
330 -	110.	102.	97.	91.	86.	82.	79.	76.	74.	71.	67.	64.	61.	59.	57.	56.	54.	52.	49.	47.
345 -	110.	102.	97.	91.	88.	84.	80.	77.	74.	72.	69.	65.	63.	62.	59.	56.	55.	54.	52.	50.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAMBA-52
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																		
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500
0 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	72.	70.	67.	64.	62.	60.	58.	56.	54.	52.
15 - 110.	102.	98.	94.	90.	86.	82.	79.	76.	74.	72.	69.	68.	65.	63.	60.	58.	56.	54.	52.
30 - 110.	102.	98.	93.	89.	85.	82.	78.	76.	73.	70.	68.	66.	64.	62.	60.	58.	56.	55.	53.
45 - 110.	102.	98.	94.	89.	85.	82.	79.	76.	73.	70.	68.	66.	63.	61.	60.	58.	56.	54.	52.
60 - 110.	102.	98.	94.	90.	85.	81.	78.	76.	71.	72.	69.	67.	64.	63.	60.	58.	56.	54.	52.
75 - 110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	72.	70.	67.	65.	63.	61.	59.	57.	55.	53.
90 - 110.	102.	98.	94.	90.	86.	82.	75.	77.	72.	70.	68.	65.	63.	59.	56.	56.	56.	55.	53.
105 - 110.	102.	98.	94.	90.	85.	81.	73.	75.	72.	70.	68.	66.	63.	62.	58.	56.	55.	53.	51.
120 - 110.	102.	98.	93.	88.	84.	80.	77.	74.	71.	68.	65.	63.	60.	58.	54.	54.	52.	50.	48.
135 - 110.	102.	98.	93.	88.	84.	81.	78.	75.	72.	70.	68.	65.	62.	59.	57.	55.	53.	51.	49.
150 - 110.	102.	98.	94.	89.	85.	82.	78.	76.	74.	71.	68.	64.	61.	59.	56.	54.	53.	51.	49.
165 - 110.	102.	98.	94.	90.	86.	81.	78.	76.	73.	71.	68.	64.	62.	60.	59.	57.	55.	53.	51.
180 - 110.	102.	98.	93.	89.	86.	83.	79.	75.	71.	59.	60.	63.	63.	61.	58.	58.	56.	54.	52.
195 - 110.	102.	98.	93.	89.	86.	83.	80.	76.	73.	70.	68.	61.	61.	62.	60.	58.	56.	55.	53.
210 - 110.	102.	98.	94.	90.	87.	83.	81.	77.	74.	70.	67.	65.	63.	56.	54.	54.	54.	53.	53.
225 - 110.	102.	98.	94.	90.	85.	81.	78.	76.	74.	72.	67.	67.	63.	61.	60.	58.	56.	54.	52.
240 - 110.	102.	98.	94.	89.	86.	82.	80.	76.	73.	70.	68.	65.	63.	61.	59.	57.	55.	54.	52.
255 - 110.	102.	98.	94.	90.	86.	82.	78.	75.	72.	70.	68.	66.	62.	59.	60.	58.	56.	54.	52.
270 - 110.	102.	98.	94.	90.	85.	81.	79.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.
285 - 110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.
300 - 110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
315 - 110.	102.	98.	94.	89.	85.	82.	80.	76.	72.	69.	67.	63.	60.	58.	56.	54.	52.	50.	48.
330 - 110.	102.	98.	94.	90.	86.	83.	81.	77.	74.	71.	68.	64.	62.	59.	57.	55.	53.	51.	49.
345 - 110.	102.	98.	94.	90.	88.	84.	81.	77.	73.	70.	68.	65.	62.	60.	57.	55.	53.	51.	49.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-53
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	87.	84.	79.	76.	68.	71.	68.	65.	62.	59.	56.	54.	53.	51.	49.
15 -	110.	102.	98.	94.	89.	85.	81.	70.	72.	73.	69.	67.	64.	62.	59.	57.	55.	53.	51.	49.
30 -	110.	102.	98.	93.	89.	82.	83.	81.	77.	74.	70.	67.	64.	55.	57.	58.	56.	55.	53.	51.
45 -	110.	102.	98.	94.	90.	87.	83.	81.	78.	75.	72.	69.	67.	65.	62.	60.	58.	56.	55.	53.
60 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	75.	72.	70.	66.	63.	62.	60.	58.	56.	55.	53.
75 -	110.	102.	98.	94.	90.	88.	83.	79.	75.	73.	70.	68.	66.	63.	61.	59.	57.	55.	53.	51.
90 -	110.	102.	98.	94.	90.	88.	83.	79.	75.	72.	69.	68.	64.	63.	59.	51.	52.	52.	53.	51.
105 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	71.	68.	65.	61.	60.	58.	53.	53.	51.	51.	49.
120 -	110.	102.	98.	94.	90.	88.	82.	77.	74.	71.	68.	65.	61.	59.	57.	52.	50.	49.	47.	45.
135 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	65.	62.	58.	55.	53.	51.	49.	48.
150 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	72.	69.	67.	65.	62.	58.	54.	52.	50.	49.	47.
165 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	69.	68.	65.	61.	60.	57.	53.	51.	50.	48.	46.
180 -	110.	102.	98.	94.	90.	85.	82.	78.	74.	67.	65.	62.	58.	57.	55.	52.	50.	49.	47.	45.
195 -	110.	102.	97.	88.	88.	84.	80.	77.	75.	69.	65.	62.	59.	57.	55.	52.	50.	49.	47.	45.
210 -	110.	102.	97.	93.	88.	82.	77.	75.	67.	69.	67.	63.	59.	57.	53.	52.	50.	49.	47.	45.
225 -	110.	102.	97.	91.	86.	82.	78.	73.	70.	67.	65.	62.	59.	57.	53.	52.	50.	49.	47.	45.
240 -	110.	102.	97.	91.	85.	81.	79.	75.	72.	68.	66.	65.	59.	59.	55.	52.	50.	49.	47.	45.
255 -	110.	102.	98.	94.	86.	80.	78.	75.	70.	71.	66.	66.	63.	60.	58.	56.	54.	52.	50.	48.
270 -	110.	102.	98.	94.	87.	84.	80.	77.	75.	72.	69.	65.	62.	59.	58.	54.	52.	50.	49.	47.
285 -	110.	102.	98.	94.	87.	84.	81.	78.	75.	72.	69.	65.	61.	57.	55.	52.	50.	49.	47.	45.
300 -	110.	102.	98.	94.	89.	85.	77.	79.	75.	72.	69.	67.	63.	60.	57.	54.	52.	50.	49.	47.
315 -	110.	102.	98.	94.	90.	87.	83.	79.	71.	72.	69.	66.	63.	60.	57.	54.	52.	50.	49.	47.
330 -	110.	102.	98.	94.	90.	85.	81.	78.	75.	72.	70.	64.	55.	60.	57.	54.	52.	50.	49.	47.
345 -	110.	102.	98.	94.	90.	86.	81.	78.	76.	73.	71.	67.	63.	61.	58.	56.	54.	52.	50.	48.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-54
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	91.	86.	84.	80.	78.	73.	71.	69.	65.	64.	62.	56.	57.	55.	54.	52.	50.
15 -	110.	102.	97.	91.	86.	84.	79.	75.	74.	70.	68.	66.	62.	60.	57.	55.	53.	51.	49.	48.
30 -	110.	102.	97.	91.	86.	82.	79.	77.	74.	72.	69.	67.	63.	61.	59.	56.	54.	53.	51.	49.
45 -	110.	102.	98.	93.	88.	84.	80.	77.	74.	72.	70.	68.	65.	62.	59.	58.	56.	54.	52.	50.
60 -	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	70.	67.	64.	62.	60.	58.	56.	55.	53.	51.
75 -	110.	102.	98.	94.	90.	86.	82.	78.	76.	74.	70.	68.	66.	63.	60.	58.	56.	55.	53.	51.
90 -	110.	102.	98.	94.	89.	86.	83.	80.	77.	75.	72.	69.	66.	64.	60.	58.	56.	55.	53.	51.
105 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	71.	69.	66.	64.	60.	58.	56.	55.	53.	51.
120 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	68.	65.	62.	59.	57.	55.	53.	51.	49.
135 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	72.	70.	68.	65.	60.	58.	57.	55.	53.	51.	49.
150 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	74.	69.	65.	61.	60.	58.	56.	54.	52.	50.	48.
165 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	73.	69.	66.	63.	60.	58.	54.	52.	50.	49.	47.
180 -	110.	102.	98.	94.	88.	84.	81.	77.	74.	67.	66.	68.	64.	62.	59.	56.	54.	53.	51.	49.
195 -	110.	102.	98.	94.	88.	82.	79.	77.	74.	71.	69.	67.	64.	62.	59.	56.	54.	53.	51.	49.
210 -	110.	102.	98.	93.	88.	81.	78.	75.	72.	71.	67.	64.	61.	58.	57.	54.	52.	50.	49.	47.
225 -	110.	102.	98.	93.	88.	83.	79.	75.	71.	68.	65.	62.	59.	57.	56.	54.	52.	50.	49.	47.
240 -	110.	102.	97.	91.	86.	82.	79.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.	49.
255 -	110.	102.	97.	91.	86.	83.	80.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.	48.
270 -	110.	102.	97.	91.	86.	82.	79.	76.	74.	72.	69.	66.	64.	63.	59.	56.	54.	52.	50.	48.
285 -	110.	102.	97.	91.	87.	84.	79.	75.	74.	71.	67.	64.	64.	63.	59.	56.	54.	52.	50.	49.
300 -	110.	102.	98.	93.	88.	84.	80.	78.	75.	73.	70.	68.	66.	63.	61.	59.	57.	55.	53.	51.
315 -	110.	102.	98.	94.	86.	80.	79.	75.	70.	68.	66.	63.	61.	59.	57.	55.	54.	53.	51.	50.
330 -	110.	102.	97.	93.	88.	84.	82.	78.	76.	73.	70.	68.	65.	59.	57.	55.	54.	53.	51.	50.
345 -	110.	102.	97.	92.	88.	84.	82.	79.	75.	72.	63.	67.	65.	63.	61.	58.	56.	55.	53.	51.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-55
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	86.	82.	80.	76.	71.	68.	65.	61.	58.	50.	55.	53.	51.	49.	48.
15 -	110.	102.	98.	94.	90.	86.	82.	78.	74.	66.	69.	67.	65.	62.	59.	53.	56.	55.	53.	51.
30 -	110.	102.	98.	94.	90.	84.	82.	78.	74.	72.	63.	67.	61.	63.	60.	59.	57.	55.	53.	51.
45 -	110.	102.	98.	94.	90.	84.	79.	77.	74.	72.	67.	61.	62.	60.	56.	53.	51.	50.	48.	46.
60 -	110.	102.	98.	94.	88.	84.	81.	77.	73.	71.	67.	65.	60.	60.	57.	54.	52.	50.	49.	47.
75 -	110.	102.	98.	94.	88.	84.	81.	77.	72.	67.	65.	63.	60.	56.	55.	52.	50.	49.	47.	45.
90 -	110.	102.	98.	93.	88.	83.	78.	73.	69.	68.	65.	64.	61.	59.	57.	53.	51.	50.	48.	46.
105 -	110.	102.	98.	93.	87.	80.	77.	74.	71.	66.	66.	64.	60.	54.	49.	48.	46.	45.	43.	42.
120 -	110.	102.	98.	93.	88.	84.	79.	72.	70.	69.	66.	63.	60.	58.	56.	53.	51.	50.	48.	46.
135 -	110.	102.	98.	93.	85.	81.	79.	74.	71.	68.	63.	64.	62.	60.	57.	55.	53.	51.	49.	48.
150 -	110.	102.	97.	93.	85.	80.	76.	73.	72.	70.	68.	58.	52.	51.	49.	47.	45.	44.	42.	41.
165 -	110.	102.	98.	93.	85.	80.	76.	74.	71.	67.	65.	62.	60.	58.	53.	51.	49.	48.	46.	45.
180 -	110.	102.	98.	91.	88.	81.	78.	74.	71.	66.	67.	64.	60.	54.	50.	47.	46.	45.	43.	42.
195 -	110.	102.	98.	90.	87.	82.	78.	74.	71.	68.	66.	63.	58.	58.	56.	53.	51.	50.	48.	46.
210 -	110.	102.	98.	91.	88.	84.	79.	76.	73.	69.	67.	64.	58.	58.	56.	53.	51.	50.	48.	46.
225 -	110.	102.	98.	92.	87.	83.	80.	77.	71.	69.	63.	61.	58.	58.	56.	55.	53.	51.	49.	48.
240 -	110.	102.	98.	93.	86.	81.	78.	74.	73.	69.	67.	65.	58.	57.	55.	53.	51.	50.	48.	46.
255 -	110.	102.	98.	93.	86.	81.	78.	72.	65.	67.	63.	61.	59.	58.	57.	53.	51.	50.	48.	46.
270 -	110.	102.	97.	92.	84.	77.	77.	72.	65.	67.	65.	62.	59.	58.	57.	55.	53.	51.	49.	48.
285 -	110.	102.	98.	93.	88.	82.	77.	73.	62.	67.	59.	62.	57.	57.	56.	52.	50.	49.	47.	45.
300 -	110.	102.	98.	94.	88.	83.	77.	74.	72.	69.	66.	63.	63.	59.	57.	53.	51.	50.	48.	46.
315 -	110.	102.	98.	94.	88.	84.	79.	76.	67.	67.	70.	66.	61.	59.	55.	53.	51.	50.	48.	46.
330 -	110.	102.	98.	94.	88.	84.	81.	77.	76.	70.	65.	62.	60.	58.	53.	53.	51.	50.	48.	46.
345 -	110.	102.	98.	94.	89.	84.	81.	79.	76.	71.	68.	65.	61.	58.	55.	53.	51.	50.	48.	46.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-56
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																			
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	- 110.	102.	98.	94.	90.	85.	83.	79.	77.	73.	69.	67.	65.	63.	54.	51.	51.	51.	50.	50.	
15	- 110.	102.	98.	94.	90.	85.	82.	80.	77.	75.	72.	64.	63.	65.	63.	61.	59.	57.	55.	53.	
30	- 110.	102.	98.	94.	90.	85.	82.	79.	69.	70.	68.	67.	68.	65.	62.	59.	57.	55.	54.	52.	
45	- 110.	102.	98.	94.	90.	86.	83.	81.	78.	76.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.	
60	- 110.	102.	98.	94.	90.	87.	84.	80.	69.	76.	73.	70.	66.	64.	57.	55.	53.	51.	49.	48.	
75	- 110.	102.	98.	94.	90.	86.	84.	82.	79.	76.	73.	70.	66.	63.	59.	56.	54.	52.	50.	48.	
90	- 110.	102.	98.	94.	90.	87.	84.	81.	71.	76.	72.	70.	67.	63.	60.	58.	56.	54.	52.	50.	
105	- 110.	102.	98.	94.	90.	86.	83.	79.	69.	66.	67.	68.	68.	65.	60.	58.	56.	54.	52.	50.	
120	- 110.	102.	98.	93.	89.	86.	80.	79.	77.	73.	72.	66.	64.	65.	63.	60.	58.	56.	55.	53.	
135	- 110.	102.	98.	94.	90.	87.	83.	78.	74.	71.	69.	67.	65.	57.	55.	53.	53.	52.	52.	51.	
150	- 110.	102.	98.	94.	90.	87.	82.	78.	74.	72.	69.	67.	64.	62.	59.	58.	56.	54.	52.	50.	
165	- 110.	102.	98.	94.	89.	86.	83.	79.	75.	72.	69.	67.	65.	63.	61.	57.	55.	53.	51.	49.	
180	- 110.	102.	98.	94.	88.	85.	82.	80.	76.	72.	69.	67.	64.	62.	59.	58.	56.	54.	52.	50.	
195	- 110.	102.	98.	93.	88.	84.	81.	75.	76.	72.	69.	67.	64.	62.	60.	58.	56.	54.	52.	50.	
210	- 110.	102.	98.	93.	88.	84.	81.	78.	76.	72.	70.	68.	65.	63.	60.	58.	56.	54.	52.	50.	
225	- 110.	102.	98.	93.	88.	84.	79.	77.	74.	67.	69.	67.	65.	60.	58.	54.	52.	50.	49.	47.	
240	- 110.	102.	98.	93.	88.	84.	80.	76.	73.	69.	67.	65.	62.	59.	56.	54.	52.	50.	49.	47.	
255	- 110.	102.	98.	93.	89.	85.	81.	77.	72.	68.	66.	63.	60.	58.	48.	52.	51.	52.	50.	48.	
270	- 110.	102.	98.	93.	89.	85.	81.	76.	73.	70.	68.	64.	61.	55.	58.	53.	53.	51.	51.	49.	
285	- 110.	102.	98.	94.	90.	85.	82.	79.	75.	72.	70.	68.	65.	63.	61.	58.	56.	54.	52.	50.	
300	- 110.	102.	98.	94.	90.	87.	82.	79.	76.	74.	71.	68.	65.	61.	59.	56.	54.	53.	51.	49.	
315	- 110.	102.	98.	94.	90.	86.	83.	79.	77.	73.	71.	68.	66.	64.	61.	60.	58.	56.	54.	52.	
330	- 110.	102.	98.	94.	90.	85.	81.	77.	74.	72.	67.	64.	66.	64.	58.	56.	56.	55.	54.	52.	
345	- 110.	102.	98.	94.	90.	85.	81.	77.	74.	71.	69.	67.	64.	58.	61.	50.	50.	50.	49.	49.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-57
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	90.	86.	81.	78.	75.	73.	71.	69.	67.	65.	61.	59.	57.	55.	53.	51.
15 -	110.	102.	98.	94.	90.	86.	79.	80.	78.	75.	71.	68.	66.	67.	65.	63.	60.	58.	56.	54.
30 -	110.	102.	98.	94.	90.	85.	83.	78.	66.	70.	64.	66.	67.	65.	63.	60.	58.	56.	55.	53.
45 -	110.	102.	98.	94.	90.	87.	84.	80.	78.	75.	72.	69.	68.	67.	65.	63.	60.	58.	56.	54.
60 -	110.	102.	98.	94.	90.	85.	81.	77.	75.	69.	68.	64.	66.	63.	57.	56.	58.	56.	54.	52.
75 -	110.	102.	98.	93.	87.	85.	77.	76.	73.	74.	70.	64.	65.	63.	61.	59.	57.	55.	53.	51.
90 -	110.	102.	98.	92.	88.	84.	81.	79.	76.	72.	71.	68.	65.	63.	61.	59.	57.	55.	53.	51.
105 -	110.	102.	98.	92.	88.	85.	82.	78.	74.	72.	67.	68.	65.	63.	60.	57.	55.	54.	52.	50.
120 -	110.	102.	98.	93.	88.	84.	81.	78.	75.	73.	69.	65.	61.	60.	55.	56.	54.	52.	50.	48.
135 -	110.	102.	98.	93.	90.	85.	82.	79.	76.	73.	70.	65.	64.	62.	58.	57.	55.	54.	52.	48.
150 -	110.	102.	98.	93.	89.	84.	81.	71.	77.	73.	70.	67.	61.	63.	61.	58.	56.	54.	52.	50.
165 -	110.	102.	98.	94.	89.	85.	83.	80.	72.	66.	70.	68.	66.	59.	61.	59.	57.	55.	54.	52.
180 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	71.	71.	68.	67.	65.	61.	60.	58.	56.	54.	52.
195 -	110.	102.	98.	93.	90.	86.	84.	81.	77.	73.	71.	70.	67.	65.	62.	60.	58.	56.	54.	52.
210 -	110.	102.	98.	94.	90.	87.	82.	80.	76.	74.	72.	70.	68.	65.	61.	58.	56.	55.	53.	51.
225 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	75.	73.	71.	68.	64.	61.	50.	53.	55.	53.	51.
240 -	110.	102.	98.	94.	90.	86.	83.	80.	75.	74.	66.	68.	66.	64.	63.	58.	56.	55.	53.	51.
255 -	110.	102.	98.	93.	84.	86.	81.	77.	76.	73.	70.	64.	66.	60.	62.	60.	58.	56.	54.	52.
270 -	110.	102.	98.	92.	88.	85.	81.	77.	70.	68.	65.	65.	63.	60.	61.	55.	58.	56.	54.	52.
285 -	110.	102.	97.	91.	88.	84.	81.	77.	70.	72.	69.	67.	63.	61.	59.	51.	51.	51.	51.	50.
300 -	110.	102.	98.	92.	87.	84.	80.	77.	75.	73.	70.	69.	58.	59.	63.	60.	58.	56.	54.	52.
315 -	110.	102.	98.	93.	88.	84.	82.	78.	74.	66.	67.	68.	65.	63.	61.	59.	57.	55.	54.	52.
330 -	110.	102.	98.	94.	90.	84.	82.	72.	76.	72.	69.	63.	65.	63.	60.	58.	56.	55.	53.	51.
345 -	110.	102.	98.	93.	90.	86.	84.	81.	78.	74.	72.	68.	65.	57.	55.	55.	55.	54.	53.	53.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-5B
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	88.	84.	81.	78.	75.	73.	71.	67.	65.	62.	60.	58.	56.	54.	52.	50.
15 -	110.	102.	98.	94.	89.	84.	82.	79.	76.	73.	71.	69.	66.	65.	62.	60.	58.	56.	55.	53.
30 -	110.	102.	98.	94.	90.	85.	82.	74.	77.	74.	71.	68.	66.	58.	62.	60.	58.	56.	55.	53.
45 -	110.	102.	98.	94.	89.	86.	84.	80.	77.	75.	72.	70.	67.	65.	63.	60.	58.	56.	54.	52.
60 -	110.	102.	98.	94.	90.	85.	82.	80.	74.	72.	72.	68.	60.	64.	61.	59.	57.	55.	54.	52.
75 -	110.	102.	98.	94.	90.	88.	84.	81.	77.	74.	72.	68.	65.	63.	61.	58.	56.	55.	53.	51.
90 -	110.	102.	98.	94.	90.	85.	83.	80.	75.	72.	69.	67.	65.	63.	56.	54.	54.	54.	53.	53.
105 -	110.	102.	98.	94.	89.	85.	82.	79.	75.	72.	63.	68.	65.	62.	53.	52.	52.	52.	51.	51.
120 -	110.	102.	98.	94.	90.	86.	81.	78.	75.	71.	69.	66.	62.	55.	52.	50.	50.	50.	49.	48.
135 -	110.	102.	98.	94.	90.	86.	82.	80.	77.	72.	70.	67.	64.	60.	58.	56.	54.	53.	51.	49.
150 -	110.	102.	98.	94.	90.	87.	84.	81.	77.	75.	72.	67.	65.	62.	59.	56.	54.	52.	50.	48.
165 -	110.	102.	98.	94.	90.	88.	84.	81.	76.	72.	70.	68.	65.	62.	53.	59.	57.	55.	53.	51.
180 -	110.	102.	98.	94.	81.	80.	80.	81.	77.	72.	64.	67.	61.	60.	56.	59.	57.	55.	54.	52.
195 -	110.	102.	98.	94.	90.	88.	84.	82.	79.	76.	71.	69.	66.	56.	62.	58.	56.	55.	53.	51.
210 -	110.	102.	98.	94.	90.	88.	79.	81.	78.	76.	74.	70.	68.	66.	63.	61.	59.	57.	55.	53.
225 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	75.	71.	70.	64.	61.	63.	62.	60.	58.	56.	54.
240 -	110.	102.	98.	94.	90.	86.	82.	78.	77.	69.	71.	68.	65.	57.	61.	60.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	74.	72.	68.	55.	64.	61.	53.	55.	57.	55.	53.
270 -	110.	102.	98.	94.	90.	86.	84.	81.	78.	75.	72.	70.	67.	65.	63.	61.	59.	57.	55.	53.
285 -	110.	102.	98.	94.	90.	87.	81.	79.	76.	73.	71.	67.	64.	65.	63.	60.	58.	56.	54.	52.
300 -	110.	102.	98.	94.	90.	86.	82.	80.	77.	73.	72.	68.	65.	61.	61.	58.	56.	55.	53.	51.
315 -	110.	102.	98.	94.	90.	85.	82.	79.	74.	74.	70.	67.	65.	62.	60.	56.	54.	53.	51.	49.
330 -	110.	102.	98.	94.	90.	84.	82.	79.	73.	74.	70.	66.	64.	61.	59.	57.	55.	53.	51.	49.
345 -	110.	102.	98.	94.	88.	84.	80.	78.	76.	72.	69.	67.	65.	63.	61.	59.	57.	55.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAWBA-59
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)										DISTANCE FROM SIREN (FEET)									
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	73.	70.	67.	63.	53.	55.	55.	56.	55.	53.
15 -	110.	102.	98.	94.	90.	88.	84.	82.	79.	76.	71.	61.	62.	63.	62.	58.	56.	55.	53.	51.
30 -	110.	102.	98.	94.	90.	78.	84.	78.	76.	76.	73.	70.	65.	63.	61.	58.	56.	55.	53.	51.
45 -	110.	102.	98.	94.	77.	81.	85.	82.	79.	76.	72.	68.	65.	53.	61.	57.	55.	54.	52.	50.
60 -	110.	102.	98.	94.	90.	86.	82.	71.	70.	70.	70.	71.	68.	65.	63.	60.	58.	56.	54.	52.
75 -	110.	102.	98.	94.	90.	86.	84.	81.	78.	76.	73.	69.	67.	65.	63.	59.	57.	55.	53.	51.
90 -	110.	102.	98.	93.	90.	87.	82.	80.	73.	74.	66.	69.	66.	63.	61.	58.	56.	55.	53.	51.
105 -	110.	102.	98.	94.	90.	86.	82.	80.	77.	74.	71.	69.	66.	65.	63.	60.	58.	56.	55.	53.
120 -	110.	102.	98.	94.	89.	85.	81.	78.	76.	73.	70.	67.	65.	58.	61.	58.	56.	55.	53.	51.
135 -	110.	102.	98.	94.	90.	85.	83.	78.	76.	73.	69.	68.	65.	63.	61.	58.	56.	55.	53.	51.
150 -	110.	102.	98.	94.	90.	86.	84.	81.	76.	72.	69.	63.	65.	63.	52.	54.	55.	56.	54.	52.
165 -	110.	102.	98.	94.	90.	87.	85.	80.	76.	73.	71.	68.	67.	60.	63.	60.	58.	56.	55.	53.
180 -	110.	102.	98.	94.	90.	86.	83.	76.	78.	76.	73.	70.	68.	65.	63.	60.	58.	56.	54.	52.
195 -	110.	102.	98.	94.	90.	86.	82.	69.	71.	74.	72.	69.	67.	63.	60.	57.	55.	54.	52.	50.
210 -	110.	102.	98.	86.	90.	87.	83.	76.	75.	75.	72.	68.	67.	63.	60.	58.	56.	55.	53.	51.
225 -	110.	102.	98.	88.	90.	87.	83.	80.	78.	76.	73.	70.	67.	64.	61.	59.	57.	55.	54.	52.
240 -	110.	102.	98.	94.	90.	87.	84.	74.	79.	76.	72.	68.	65.	63.	61.	56.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	90.	81.	84.	81.	79.	76.	72.	64.	68.	65.	61.	59.	57.	55.	53.	51.
270 -	110.	102.	98.	94.	90.	81.	84.	80.	78.	74.	72.	65.	67.	65.	62.	59.	57.	55.	54.	52.
285 -	110.	102.	98.	94.	90.	86.	82.	79.	71.	71.	69.	70.	66.	66.	64.	62.	60.	58.	56.	54.
300 -	110.	102.	98.	94.	90.	78.	83.	81.	77.	75.	73.	67.	68.	66.	63.	60.	58.	56.	54.	52.
315 -	110.	102.	98.	94.	90.	88.	83.	80.	78.	68.	70.	70.	68.	65.	62.	59.	57.	55.	54.	52.
330 -	110.	102.	98.	94.	90.	87.	84.	82.	78.	69.	73.	70.	68.	65.	60.	57.	55.	54.	52.	50.
345 -	110.	102.	98.	94.	90.	87.	84.	82.	79.	76.	73.	70.	67.	63.	61.	58.	56.	55.	53.	51.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-60
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	81.	84.	74.	78.	75.	72.	71.	67.	64.	63.	60.	57.	56.	55.	52.
15 -	110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	72.	70.	68.	63.	64.	62.	60.	57.	56.	54.
30 -	110.	102.	98.	94.	90.	88.	85.	80.	78.	71.	73.	70.	68.	65.	63.	60.	58.	49.	49.	49.
45 -	110.	102.	98.	94.	84.	88.	84.	81.	77.	70.	72.	70.	66.	64.	61.	60.	55.	56.	50.	50.
60 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	69.	72.	69.	66.	58.	63.	56.	56.	57.	56.	52.
75 -	110.	102.	98.	94.	90.	85.	83.	80.	78.	74.	71.	69.	67.	55.	63.	60.	58.	55.	53.	51.
90 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	74.	72.	70.	64.	65.	63.	59.	56.	55.	52.	51.
105 -	110.	102.	98.	94.	89.	85.	82.	79.	77.	74.	66.	67.	68.	65.	63.	59.	57.	55.	52.	50.
120 -	110.	102.	98.	93.	88.	85.	83.	78.	76.	72.	64.	63.	61.	60.	59.	61.	58.	55.	53.	51.
135 -	110.	102.	98.	94.	88.	85.	82.	78.	75.	72.	70.	67.	65.	62.	60.	57.	56.	54.	51.	49.
150 -	110.	102.	98.	94.	90.	88.	83.	79.	72.	73.	71.	62.	67.	64.	63.	60.	56.	54.	53.	48.
165 -	110.	102.	98.	94.	90.	87.	83.	79.	76.	63.	66.	70.	68.	64.	61.	50.	57.	56.	54.	48.
180 -	110.	102.	98.	94.	90.	87.	84.	74.	77.	74.	72.	67.	64.	64.	63.	61.	59.	57.	56.	54.
195 -	110.	102.	98.	94.	84.	84.	82.	79.	72.	72.	69.	68.	64.	63.	61.	62.	60.	58.	57.	55.
210 -	110.	102.	98.	93.	89.	84.	81.	77.	69.	73.	68.	58.	59.	62.	56.	53.	53.	50.	48.	45.
225 -	110.	102.	98.	94.	89.	86.	81.	79.	74.	71.	69.	65.	61.	59.	52.	48.	45.	45.	44.	43.
240 -	110.	102.	98.	94.	90.	87.	83.	79.	76.	73.	71.	67.	63.	62.	55.	57.	56.	53.	50.	48.
255 -	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	73.	70.	67.	65.	62.	61.	59.	56.	55.	51.
270 -	110.	102.	98.	94.	90.	86.	82.	78.	76.	73.	71.	69.	67.	63.	61.	59.	57.	56.	48.	48.
285 -	110.	102.	98.	94.	90.	86.	82.	80.	73.	73.	73.	69.	67.	65.	63.	58.	57.	58.	56.	54.
300 -	110.	102.	98.	94.	88.	85.	82.	79.	76.	74.	69.	70.	66.	55.	62.	60.	58.	55.	53.	51.
315 -	110.	102.	98.	94.	90.	85.	81.	79.	76.	73.	71.	68.	65.	63.	60.	58.	54.	53.	54.	51.
330 -	110.	102.	98.	94.	90.	87.	83.	79.	76.	68.	71.	69.	66.	64.	62.	56.	50.	56.	54.	52.
345 -	110.	102.	98.	94.	90.	81.	85.	80.	76.	66.	71.	68.	65.	57.	59.	60.	57.	51.	51.	50.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-61
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	88.	84.	81.	77.	73.	72.	68.	65.	63.	59.	56.	54.	52.	50.	48.
15 -	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	69.	67.	63.	62.	59.	57.	55.	54.	52.	50.
30 -	110.	102.	98.	87.	90.	86.	83.	77.	77.	73.	72.	68.	65.	62.	60.	56.	54.	52.	50.	48.
45 -	110.	102.	98.	94.	90.	85.	83.	79.	72.	73.	70.	68.	64.	61.	58.	56.	54.	52.	50.	48.
60 -	110.	102.	98.	94.	90.	85.	81.	77.	76.	73.	65.	66.	64.	63.	61.	57.	56.	54.	51.	49.
75 -	110.	102.	98.	94.	90.	85.	81.	77.	74.	71.	69.	66.	64.	63.	57.	57.	55.	54.	52.	50.
90 -	110.	102.	98.	94.	90.	87.	83.	78.	74.	71.	69.	67.	64.	62.	60.	58.	56.	54.	52.	50.
105 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	74.	70.	67.	64.	62.	60.	58.	56.	54.	52.	50.
120 -	110.	102.	98.	94.	90.	86.	81.	76.	65.	64.	67.	66.	63.	57.	55.	55.	54.	55.	53.	51.
135 -	110.	102.	98.	93.	90.	85.	79.	75.	69.	64.	66.	65.	60.	59.	55.	53.	51.	50.	48.	46.
150 -	110.	102.	98.	91.	88.	84.	81.	75.	74.	71.	69.	64.	64.	59.	53.	51.	49.	48.	46.	45.
165 -	110.	102.	96.	91.	85.	81.	77.	74.	70.	68.	65.	57.	54.	52.	52.	52.	50.	49.	47.	45.
180 -	110.	102.	96.	90.	85.	81.	78.	76.	71.	67.	66.	63.	59.	57.	56.	52.	50.	49.	47.	45.
195 -	110.	102.	98.	93.	87.	84.	80.	77.	70.	68.	65.	63.	57.	56.	56.	52.	50.	49.	47.	45.
210 -	110.	102.	98.	93.	89.	84.	79.	74.	72.	66.	67.	64.	54.	56.	57.	56.	54.	52.	50.	48.
225 -	110.	102.	98.	94.	90.	82.	75.	77.	73.	70.	69.	61.	64.	62.	60.	56.	54.	52.	50.	48.
240 -	110.	102.	98.	94.	89.	83.	81.	77.	74.	68.	69.	63.	62.	61.	60.	58.	56.	54.	52.	50.
255 -	110.	102.	98.	94.	90.	83.	81.	78.	70.	69.	71.	65.	57.	60.	56.	54.	52.	50.	49.	47.
270 -	110.	102.	98.	94.	90.	82.	75.	74.	69.	67.	68.	66.	63.	60.	59.	56.	54.	52.	50.	48.
285 -	110.	102.	98.	94.	90.	84.	82.	77.	65.	65.	71.	65.	63.	60.	59.	54.	54.	52.	50.	48.
300 -	110.	102.	98.	88.	90.	86.	81.	79.	76.	68.	71.	68.	64.	62.	61.	57.	55.	54.	52.	50.
315 -	110.	102.	98.	94.	90.	85.	81.	77.	70.	67.	67.	66.	63.	60.	60.	60.	58.	56.	54.	52.
330 -	110.	102.	98.	94.	84.	87.	82.	78.	77.	69.	68.	70.	67.	64.	60.	57.	55.	53.	51.	49.
345 -	110.	102.	98.	94.	90.	85.	78.	75.	78.	75.	71.	69.	64.	58.	59.	53.	56.	55.	53.	51.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50. FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-62
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)										DISTANCE FROM SIREN (FEET)									
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	85.	82.	78.	75.	72.	70.	67.	65.	59.	59.	55.	55.	54.	53.	53.
15 -	110.	102.	98.	94.	90.	85.	82.	78.	76.	72.	70.	68.	60.	65.	62.	59.	57.	55.	53.	51.
30 -	110.	102.	98.	94.	90.	85.	82.	79.	77.	74.	71.	68.	65.	59.	56.	60.	58.	56.	54.	52.
45 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	72.	70.	68.	65.	62.	52.	58.	56.	54.	52.	50.
60 -	110.	102.	98.	94.	90.	85.	82.	78.	74.	71.	65.	64.	64.	62.	55.	57.	55.	53.	51.	49.
75 -	110.	102.	98.	93.	89.	84.	80.	78.	72.	64.	68.	65.	63.	62.	59.	56.	54.	52.	50.	48.
90 -	110.	102.	97.	92.	88.	84.	79.	75.	74.	71.	65.	64.	63.	60.	57.	54.	52.	50.	49.	47.
105 -	110.	102.	98.	91.	82.	83.	81.	77.	73.	71.	68.	64.	57.	60.	57.	53.	51.	50.	48.	46.
120 -	110.	102.	98.	91.	86.	77.	80.	77.	73.	69.	63.	66.	62.	58.	57.	47.	48.	47.	47.	46.
135 -	110.	102.	98.	92.	88.	85.	82.	77.	74.	72.	62.	66.	64.	62.	60.	58.	56.	54.	52.	50.
150 -	110.	102.	98.	94.	90.	87.	83.	78.	75.	74.	67.	69.	67.	64.	60.	56.	54.	52.	50.	48.
165 -	110.	102.	98.	92.	89.	80.	80.	80.	77.	74.	71.	69.	66.	64.	62.	60.	58.	56.	54.	52.
180 -	110.	102.	98.	93.	90.	86.	83.	81.	77.	75.	71.	69.	67.	62.	59.	57.	55.	54.	52.	50.
195 -	110.	102.	98.	94.	88.	85.	77.	73.	73.	75.	70.	68.	65.	64.	62.	60.	58.	56.	54.	52.
210 -	110.	102.	98.	94.	90.	85.	82.	70.	74.	73.	70.	68.	66.	64.	62.	60.	58.	56.	54.	52.
225 -	110.	102.	98.	94.	90.	80.	82.	72.	73.	75.	72.	68.	65.	62.	57.	55.	53.	51.	49.	48.
240 -	110.	102.	98.	94.	89.	81.	83.	79.	76.	73.	63.	68.	66.	62.	59.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	90.	85.	82.	74.	76.	73.	71.	69.	67.	65.	63.	60.	58.	56.	55.	53.
270 -	110.	102.	98.	94.	90.	86.	81.	76.	74.	72.	68.	67.	61.	59.	55.	53.	53.	52.	51.	50.
285 -	110.	102.	98.	93.	88.	84.	79.	77.	74.	71.	70.	67.	63.	60.	59.	58.	56.	55.	53.	51.
300 -	110.	102.	98.	94.	90.	84.	81.	77.	73.	70.	68.	67.	63.	61.	60.	57.	55.	53.	51.	49.
315 -	110.	102.	98.	94.	89.	86.	83.	77.	69.	72.	69.	67.	63.	61.	57.	56.	54.	52.	50.	48.
330 -	110.	102.	98.	94.	90.	84.	81.	79.	72.	74.	70.	60.	66.	63.	60.	57.	55.	53.	51.	49.
345 -	110.	102.	98.	94.	90.	86.	82.	79.	76.	74.	70.	67.	59.	59.	61.	55.	55.	54.	53.	53.

SIREN MODEL	FSC THUNDERROLLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-63
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	88.	84.	79.	76.	73.	70.	67.	65.	62.	60.	57.	55.	53.	51.	49.	48.
15	110.	102.	98.	94.	89.	84.	78.	75.	73.	70.	67.	65.	62.	60.	57.	55.	53.	51.	49.	48.
30	110.	102.	98.	94.	89.	85.	81.	74.	72.	68.	66.	63.	60.	58.	56.	53.	51.	50.	48.	46.
45	110.	102.	98.	92.	88.	84.	81.	78.	75.	72.	69.	65.	63.	60.	58.	56.	54.	52.	50.	48.
60	110.	102.	98.	92.	88.	84.	80.	75.	71.	70.	66.	59.	60.	57.	49.	48.	48.	47.	46.	45.
75	110.	102.	98.	93.	88.	84.	79.	76.	73.	69.	66.	61.	59.	57.	55.	51.	49.	48.	46.	45.
90	110.	102.	98.	93.	89.	85.	81.	77.	74.	71.	67.	64.	58.	59.	56.	49.	48.	46.	45.	43.
105	110.	102.	98.	94.	89.	85.	81.	78.	75.	72.	69.	67.	63.	62.	59.	57.	55.	54.	52.	50.
120	110.	102.	98.	94.	90.	85.	81.	77.	75.	73.	70.	68.	65.	63.	59.	57.	55.	53.	51.	49.
135	110.	102.	98.	94.	90.	86.	82.	78.	76.	73.	70.	67.	64.	61.	58.	55.	53.	51.	49.	48.
150	110.	102.	98.	94.	90.	85.	82.	79.	75.	72.	70.	67.	65.	61.	58.	55.	53.	51.	49.	48.
165	110.	102.	98.	94.	90.	86.	82.	79.	76.	73.	70.	67.	64.	59.	56.	52.	50.	49.	47.	45.
180	110.	102.	98.	94.	90.	86.	83.	78.	76.	72.	68.	65.	61.	58.	55.	53.	51.	50.	48.	46.
195	110.	102.	98.	94.	89.	85.	82.	78.	76.	73.	69.	66.	64.	62.	59.	53.	51.	50.	48.	46.
210	110.	102.	98.	93.	88.	84.	79.	76.	71.	63.	60.	60.	59.	60.	55.	51.	49.	48.	46.	45.
225	110.	102.	98.	92.	88.	82.	79.	76.	70.	68.	60.	65.	59.	56.	55.	54.	53.	51.	50.	48.
240	110.	102.	98.	92.	86.	84.	79.	75.	74.	69.	65.	58.	61.	59.	53.	51.	50.	49.	48.	47.
255	110.	102.	97.	91.	86.	83.	80.	78.	75.	73.	67.	59.	60.	58.	60.	57.	55.	53.	51.	49.
270	110.	102.	97.	91.	88.	85.	79.	77.	73.	71.	64.	67.	63.	61.	58.	53.	51.	50.	48.	46.
285	110.	102.	97.	91.	88.	81.	81.	78.	74.	67.	59.	60.	59.	56.	47.	52.	50.	49.	47.	45.
300	110.	102.	98.	92.	88.	85.	82.	77.	72.	69.	66.	64.	62.	60.	58.	56.	54.	52.	50.	48.
315	110.	102.	98.	93.	89.	85.	81.	75.	72.	69.	68.	65.	63.	60.	58.	56.	54.	52.	50.	48.
330	110.	102.	98.	94.	90.	85.	80.	74.	71.	68.	66.	63.	60.	58.	56.	53.	51.	50.	48.	46.
345	110.	102.	98.	94.	90.	85.	80.	75.	73.	70.	67.	65.	62.	60.	57.	55.	53.	51.	49.	48.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-64
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE		DISTANCE FROM SIREN (FEET)																			
FROM EAST (DEG)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	88.	85.	82.	78.	74.	70.	67.	65.	62.	58.	57.	57.	55.	53.	51.	49.	
15	110.	102.	98.	94.	90.	85.	80.	76.	74.	71.	67.	65.	63.	61.	59.	57.	55.	54.	52.	50.	
30	110.	102.	98.	94.	90.	86.	81.	77.	73.	69.	67.	64.	62.	59.	57.	56.	54.	52.	50.	48.	
45	110.	102.	98.	93.	88.	84.	79.	75.	73.	71.	67.	63.	62.	57.	55.	53.	52.	51.	49.	48.	
60	110.	102.	98.	93.	87.	83.	79.	75.	72.	69.	66.	63.	61.	57.	55.	52.	51.	49.	47.	45.	
75	110.	102.	98.	94.	88.	85.	80.	76.	74.	72.	70.	65.	62.	58.	57.	54.	52.	50.	49.	47.	
90	110.	102.	98.	94.	90.	85.	81.	78.	76.	73.	70.	67.	64.	58.	59.	57.	55.	54.	52.	50.	
105	110.	102.	98.	93.	90.	86.	82.	79.	77.	73.	71.	67.	63.	60.	58.	56.	54.	52.	50.	48.	
120	110.	102.	98.	93.	90.	87.	83.	79.	76.	72.	69.	67.	63.	61.	54.	54.	54.	53.	53.	51.	
135	110.	102.	98.	94.	90.	87.	84.	80.	76.	74.	71.	67.	59.	63.	61.	54.	58.	56.	54.	52.	
150	110.	102.	98.	94.	90.	87.	84.	81.	77.	75.	72.	69.	65.	63.	61.	59.	56.	55.	53.	51.	
165	110.	102.	98.	94.	90.	87.	85.	81.	76.	73.	70.	67.	63.	61.	59.	56.	54.	53.	51.	49.	
180	110.	102.	98.	94.	90.	87.	85.	81.	77.	74.	70.	67.	64.	58.	61.	56.	55.	55.	53.	52.	
195	110.	102.	98.	94.	90.	88.	85.	81.	77.	73.	70.	67.	65.	60.	56.	56.	55.	56.	54.	52.	
210	110.	102.	98.	94.	90.	88.	85.	81.	77.	72.	70.	67.	65.	63.	61.	57.	58.	56.	54.	52.	
225	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	71.	68.	65.	63.	62.	56.	56.	57.	55.	53.	
240	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	73.	70.	67.	64.	61.	59.	58.	56.	54.	52.	
255	110.	102.	98.	94.	90.	87.	83.	80.	77.	75.	72.	70.	68.	65.	63.	60.	59.	57.	55.	53.	
270	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	72.	69.	66.	64.	62.	58.	56.	55.	53.	51.	
285	110.	102.	98.	94.	90.	88.	84.	81.	77.	73.	71.	68.	65.	63.	58.	58.	56.	55.	53.	51.	
300	110.	102.	98.	94.	90.	88.	83.	80.	77.	73.	71.	67.	65.	62.	59.	57.	55.	53.	51.	49.	
315	110.	102.	98.	94.	90.	86.	82.	79.	77.	74.	71.	67.	64.	61.	59.	52.	56.	54.	52.	50.	
330	110.	102.	98.	94.	90.	85.	81.	78.	76.	72.	68.	65.	63.	60.	59.	56.	54.	53.	51.	49.	
345	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	68.	65.	64.	58.	58.	56.	56.	55.	53.	51.	

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-65
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	94.	98.	88.	88.	84.	79.	75.	73.	70.	68.	64.	61.	59.	58.	53.	54.	53.	51.	49.
15 -	110.	102.	98.	94.	90.	85.	81.	78.	75.	71.	67.	65.	63.	60.	59.	57.	55.	53.	51.	49.
30 -	110.	102.	98.	93.	88.	84.	81.	78.	76.	73.	70.	67.	65.	63.	61.	57.	58.	56.	54.	52.
45 -	110.	102.	98.	93.	87.	84.	79.	76.	73.	66.	60.	59.	58.	57.	56.	57.	55.	55.	54.	52.
60 -	110.	102.	98.	93.	88.	84.	81.	76.	73.	66.	63.	60.	58.	57.	58.	57.	55.	55.	54.	52.
75 -	110.	102.	98.	94.	89.	84.	80.	77.	74.	64.	63.	63.	66.	64.	61.	59.	57.	55.	54.	52.
90 -	110.	102.	98.	94.	90.	85.	80.	78.	70.	67.	67.	66.	67.	64.	61.	59.	57.	55.	53.	51.
105 -	110.	102.	98.	94.	90.	86.	83.	81.	77.	75.	71.	68.	62.	59.	49.	54.	52.	50.	49.	47.
120 -	110.	102.	98.	94.	88.	85.	77.	75.	77.	75.	71.	68.	63.	61.	57.	54.	52.	50.	49.	47.
135 -	110.	102.	98.	93.	88.	84.	82.	75.	73.	75.	72.	69.	66.	63.	62.	60.	58.	56.	54.	52.
150 -	110.	102.	98.	92.	88.	79.	78.	75.	77.	74.	70.	67.	64.	61.	59.	56.	54.	52.	50.	48.
165 -	110.	102.	98.	93.	89.	82.	80.	80.	77.	75.	72.	68.	65.	62.	60.	56.	54.	52.	50.	48.
180 -	110.	102.	98.	93.	89.	82.	83.	78.	76.	72.	69.	66.	63.	61.	57.	48.	49.	49.	49.	48.
195 -	110.	102.	98.	94.	90.	87.	84.	77.	75.	72.	68.	64.	61.	59.	57.	54.	52.	50.	49.	47.
210 -	110.	102.	98.	94.	90.	84.	81.	79.	75.	73.	70.	68.	64.	62.	57.	53.	51.	50.	48.	46.
225 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	71.	69.	67.	64.	62.	59.	56.	54.	52.	50.	48.
240 -	110.	102.	98.	94.	89.	86.	82.	78.	75.	71.	67.	65.	62.	60.	57.	55.	53.	51.	49.	48.
255 -	110.	102.	98.	93.	88.	84.	79.	75.	74.	71.	68.	65.	61.	58.	55.	52.	50.	49.	47.	45.
270 -	110.	102.	98.	91.	87.	83.	79.	75.	71.	68.	65.	62.	59.	57.	55.	52.	50.	49.	47.	45.
285 -	110.	102.	98.	93.	87.	83.	79.	75.	72.	69.	66.	62.	58.	56.	53.	51.	49.	48.	46.	45.
300 -	110.	102.	98.	92.	86.	83.	79.	77.	74.	70.	67.	63.	59.	58.	57.	52.	51.	51.	49.	48.
315 -	110.	102.	98.	91.	88.	84.	81.	76.	72.	69.	66.	62.	58.	57.	56.	51.	49.	48.	46.	45.
330 -	110.	102.	98.	93.	90.	84.	80.	77.	72.	69.	67.	63.	59.	58.	57.	51.	51.	49.	48.	47.
345 -	110.	102.	98.	94.	90.	84.	79.	75.	71.	69.	67.	64.	62.	60.	56.	55.	55.	53.	51.	49.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAMBA-66
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)				DISTANCE FROM SIREN (FEET)															
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	93.	88.	84.	81.	77.	67.	72.	70.	68.	65.	59.	61.	59.	57.	55.	54.	52.
15 -	110.	102.	98.	93.	88.	86.	82.	80.	77.	74.	71.	70.	67.	64.	62.	50.	53.	54.	56.	54.
30 -	110.	102.	98.	93.	89.	85.	82.	79.	76.	73.	71.	65.	67.	64.	63.	57.	59.	57.	56.	54.
45 -	110.	102.	98.	94.	90.	86.	82.	77.	67.	65.	71.	68.	65.	59.	54.	55.	55.	54.	55.	53.
60 -	110.	102.	98.	94.	81.	86.	84.	80.	77.	75.	65.	66.	68.	66.	64.	62.	60.	58.	56.	54.
75 -	110.	102.	98.	94.	90.	88.	84.	79.	76.	74.	72.	70.	64.	62.	64.	60.	58.	56.	54.	52.
90 -	110.	102.	98.	94.	90.	86.	72.	75.	78.	76.	74.	71.	68.	65.	61.	48.	50.	51.	52.	51.
105 -	110.	102.	98.	94.	90.	37.	84.	81.	71.	76.	73.	70.	67.	64.	62.	58.	56.	55.	53.	51.
120 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	74.	70.	68.	65.	62.	59.	57.	55.	54.	52.
135 -	110.	102.	98.	94.	90.	86.	84.	74.	78.	75.	63.	69.	59.	60.	61.	61.	59.	57.	56.	54.
150 -	110.	102.	98.	94.	90.	77.	80.	82.	78.	75.	70.	69.	58.	64.	61.	58.	56.	55.	53.	51.
165 -	110.	102.	98.	94.	84.	86.	84.	78.	76.	65.	65.	66.	67.	64.	59.	56.	54.	53.	51.	49.
180 -	110.	102.	98.	93.	90.	84.	82.	78.	77.	74.	69.	69.	65.	62.	61.	55.	53.	51.	49.	48.
195 -	110.	102.	98.	92.	88.	84.	81.	77.	74.	72.	70.	68.	66.	63.	59.	57.	55.	53.	51.	49.
210 -	110.	102.	98.	94.	86.	83.	79.	76.	74.	71.	69.	65.	63.	62.	58.	55.	53.	51.	49.	48.
225 -	110.	102.	98.	93.	88.	84.	81.	77.	74.	67.	62.	66.	63.	61.	57.	54.	52.	50.	49.	47.
240 -	110.	102.	98.	93.	89.	85.	82.	79.	77.	74.	70.	66.	63.	62.	59.	57.	55.	54.	52.	50.
255 -	110.	102.	98.	94.	90.	86.	83.	80.	76.	73.	70.	67.	65.	62.	59.	57.	55.	53.	51.	49.
270 -	110.	102.	98.	94.	90.	87.	82.	78.	74.	71.	62.	63.	63.	57.	54.	58.	56.	54.	52.	50.
285 -	110.	102.	98.	94.	90.	88.	82.	79.	76.	73.	71.	68.	66.	64.	63.	60.	58.	56.	55.	53.
300 -	110.	102.	98.	94.	90.	88.	84.	82.	78.	76.	72.	69.	67.	64.	56.	60.	58.	56.	54.	52.
315 -	110.	102.	98.	94.	90.	86.	83.	80.	77.	75.	73.	70.	68.	65.	63.	60.	58.	56.	55.	53.
330 -	110.	102.	98.	94.	90.	86.	82.	78.	75.	72.	70.	67.	61.	63.	60.	57.	55.	54.	52.	50.
345 -	110.	102.	98.	94.	89.	85.	81.	77.	73.	71.	68.	65.	63.	62.	59.	57.	55.	53.	51.	49.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

ACOUSTIC TECHNOLOGY INC.

SIREN NUMBER CATAMBA-67
 DUKE POWER COMPANY
 CATAMBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	87.	84.	82.	79.	76.	73.	71.	68.	64.	61.	57.	55.	53.	51.	49.
15 -	110.	102.	98.	94.	90.	88.	85.	82.	79.	76.	72.	68.	67.	59.	63.	58.	56.	55.	53.	51.
30 -	110.	102.	98.	94.	90.	88.	84.	82.	79.	76.	71.	67.	65.	61.	59.	46.	48.	48.	48.	48.
45 -	110.	102.	98.	94.	89.	81.	84.	81.	75.	76.	72.	69.	64.	62.	60.	56.	54.	53.	51.	49.
60 -	110.	102.	98.	94.	89.	84.	82.	79.	77.	71.	72.	70.	66.	65.	63.	60.	58.	56.	54.	52.
75 -	110.	102.	98.	93.	88.	86.	83.	80.	76.	74.	69.	70.	62.	65.	61.	58.	56.	54.	52.	50.
90 -	110.	102.	98.	94.	88.	80.	82.	79.	75.	73.	71.	69.	66.	63.	62.	57.	58.	56.	55.	53.
105 -	110.	102.	98.	92.	86.	75.	81.	77.	74.	66.	58.	60.	55.	58.	56.	53.	51.	50.	48.	46.
120 -	110.	102.	98.	93.	87.	82.	79.	75.	69.	68.	56.	62.	54.	54.	52.	51.	49.	48.	46.	45.
135 -	110.	102.	98.	93.	89.	80.	76.	74.	70.	62.	61.	61.	57.	55.	53.	51.	49.	47.	45.	44.
150 -	110.	102.	98.	94.	88.	81.	74.	74.	70.	69.	63.	53.	56.	58.	56.	53.	51.	50.	48.	46.
165 -	110.	102.	98.	94.	87.	85.	79.	74.	72.	68.	58.	62.	62.	60.	59.	53.	51.	50.	48.	46.
180 -	110.	102.	98.	94.	89.	84.	79.	76.	71.	65.	61.	62.	61.	57.	55.	54.	53.	52.	50.	49.
195 -	110.	102.	98.	94.	90.	84.	81.	78.	76.	74.	71.	69.	65.	62.	59.	57.	55.	53.	51.	49.
210 -	110.	102.	98.	94.	90.	86.	83.	79.	77.	75.	72.	67.	65.	63.	58.	54.	52.	50.	49.	47.
225 -	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	71.	68.	66.	62.	59.	57.	55.	53.	51.	49.
240 -	110.	102.	98.	94.	90.	87.	84.	81.	78.	74.	70.	67.	65.	62.	59.	57.	55.	53.	51.	49.
255 -	110.	102.	98.	94.	90.	86.	77.	81.	78.	75.	71.	69.	65.	63.	62.	60.	58.	56.	54.	52.
270 -	110.	102.	98.	94.	90.	87.	85.	80.	72.	75.	72.	70.	68.	65.	61.	55.	58.	56.	54.	52.
285 -	110.	102.	98.	94.	89.	85.	82.	79.	76.	72.	69.	67.	54.	60.	58.	59.	57.	55.	54.	52.
300 -	110.	102.	98.	93.	88.	84.	79.	77.	73.	70.	59.	60.	63.	60.	57.	56.	54.	52.	50.	48.
315 -	110.	102.	98.	93.	88.	84.	75.	76.	69.	71.	60.	67.	63.	60.	59.	56.	54.	53.	51.	49.
330 -	110.	102.	98.	94.	90.	85.	76.	78.	68.	72.	62.	60.	65.	63.	61.	56.	58.	56.	54.	52.
345 -	110.	102.	98.	94.	90.	86.	84.	81.	77.	74.	72.	69.	61.	65.	63.	61.	59.	57.	56.	54.

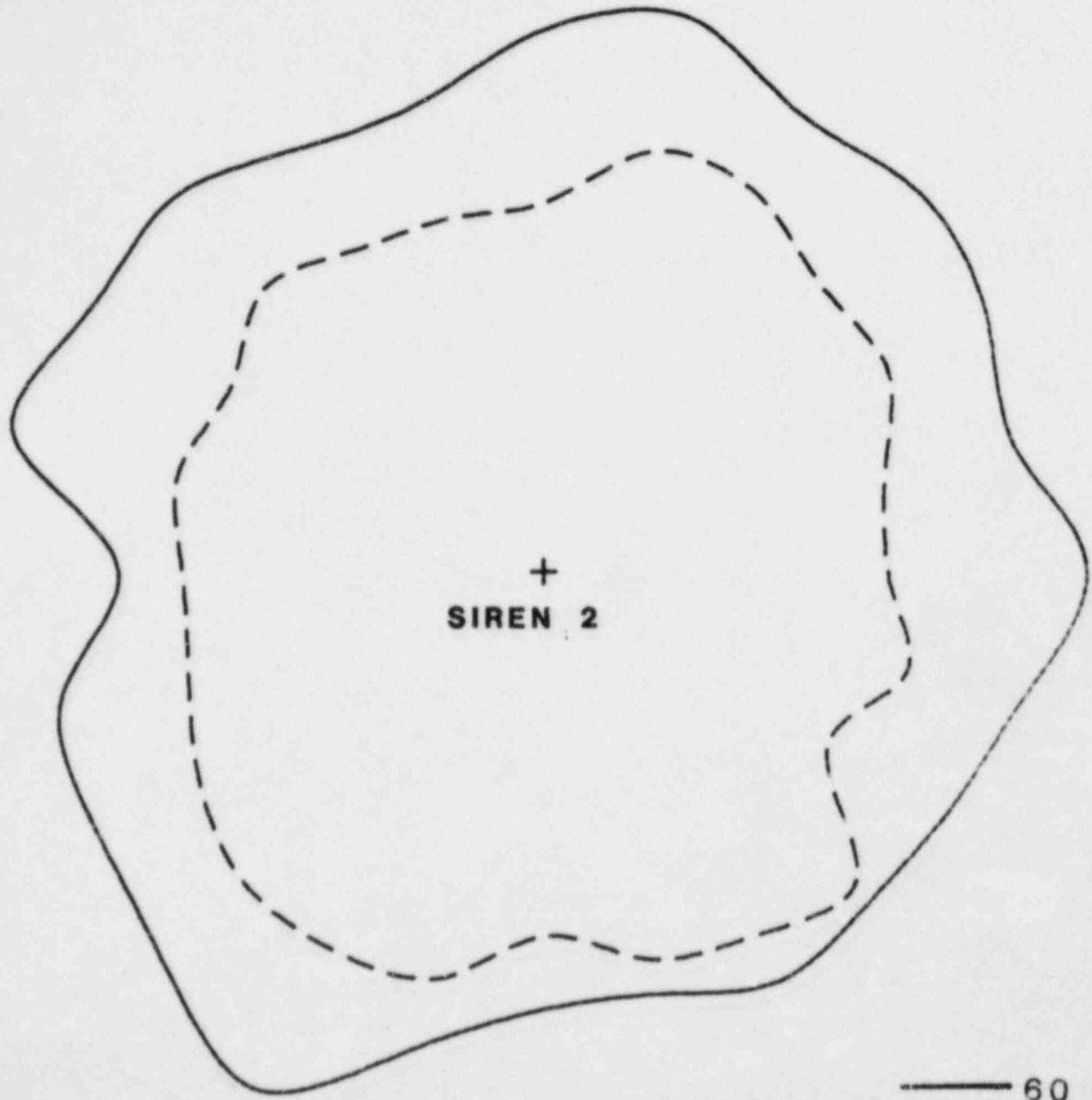
SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

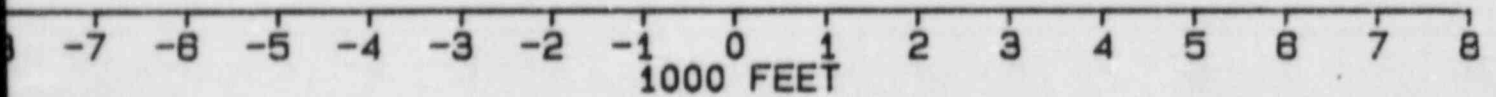
APPENDIX 1B: 60 and 70 dBC SIREN SOUND CONTOURS

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



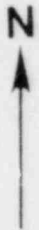
— 60 dBC
- - - 70 dBC



ACOUSTIC TECHNOLOGY INC.

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



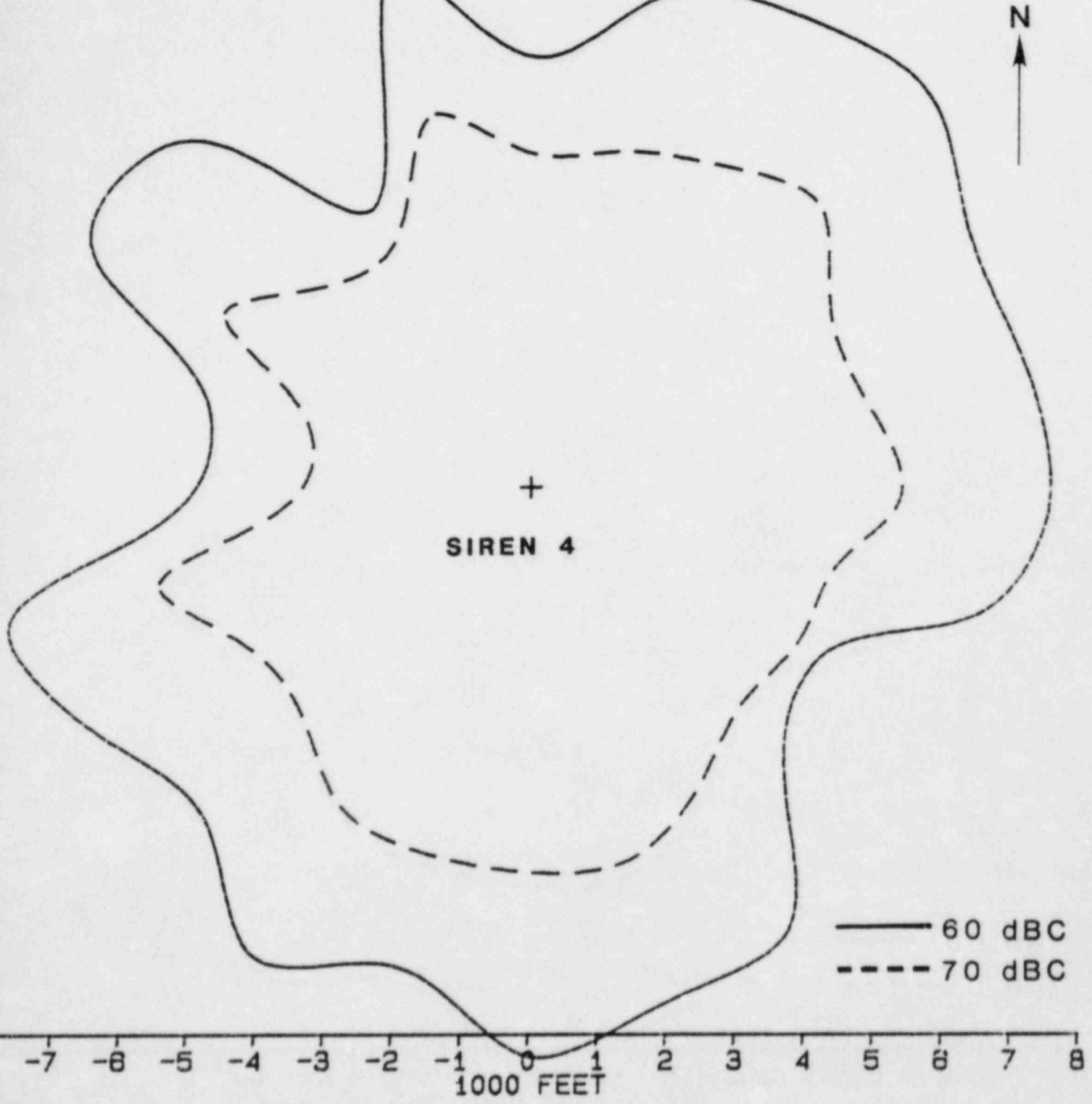
+
SIREN 3

— 60 dBC
- - - 70 dBC



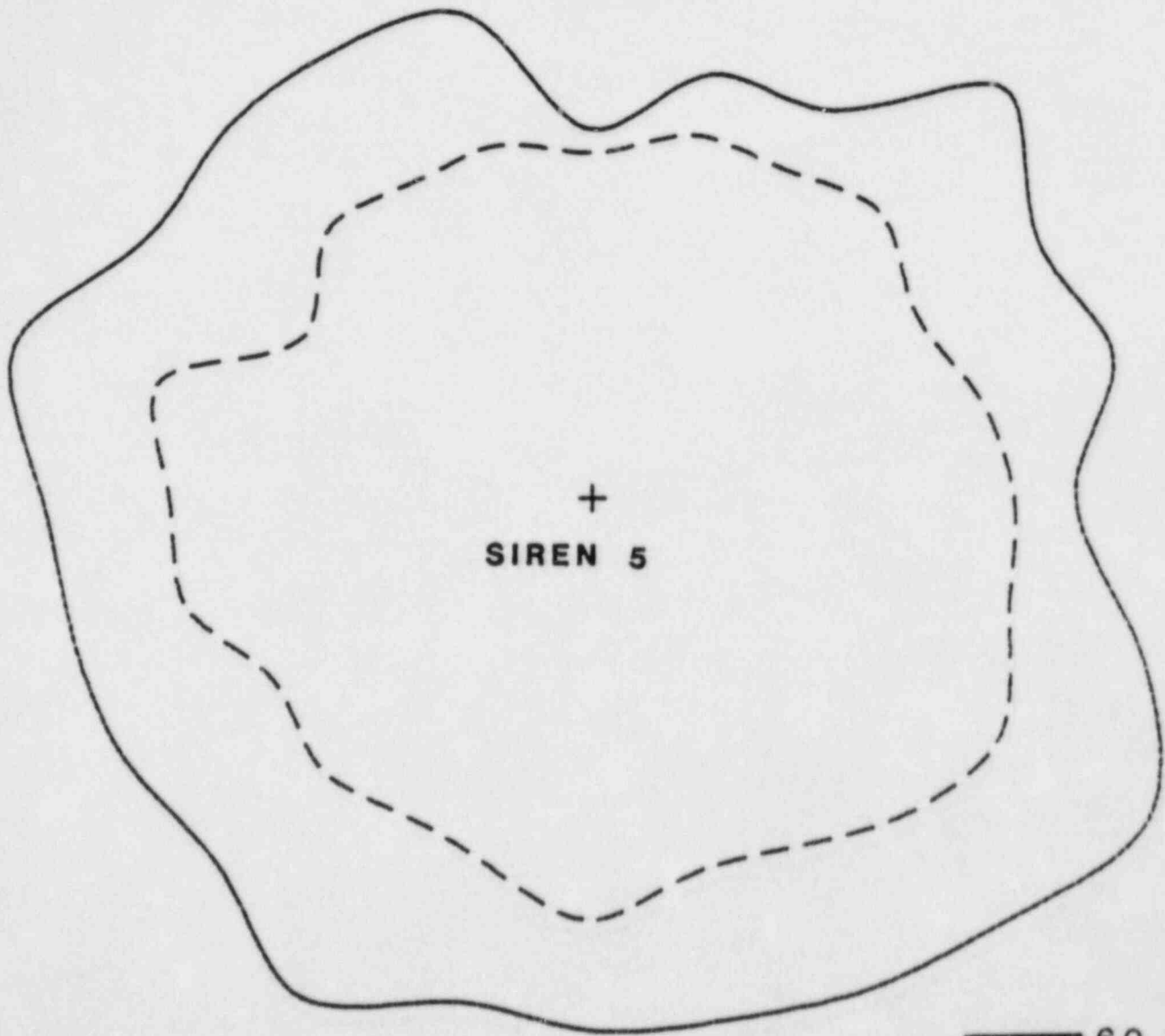
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**

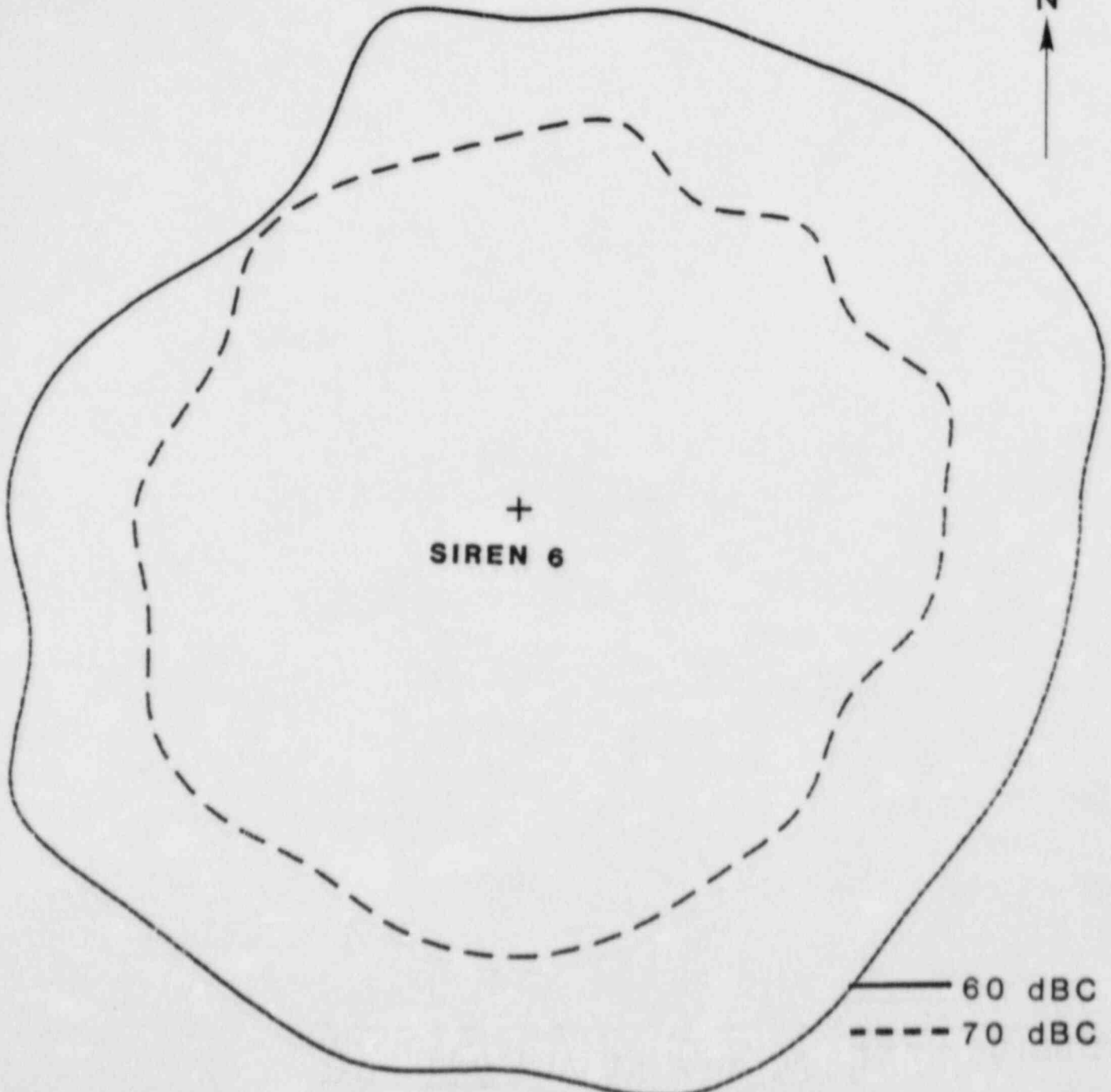


— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



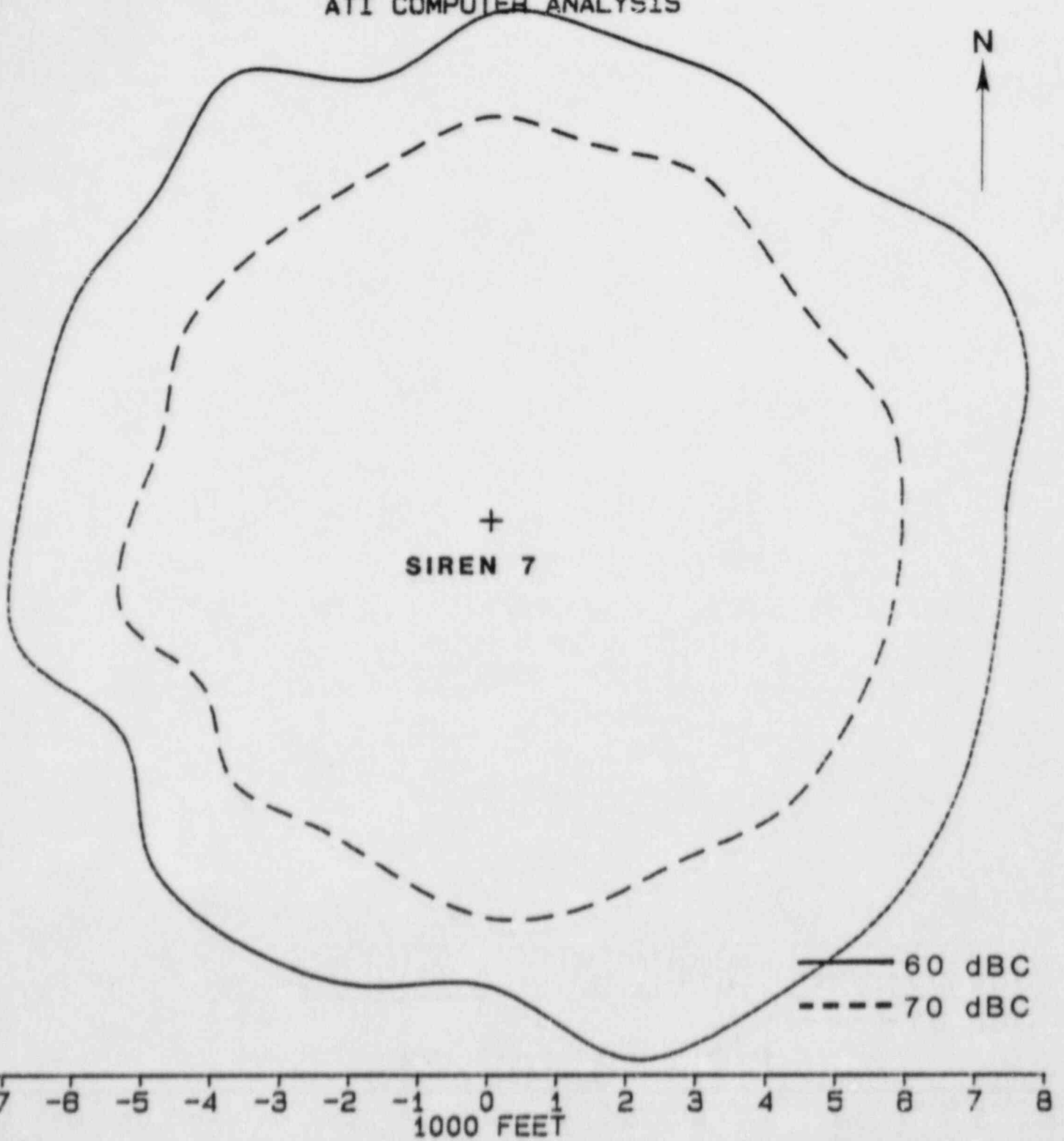
+
SIREN 6

— 60 dBC
- - - 70 dBC

3 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

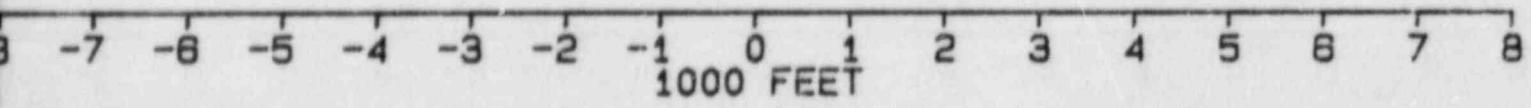
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



SIREN 8

— 60 dBC
- - - 70 dBC



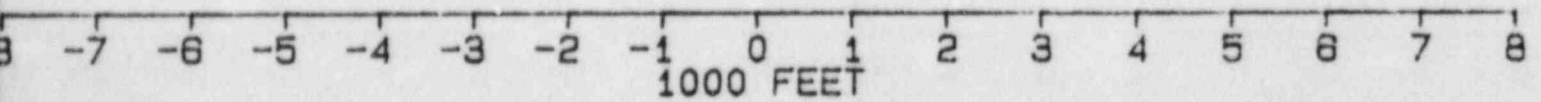
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

ATI COMPUTER ANALYSIS



SIREN 9

— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATT COMPUTER ANALYSIS

N

+

SIREN 10

— 60 dBC

- - - 70 dBC

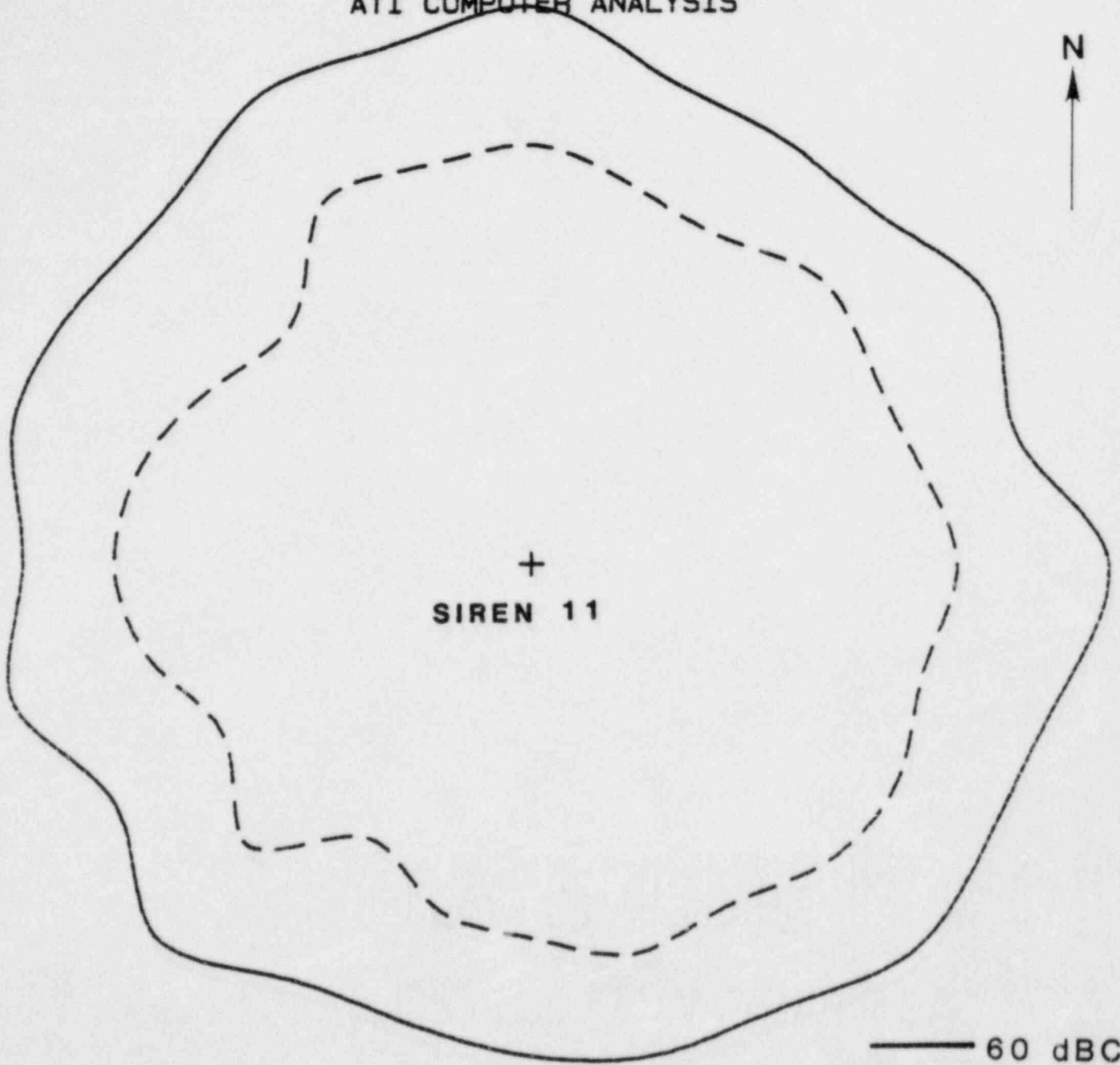
8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



ACOUSTIC TECHNOLOGY INC.

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



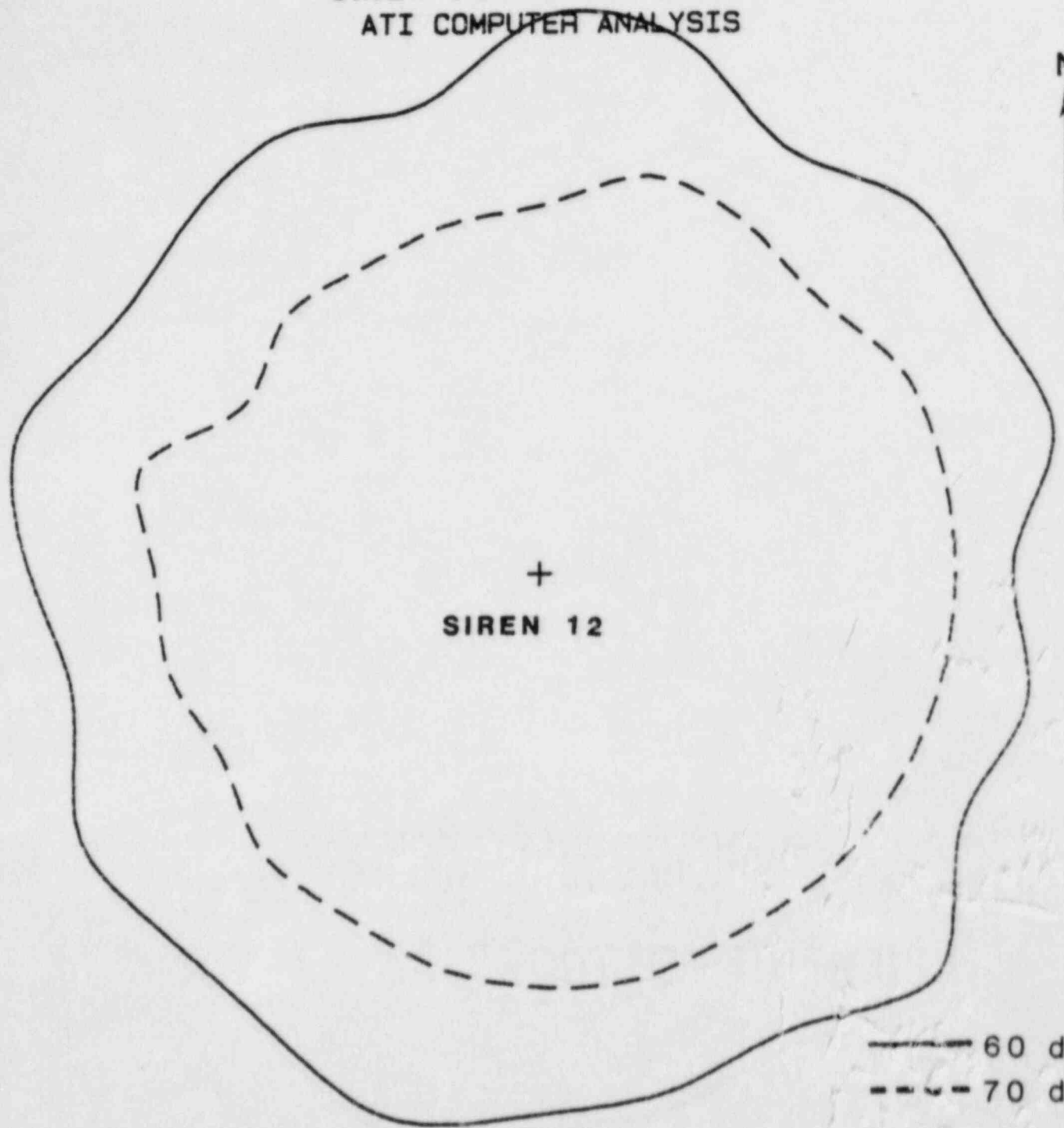
+
SIREN 11

—— 60 dBC
- - - 70 dBC

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



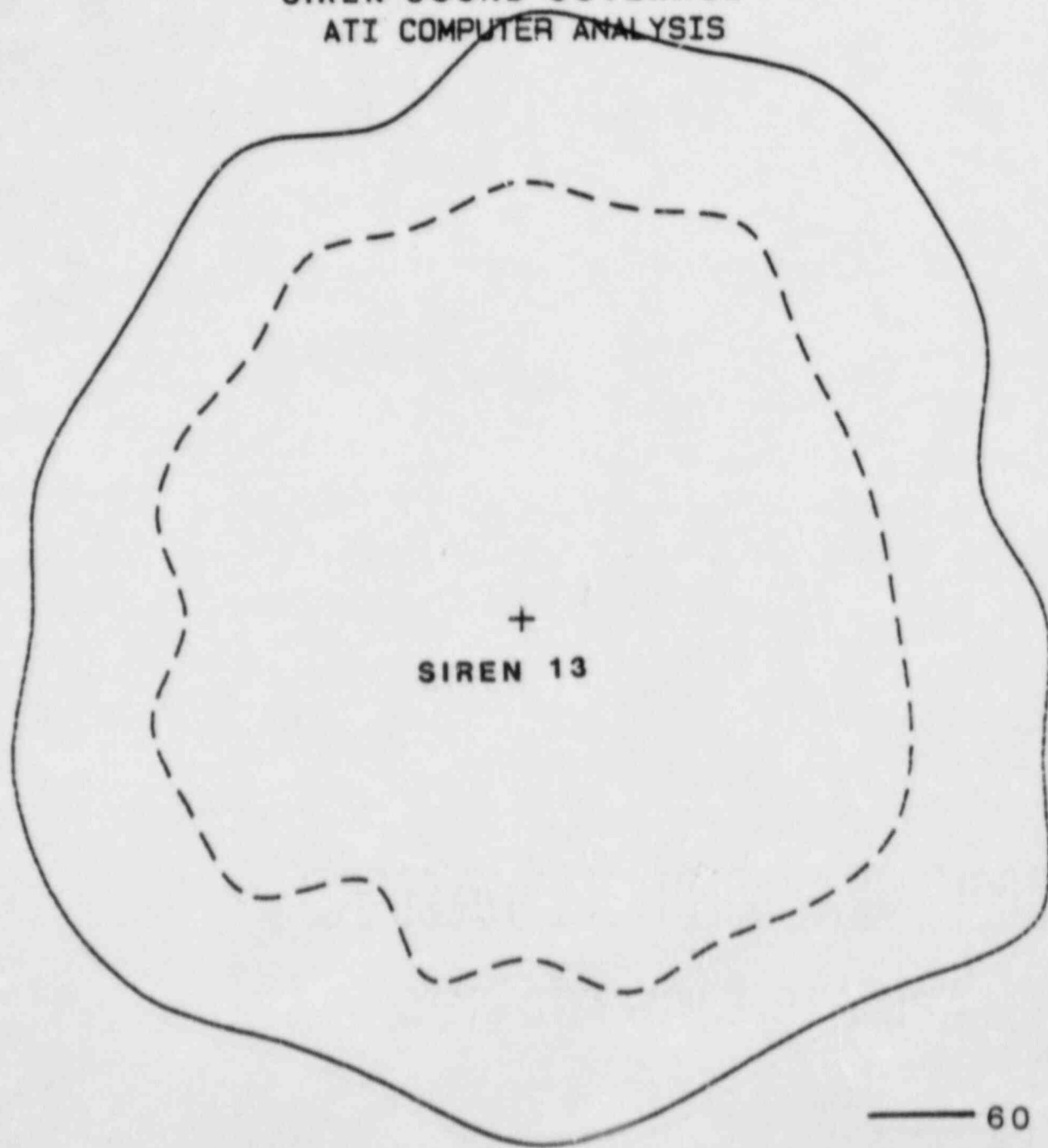
+
SIREN 12

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



+
SIREN 13

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 14

— 60 dBC
- - - 70 dBC

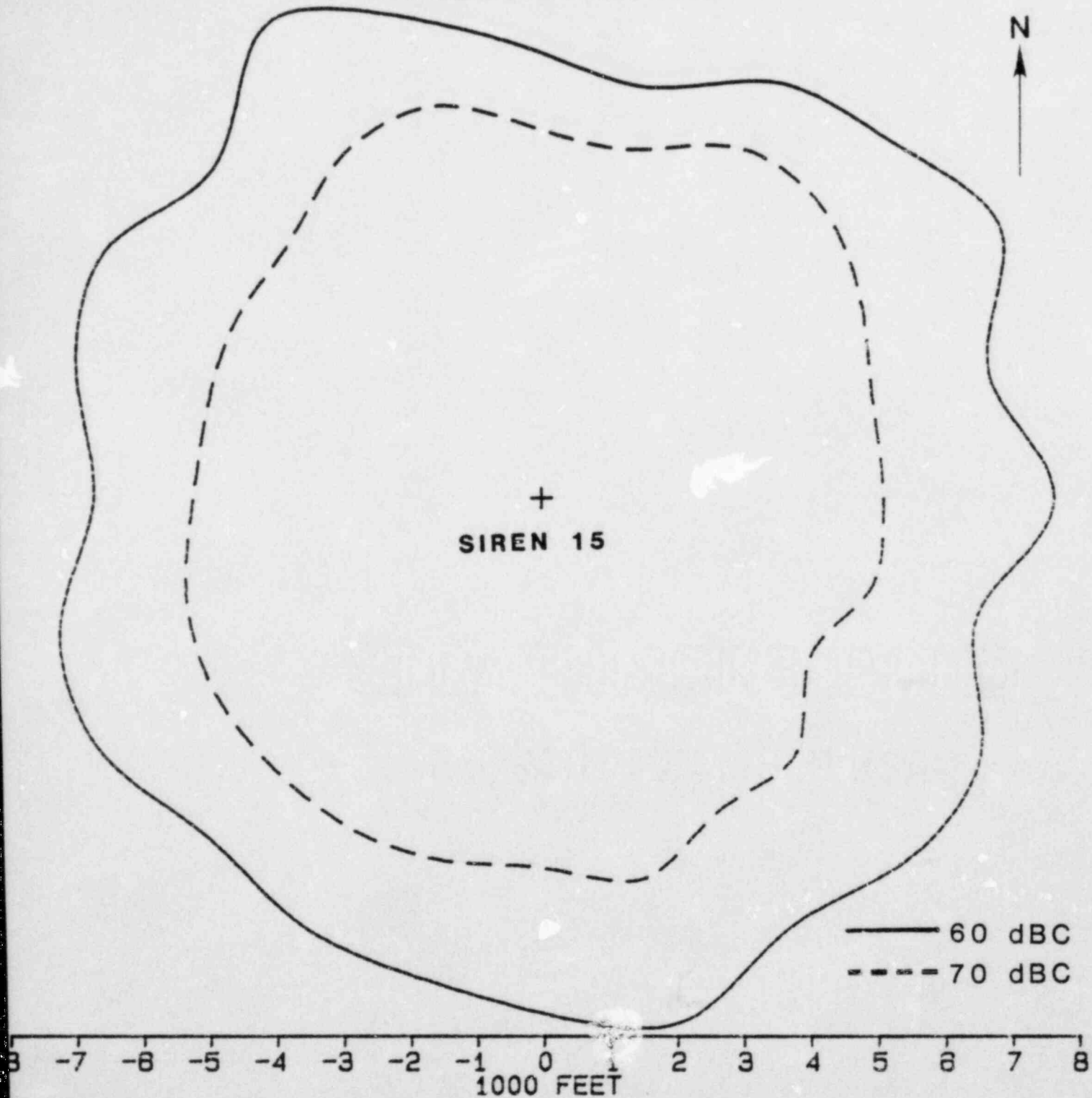
8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



ACOUSTIC TECHNOLOGY INC.

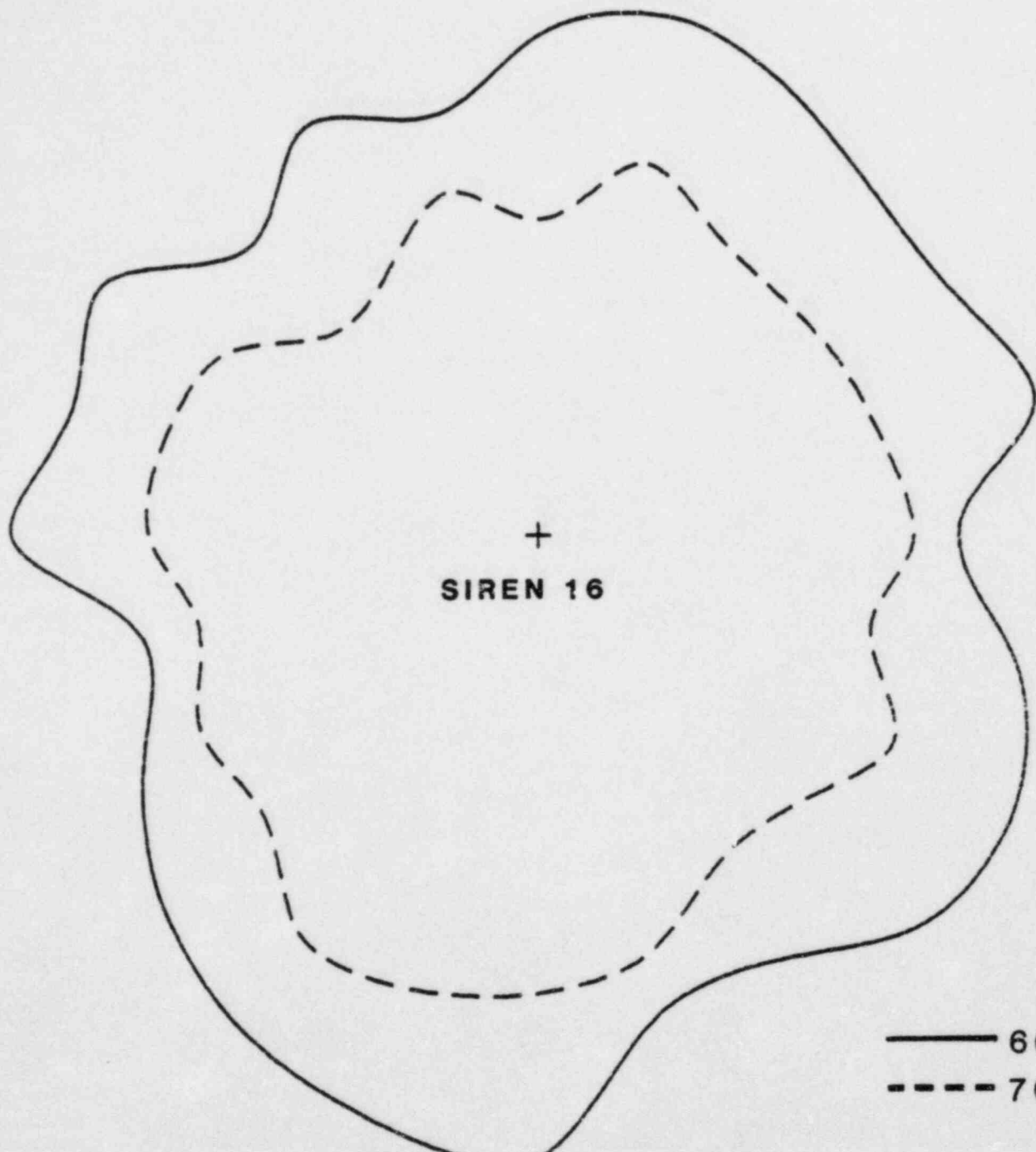
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



+
SIREN 16

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



+
SIREN 17

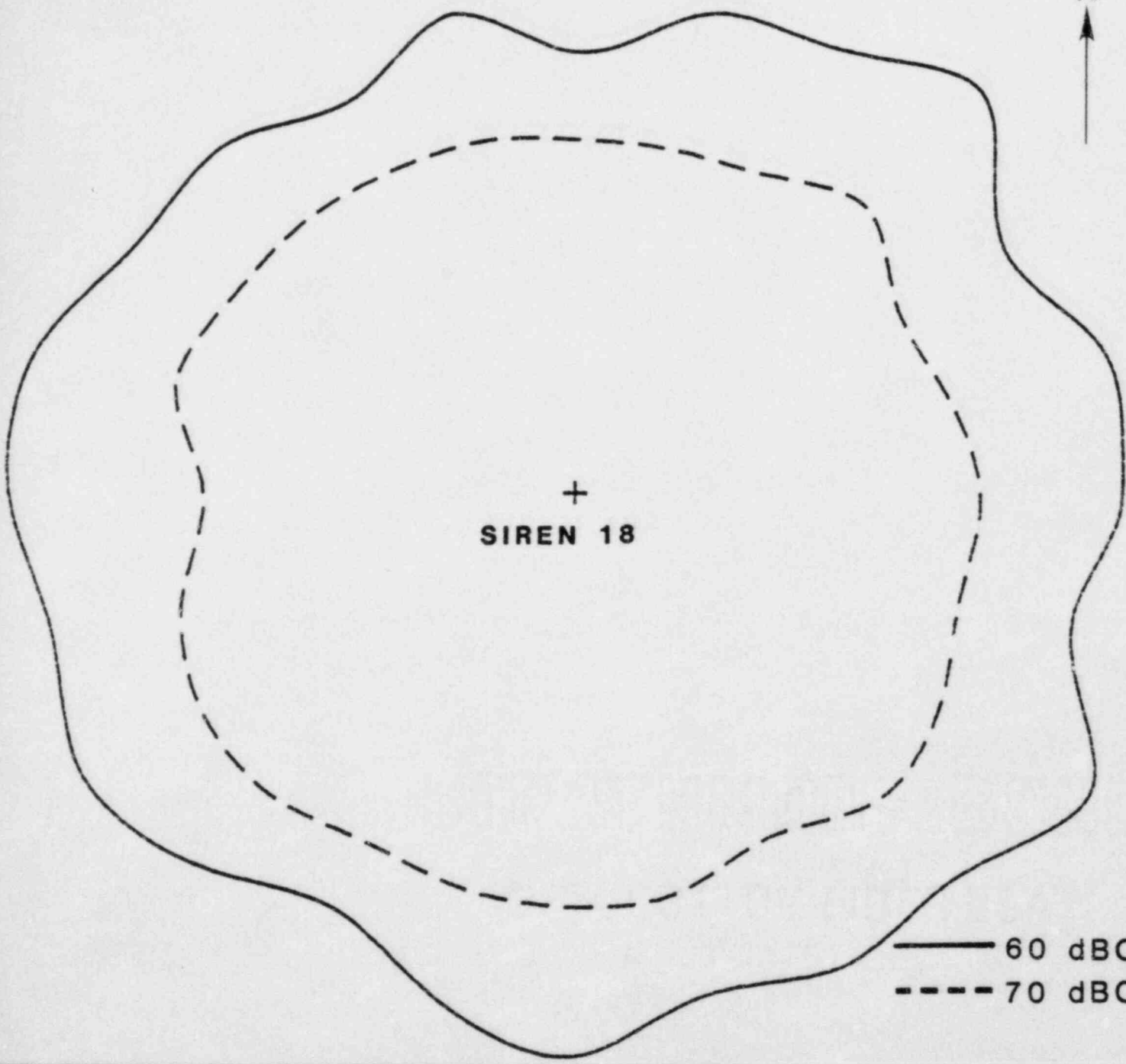
— 60 dBC
- - - 70 dBC



ACOUSTIC TECHNOLOGY INC.

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



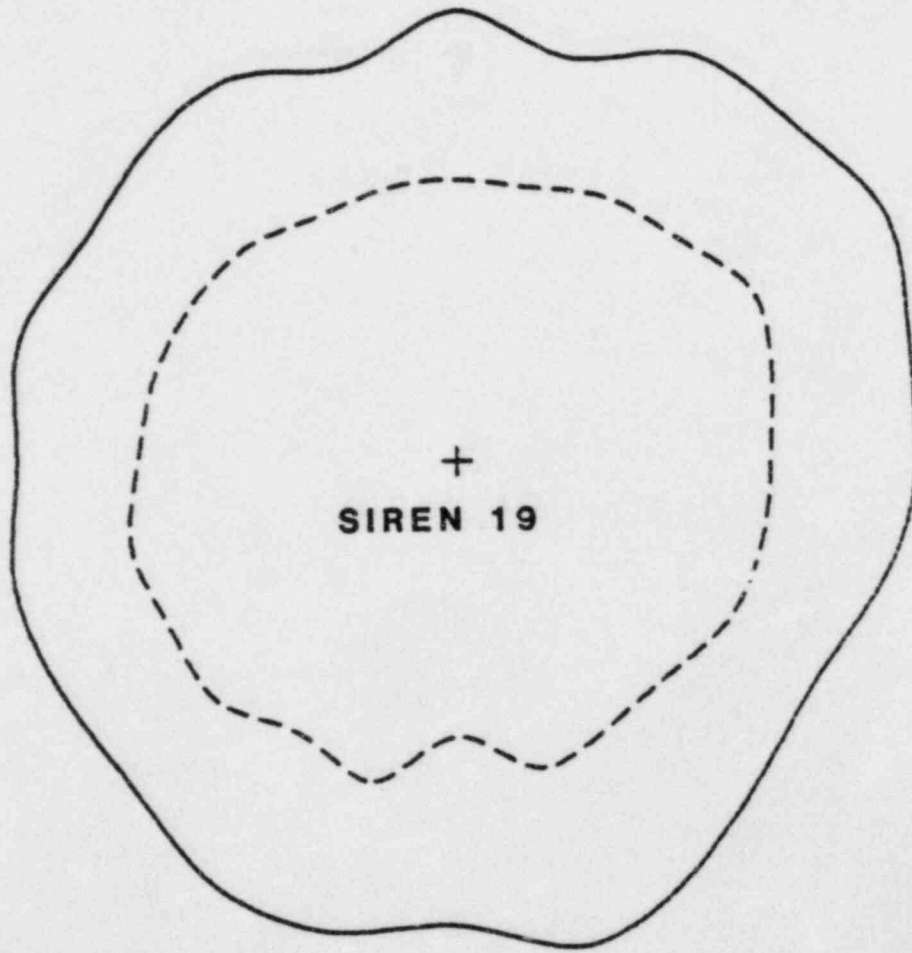
+
SIREN 18

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**

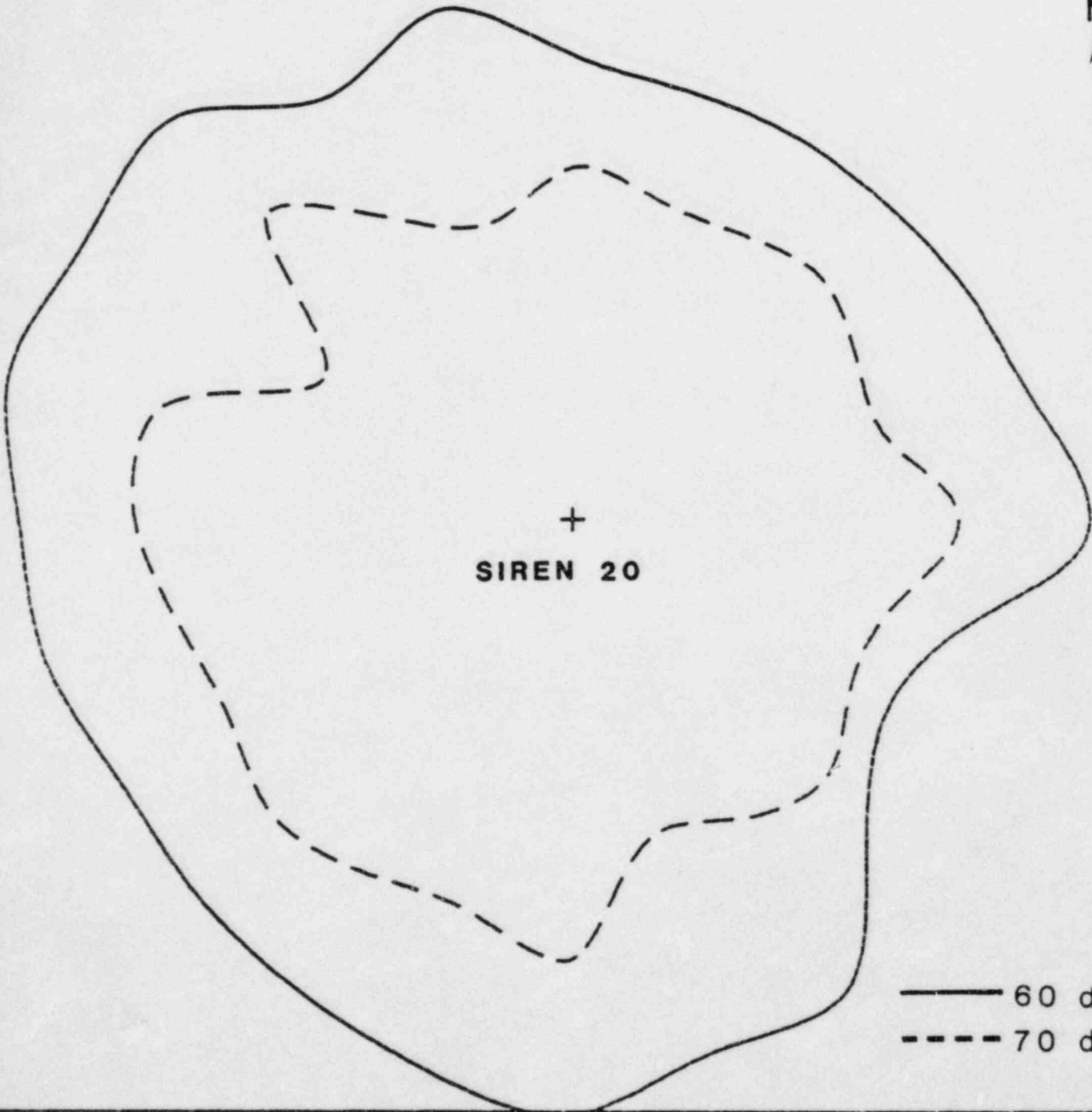


—— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



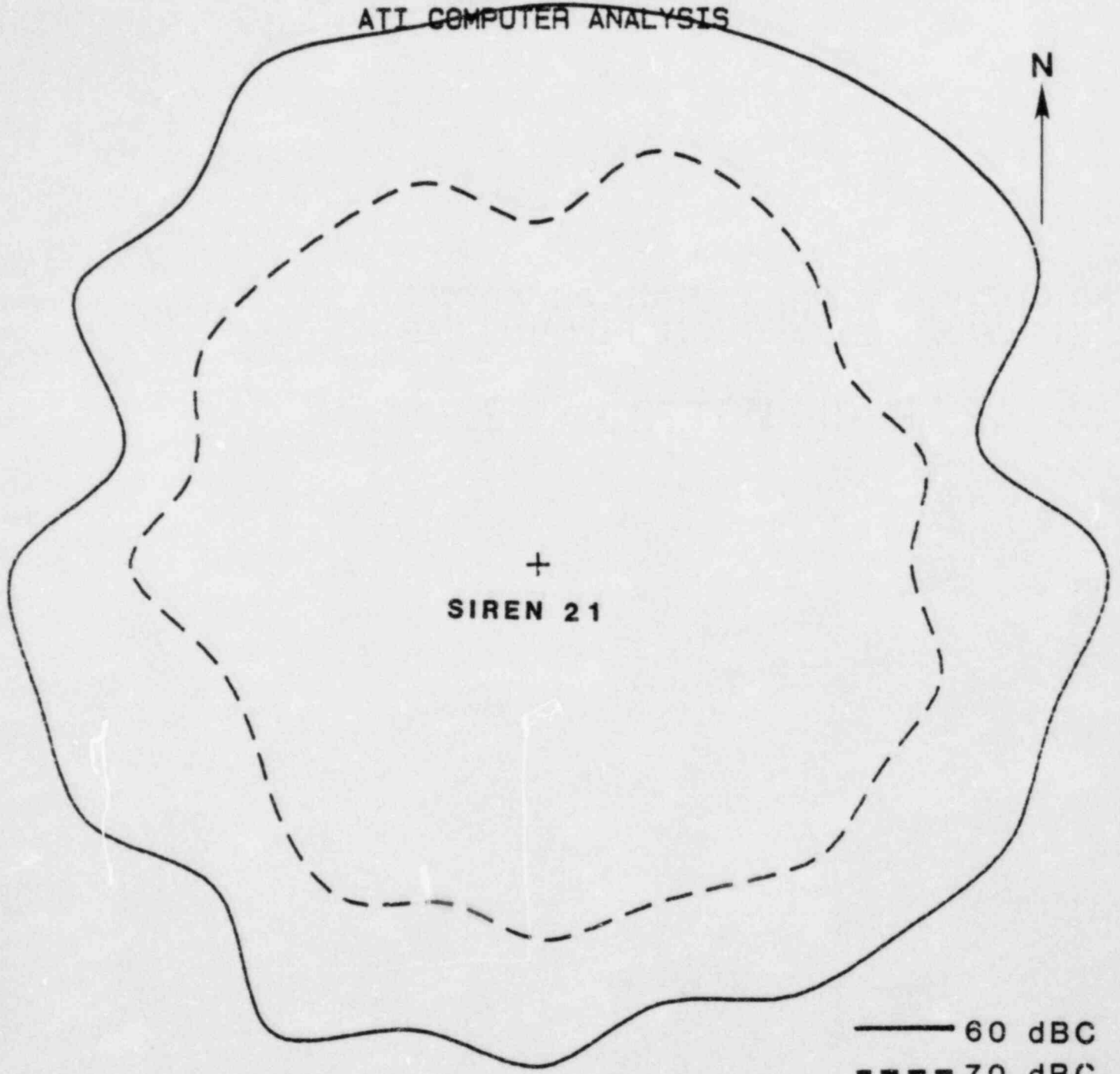
+
SIREN 20

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**

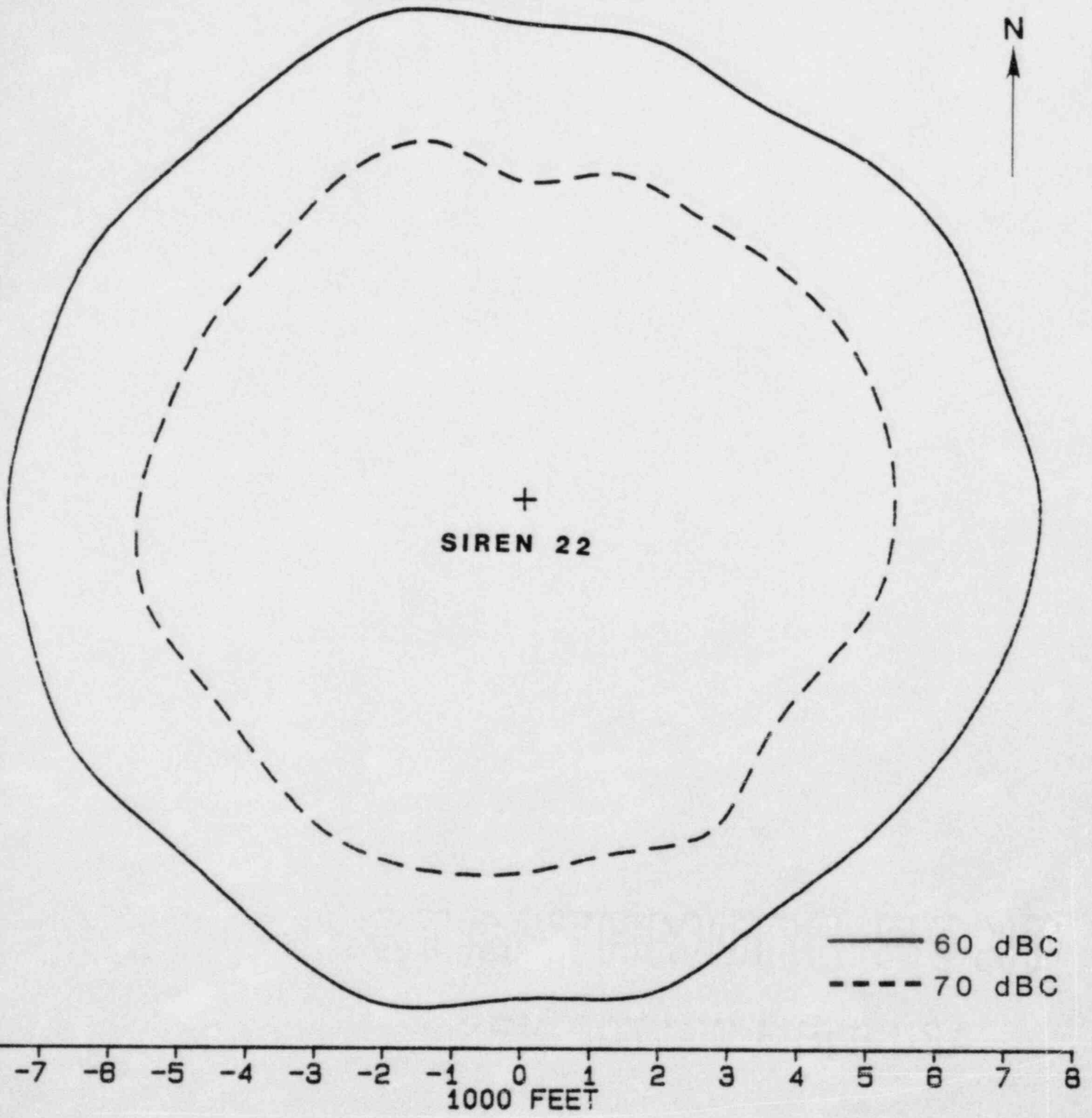


8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

——— 60 dBC
- - - - 70 dBC

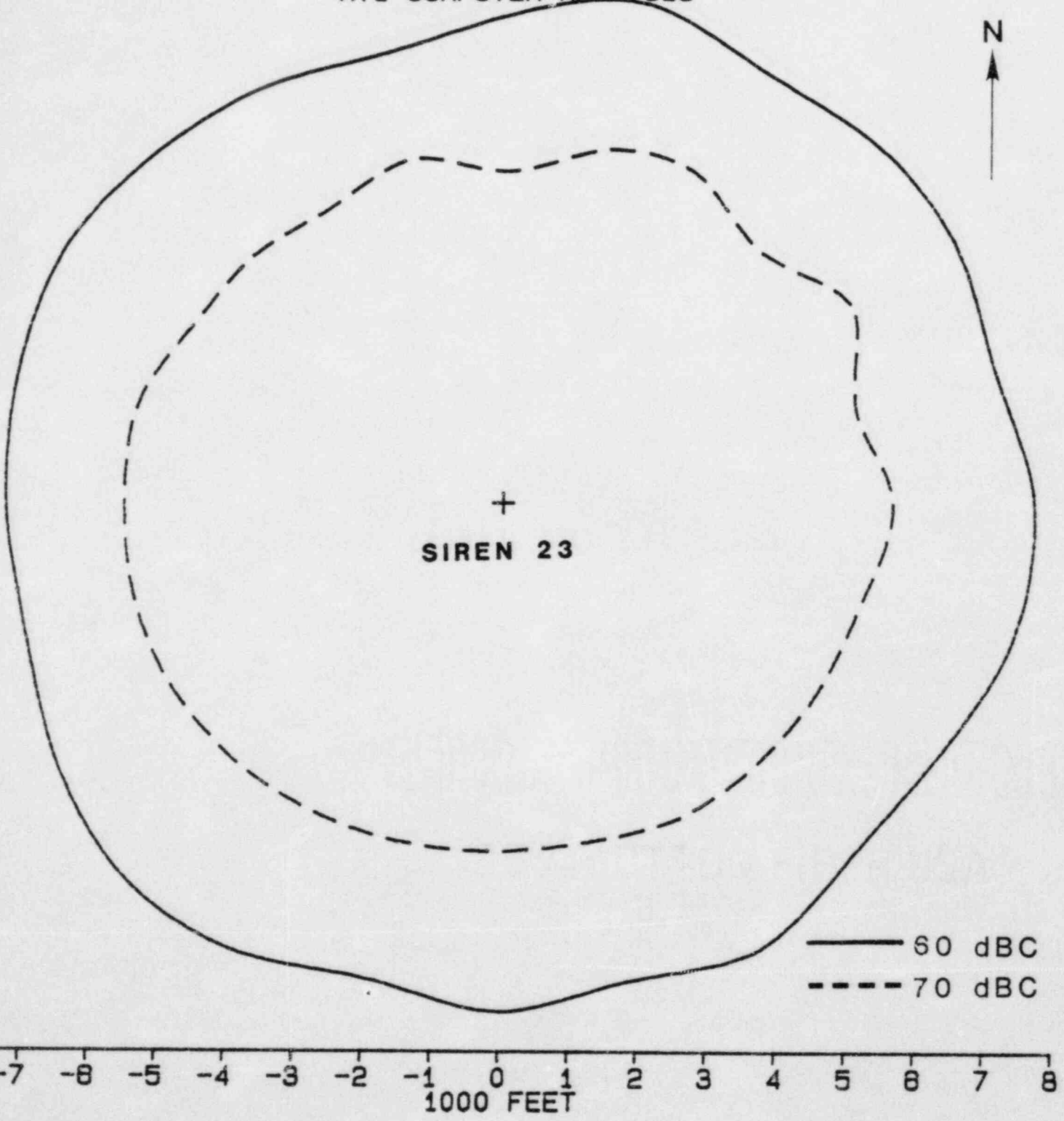
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

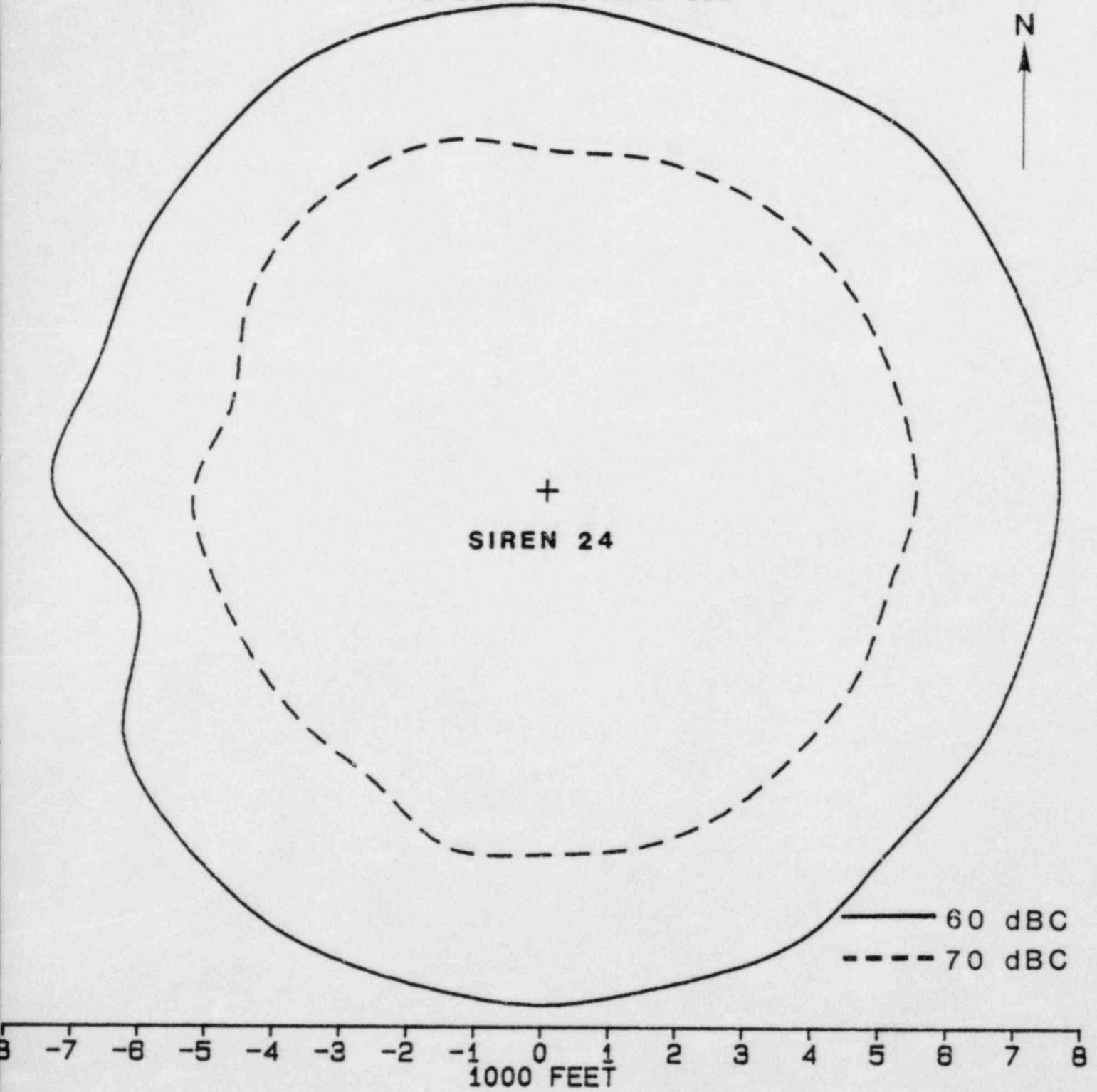
**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



— 60 dBC
- - - 70 dBC

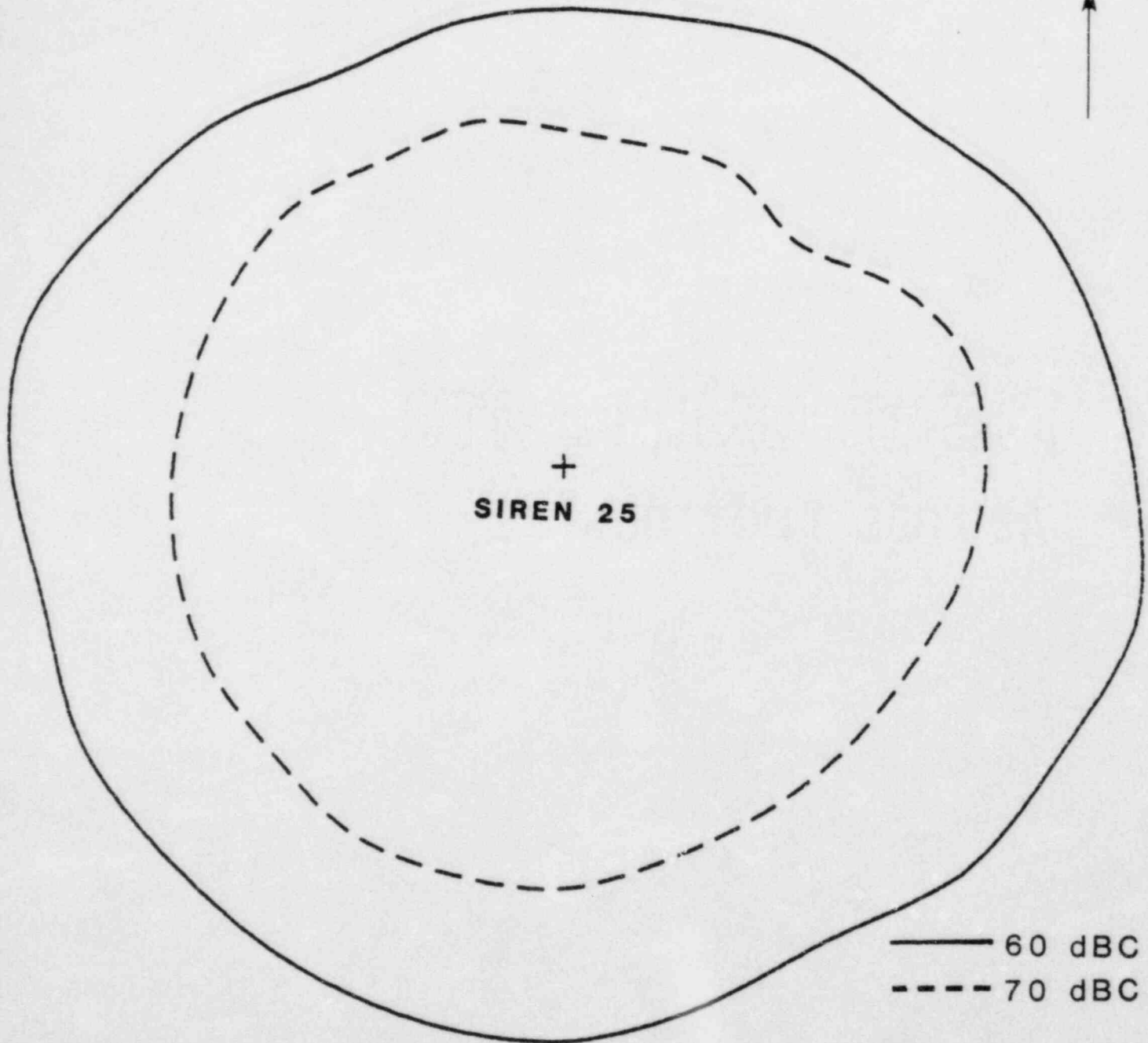
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



+
SIREN 25

— 60 dBC
- - - 70 dBC

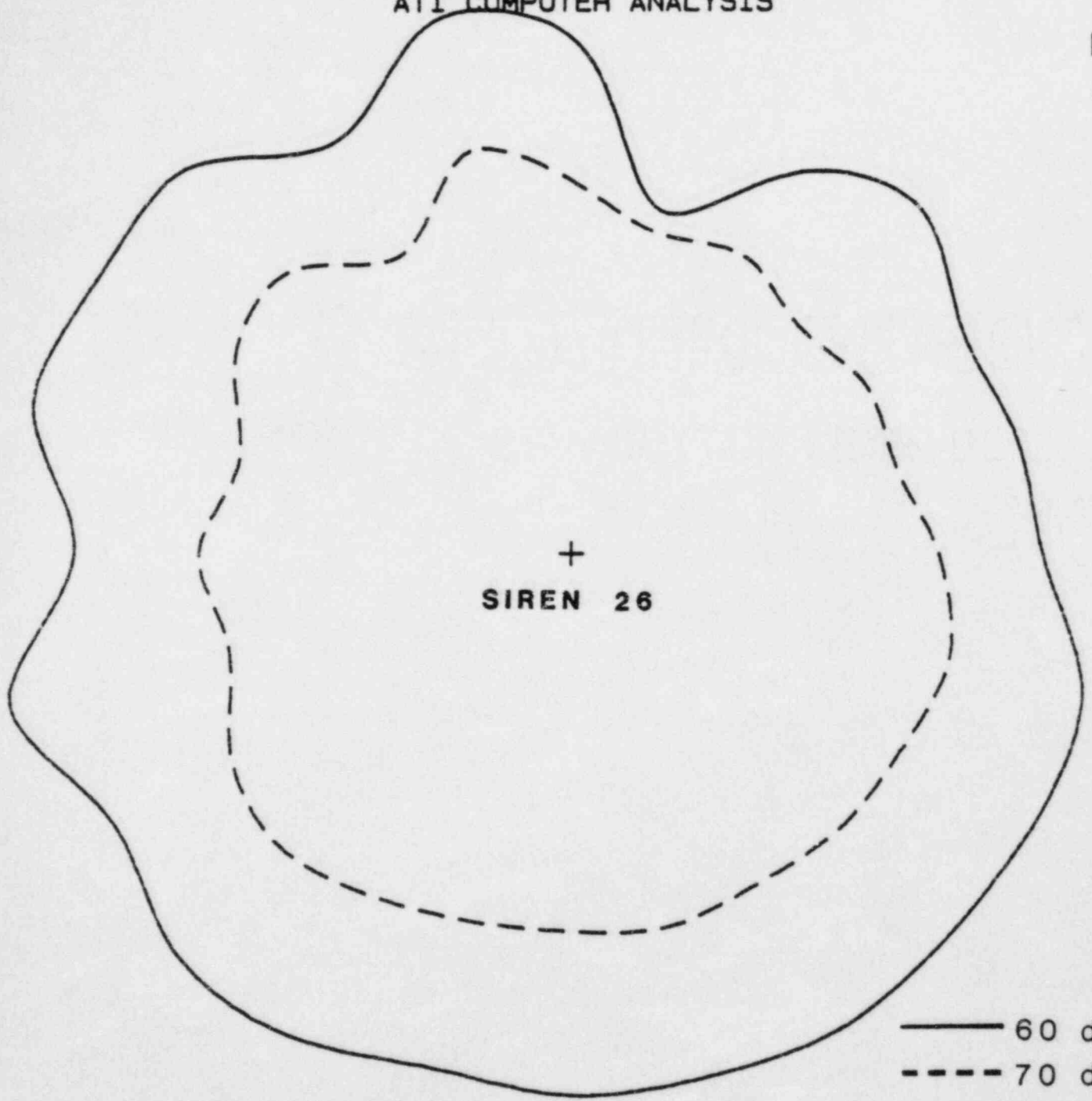
8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



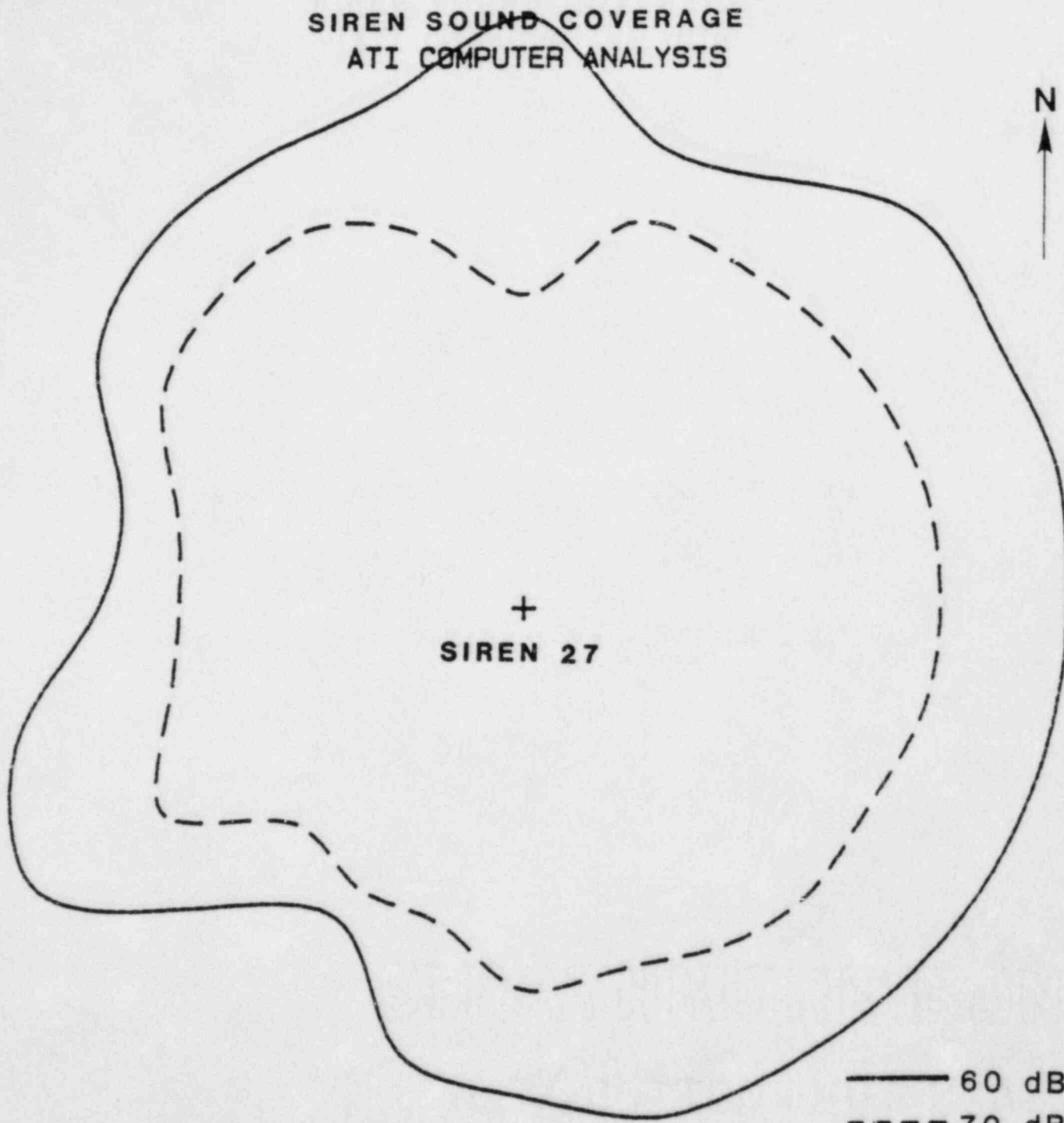
+
SIREN 26

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



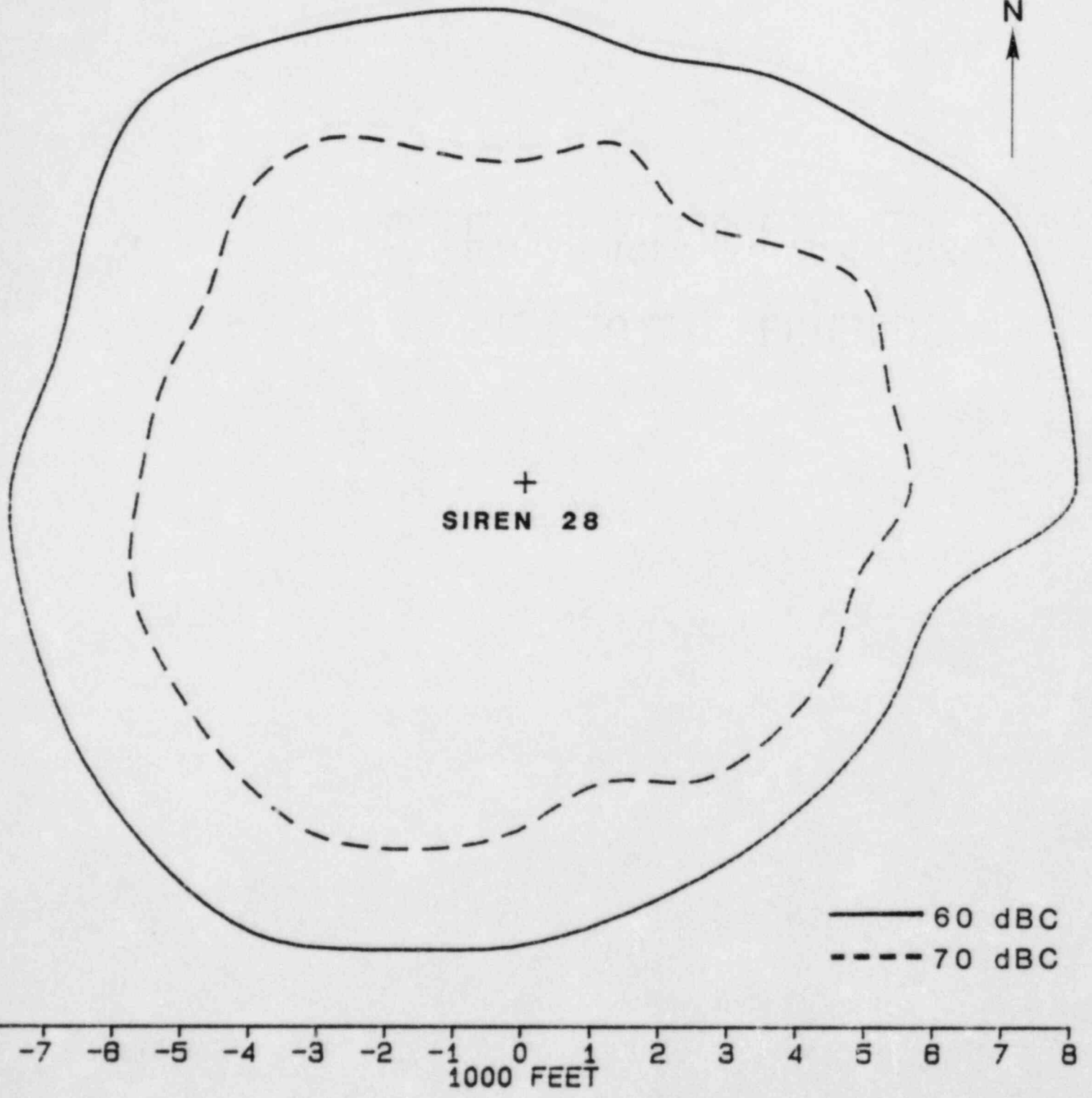
+
SIREN 27

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

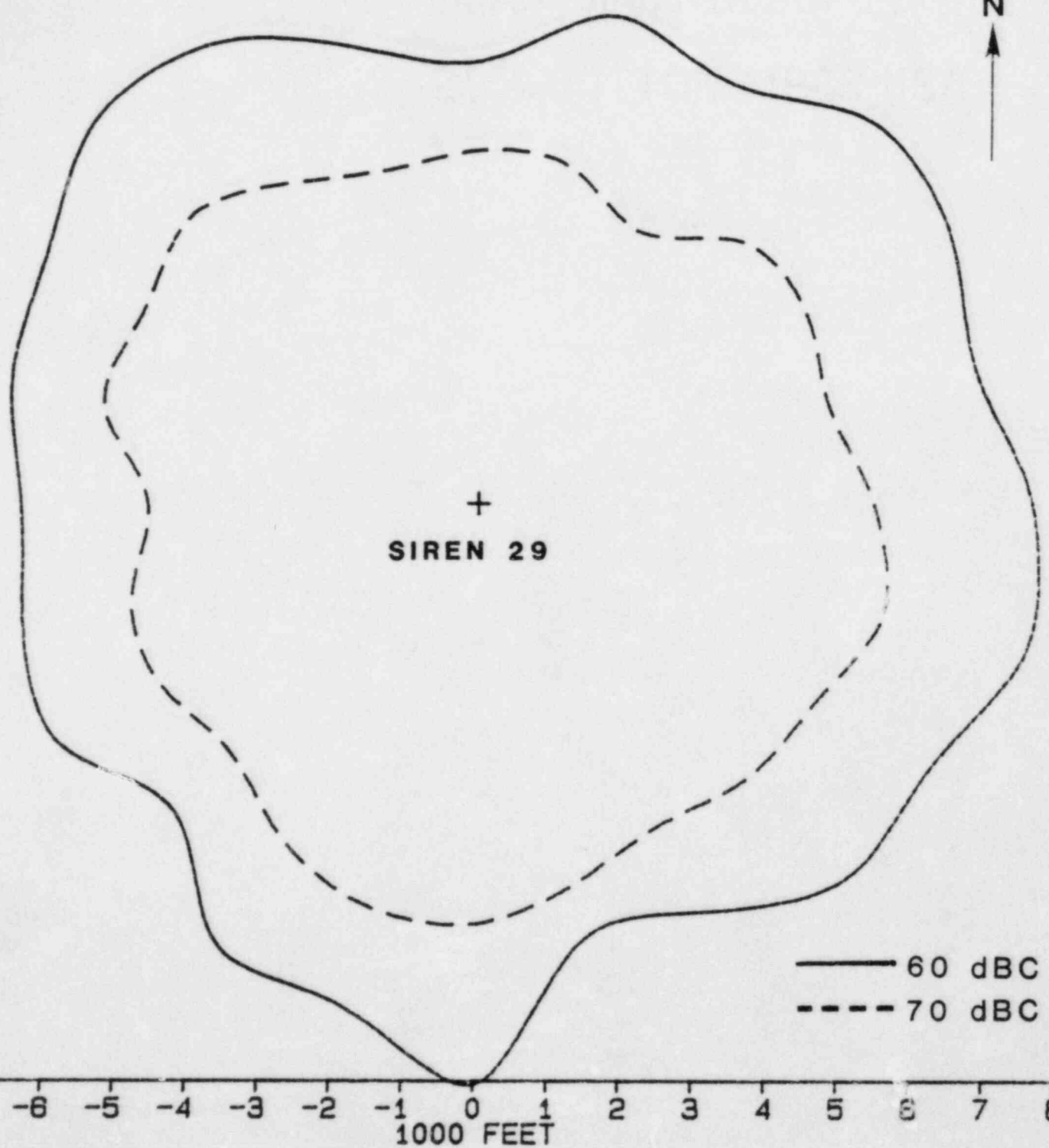
**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



— 60 dBC
- - - 70 dBC

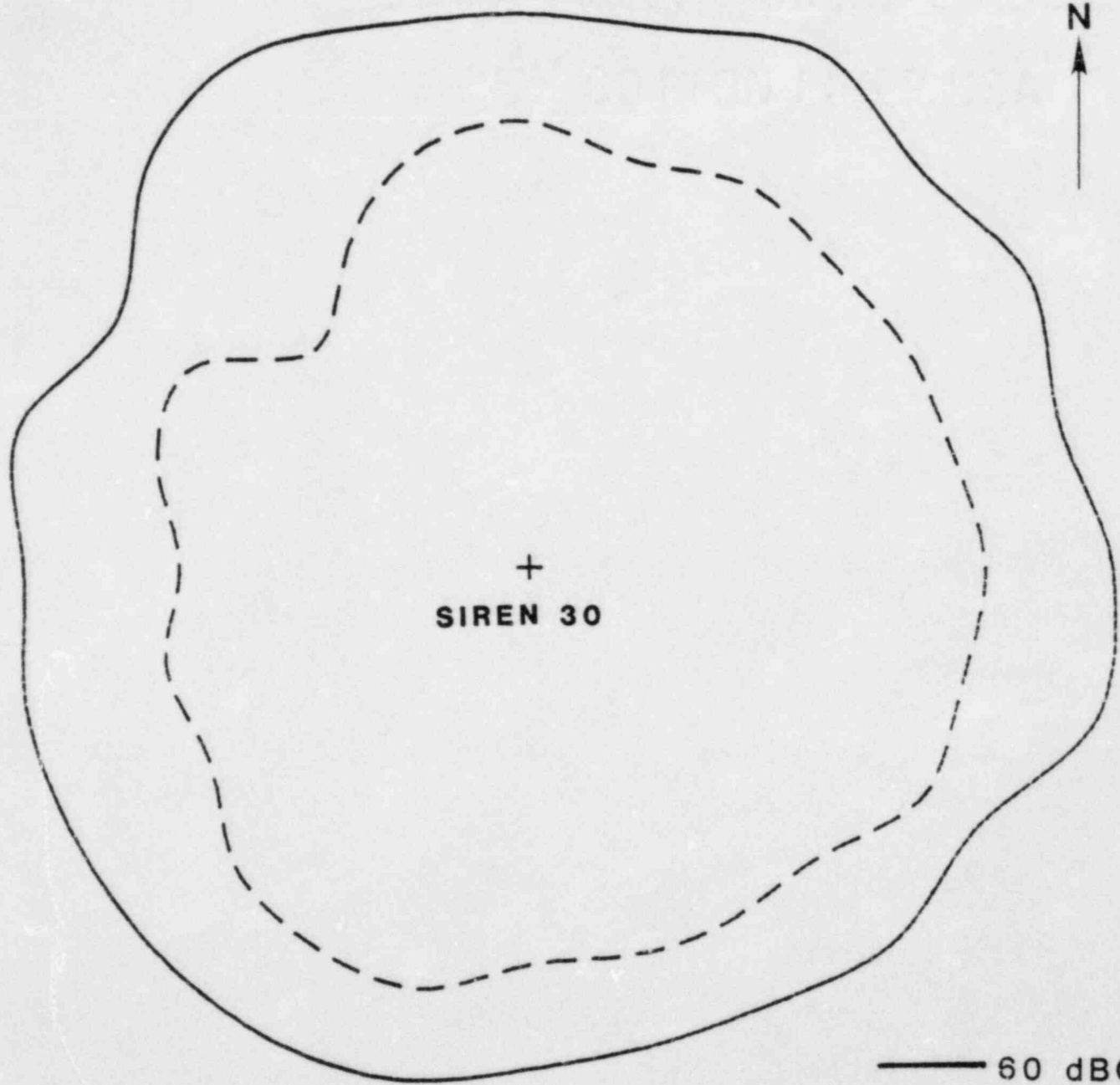
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



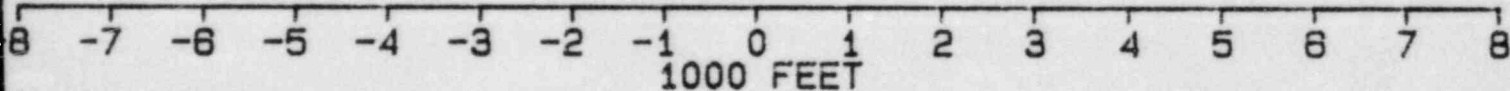
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



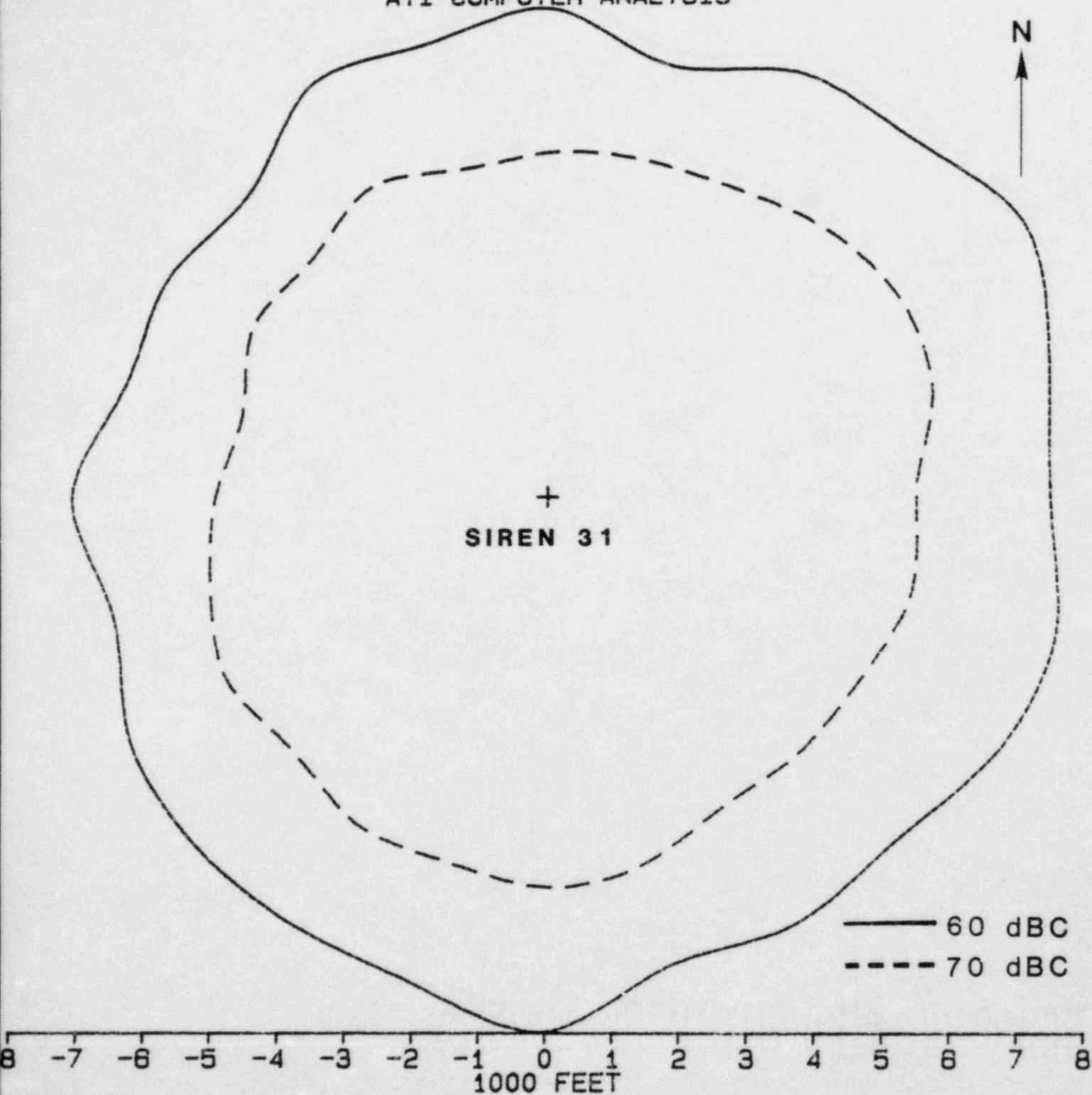
+
SIREN 30

— 60 dBC
- - - 70 dBC



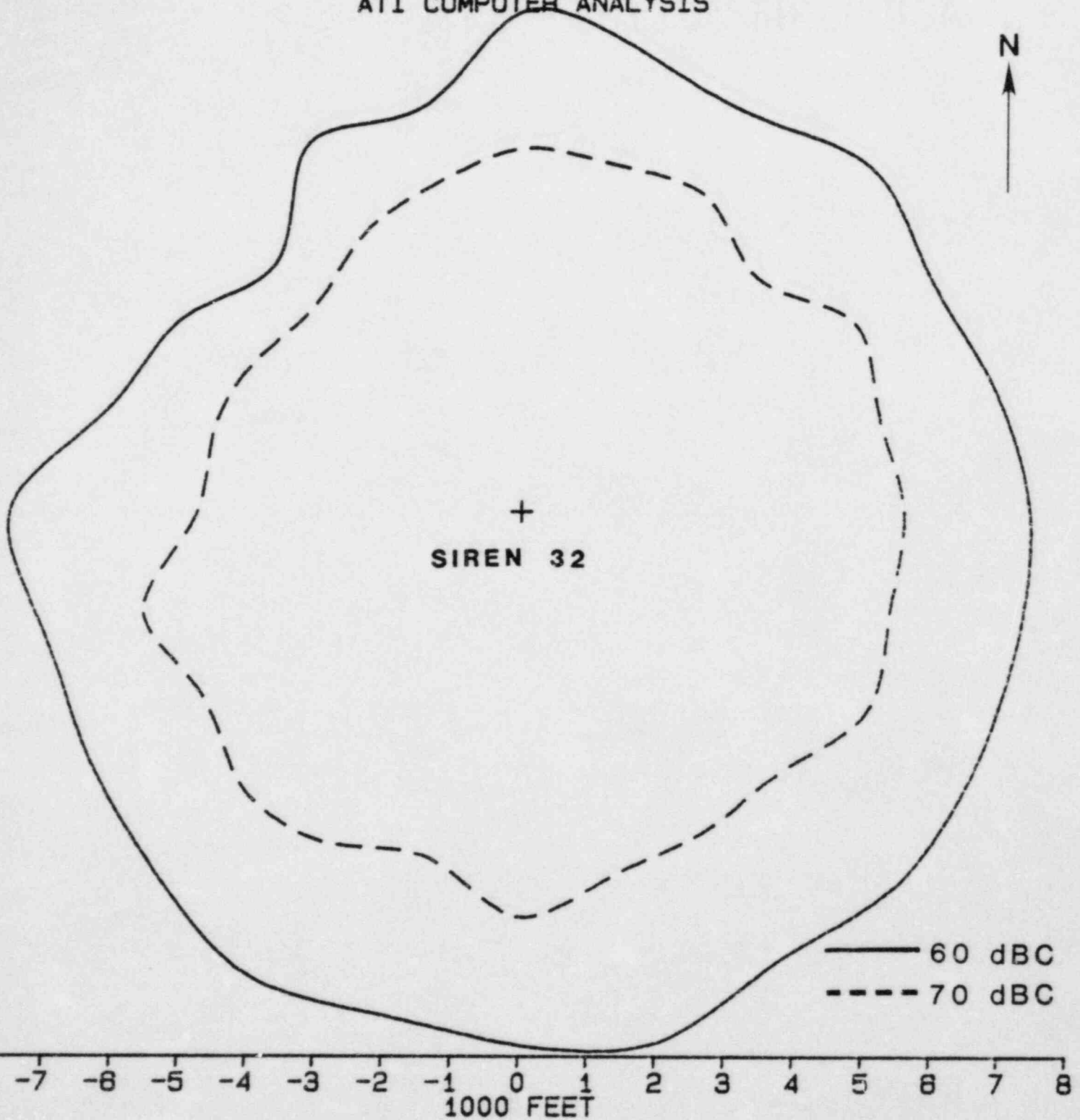
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 33

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



+
SIREN 34

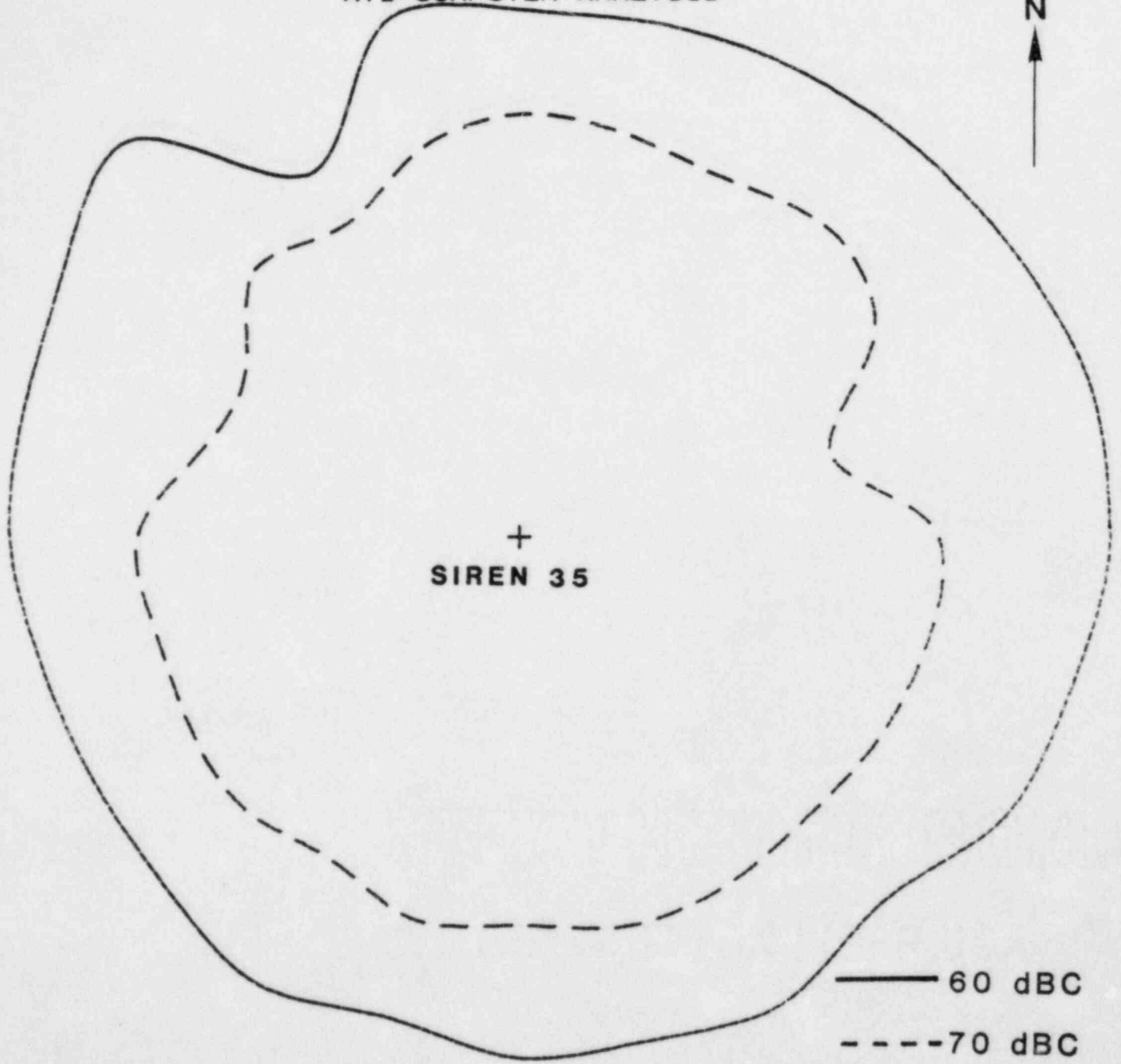
— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 35

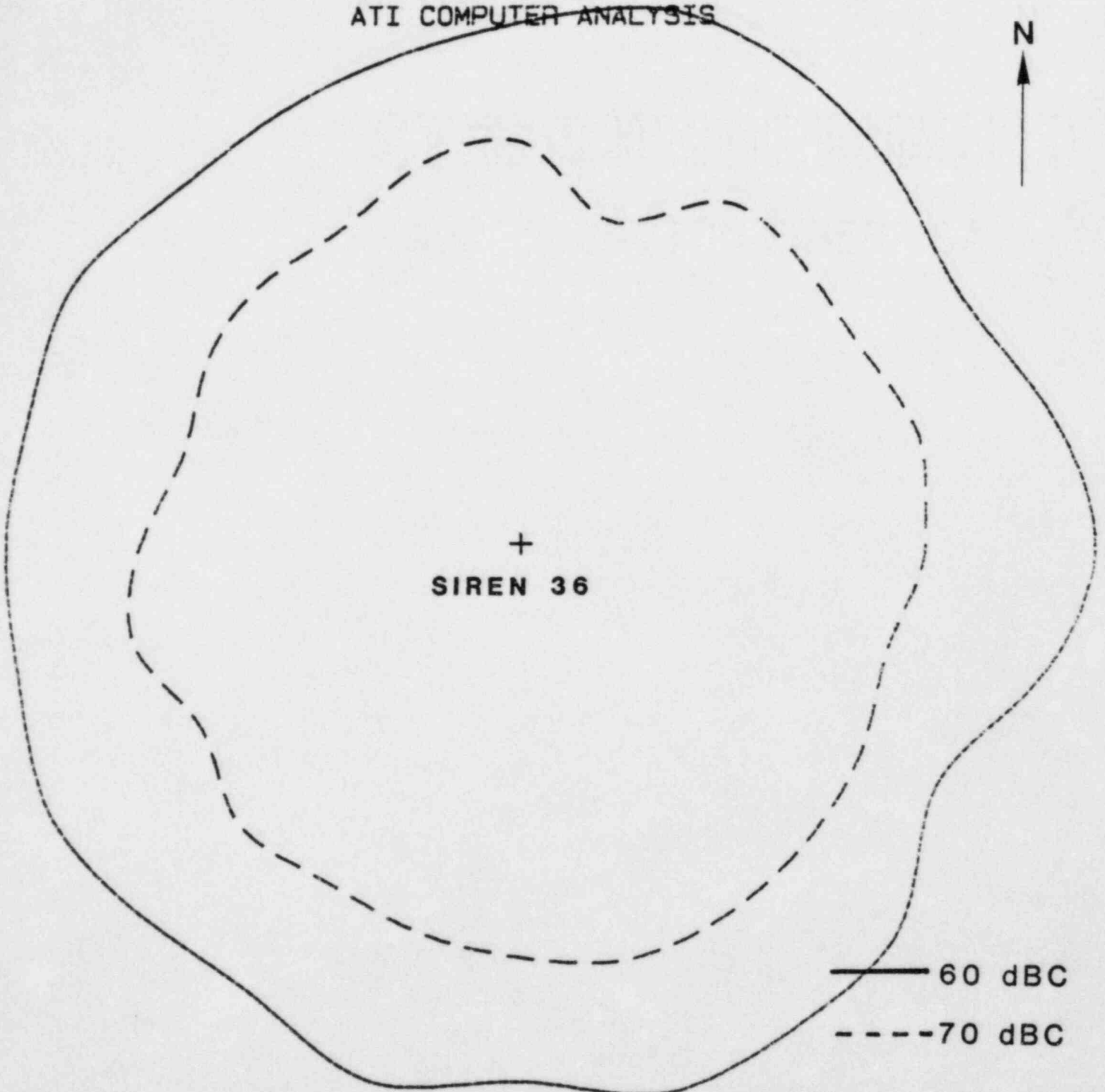
— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 36

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

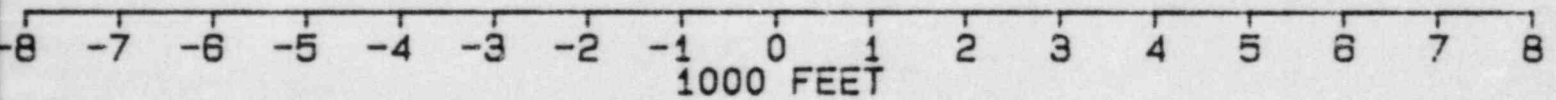
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

ATI COMPUTER ANALYSIS



+
SIREN 37

— 60 dBC
- - - 70 dBC



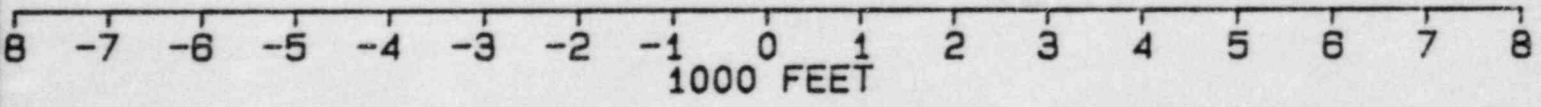
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



+
SIREN 38

— 60 dBC
- - - 70 dBC



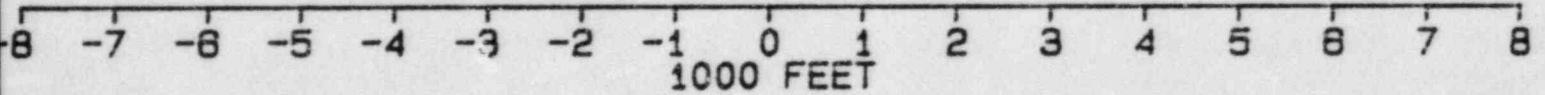
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



+
SIREN 39

— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 40

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



+
SIREN 41

— 60 dBC
- - - 70 dBC

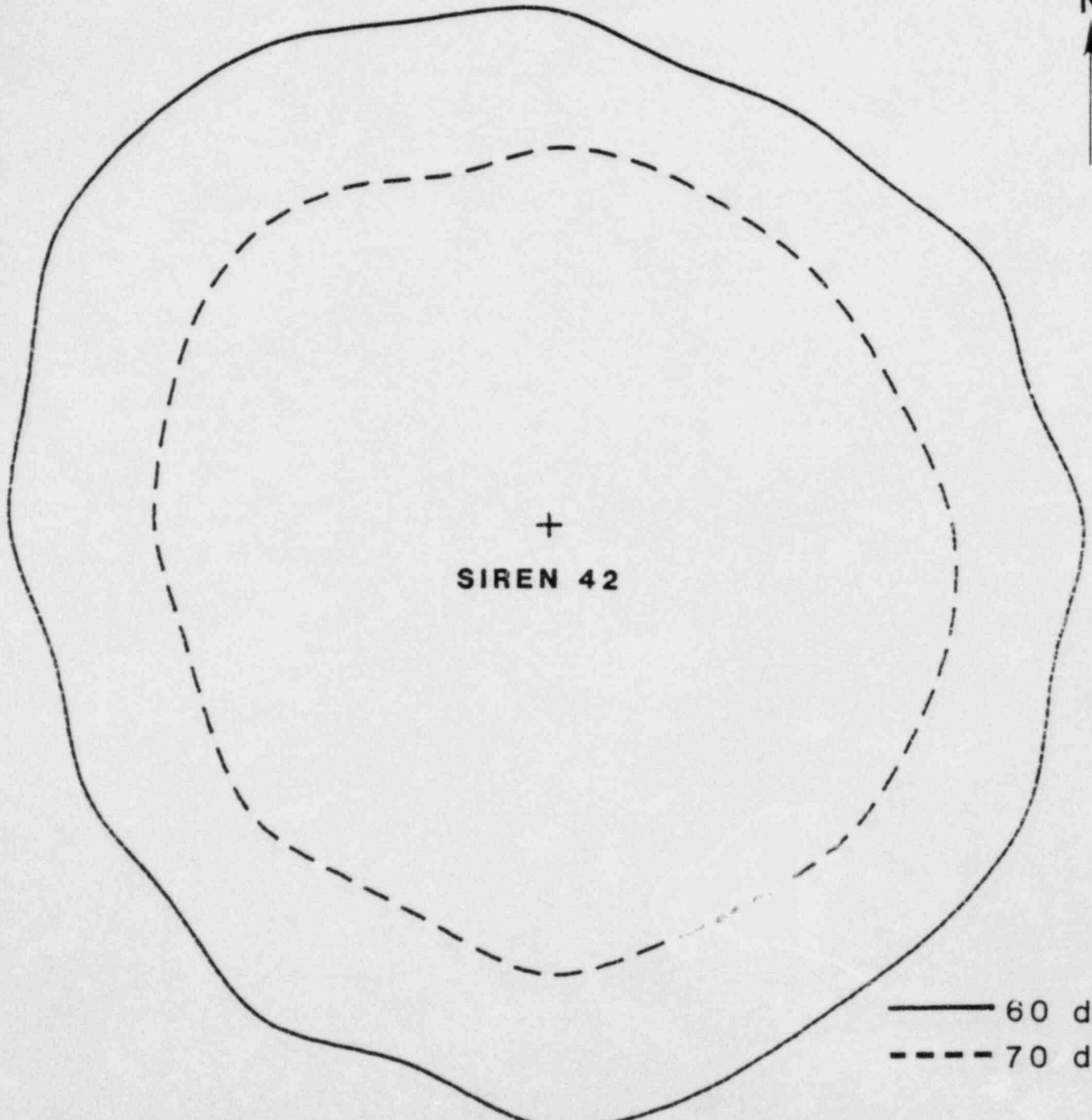
-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



+
SIREN 42

— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

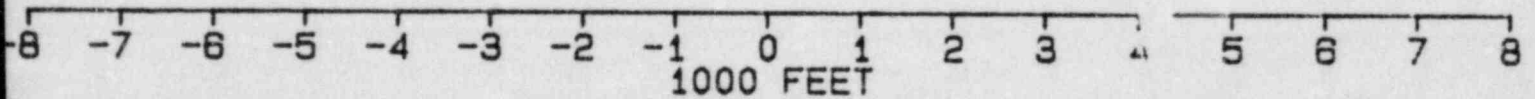
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 43

——— 60 dBC
- - - - 70 dBC



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

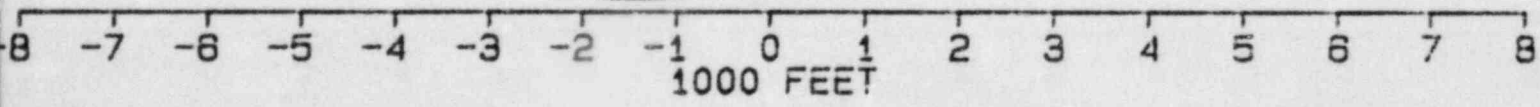
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 44

— 60 dBC
- - - 70 dBC



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

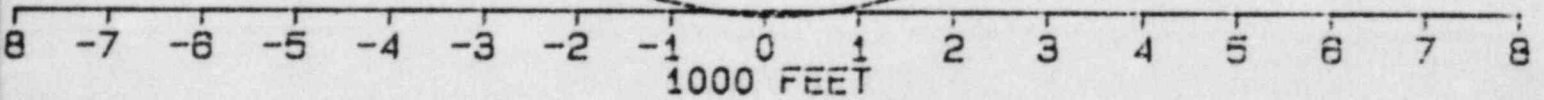
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 45

— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 46

— 60 dBC
- - - 70 dBC

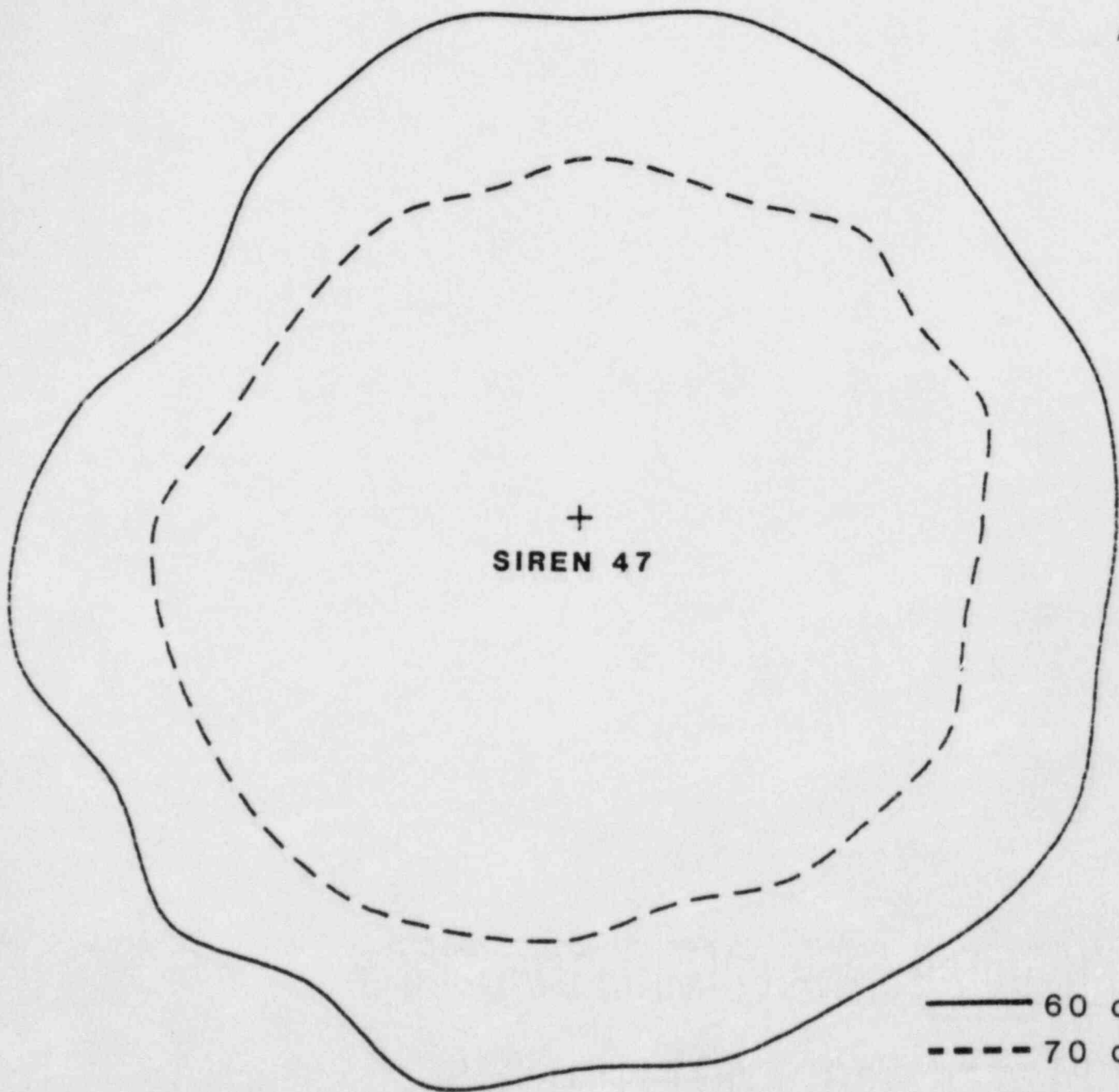
8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



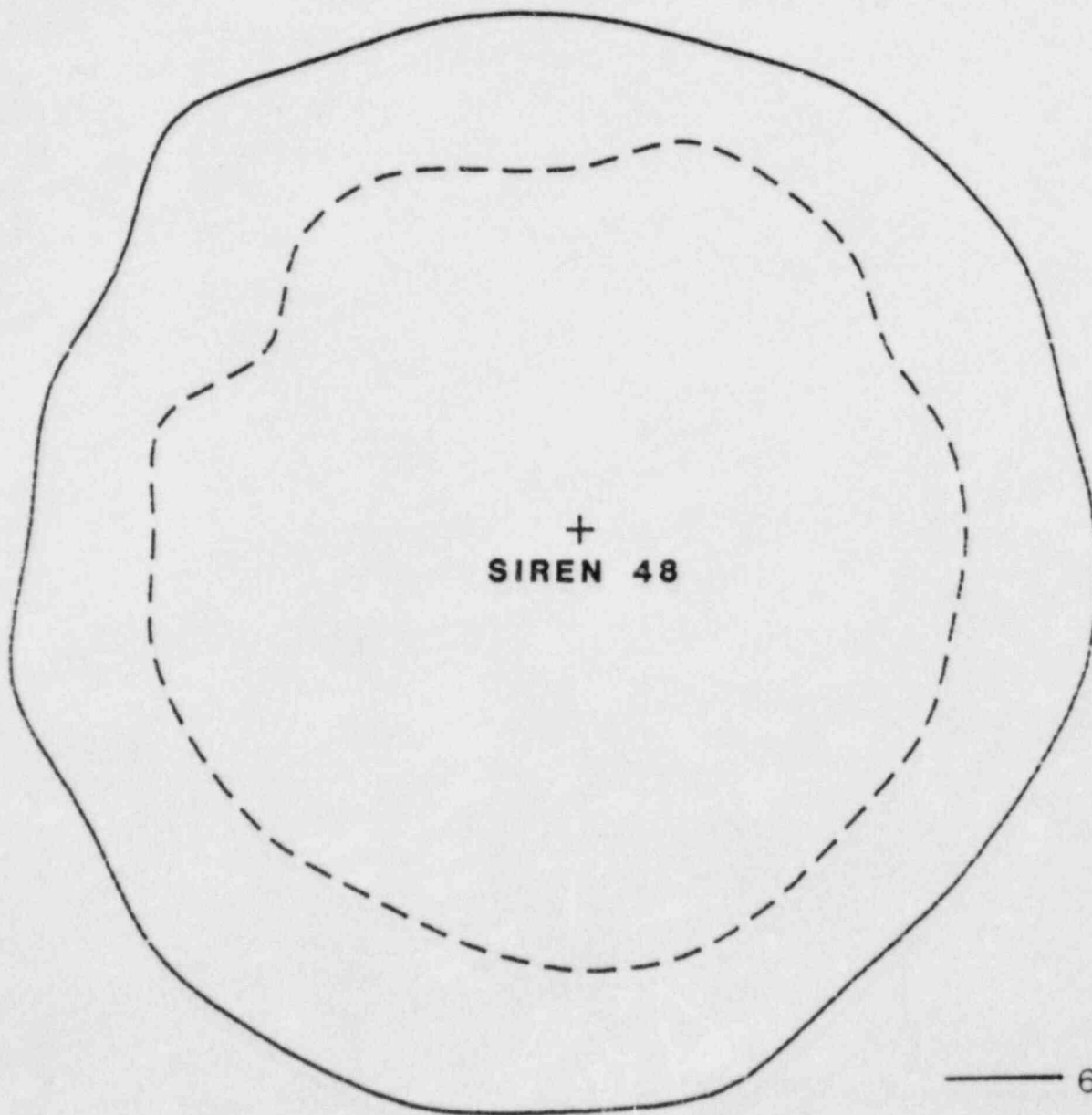
— 60 dBC
- - - 70 dBC

8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

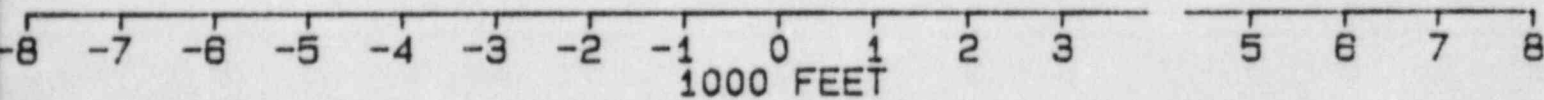
ATI COMPUTER ANALYSIS



+
SIREN 48

——— 60 dBC

- - - - 70 dBC

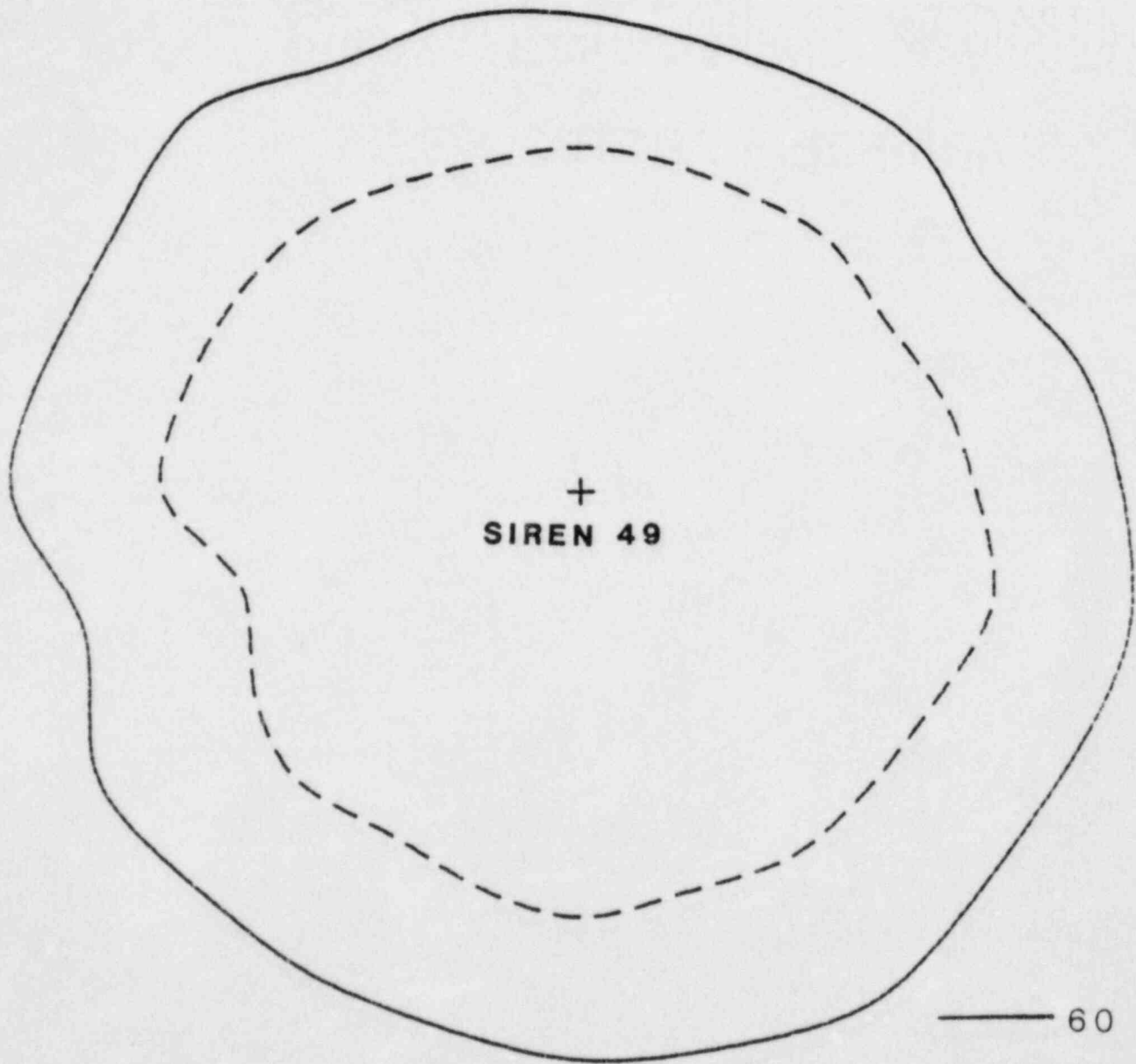
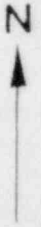


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CATAWBA NUCLEAR STATION

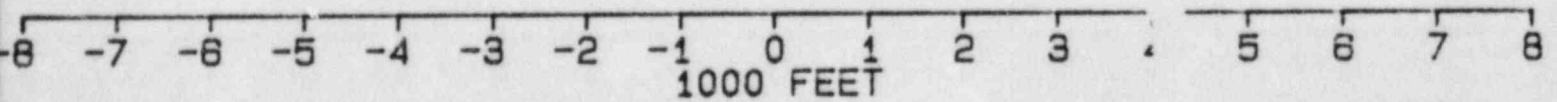
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 49

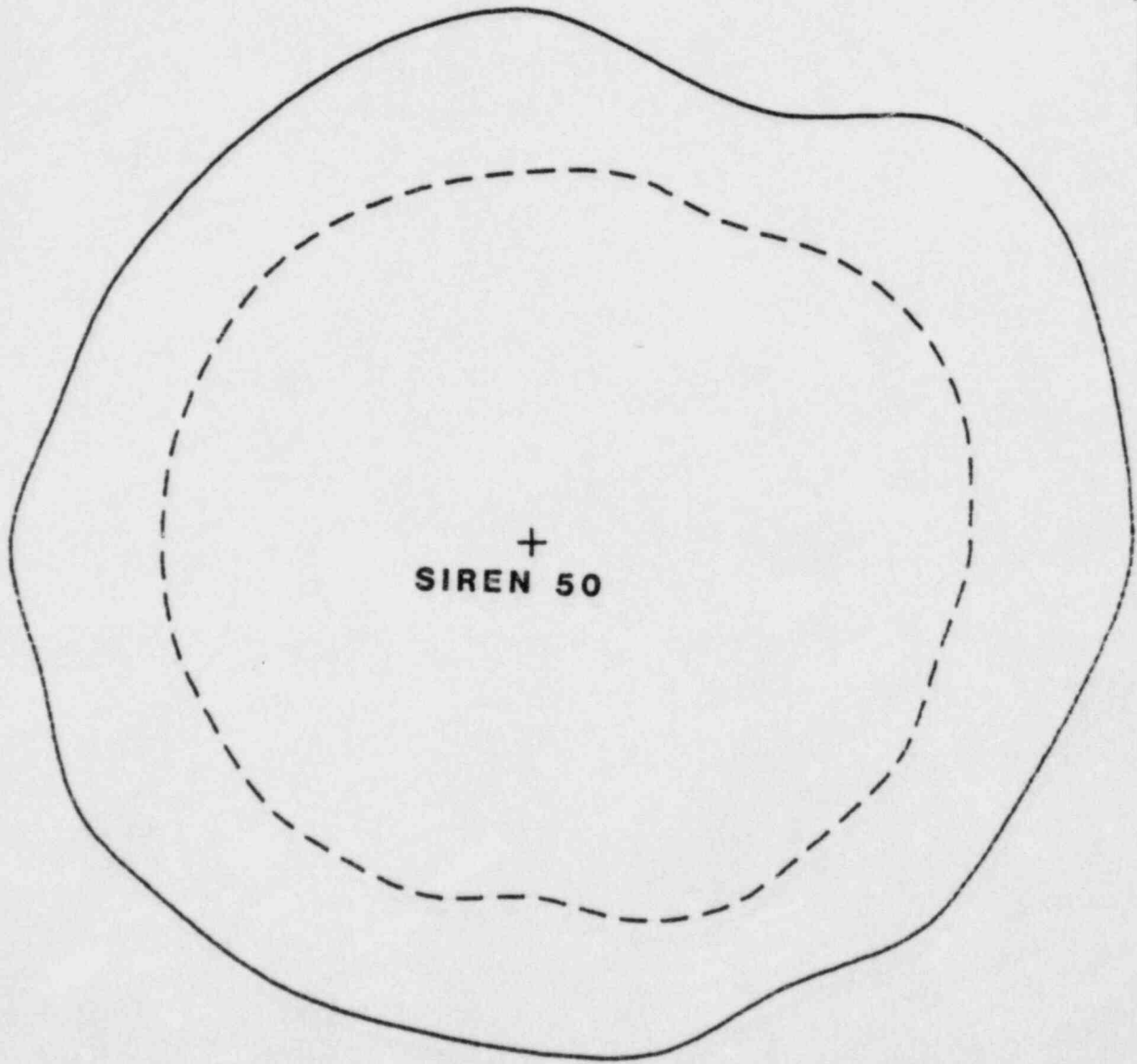
— 60 dBC
- - - 70 dBC



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

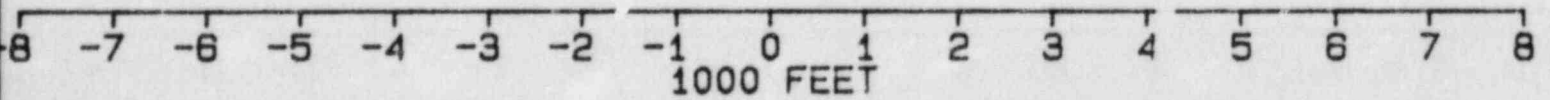
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



**+
SIREN 50**

— 60 dBC
- - - 70 dBC

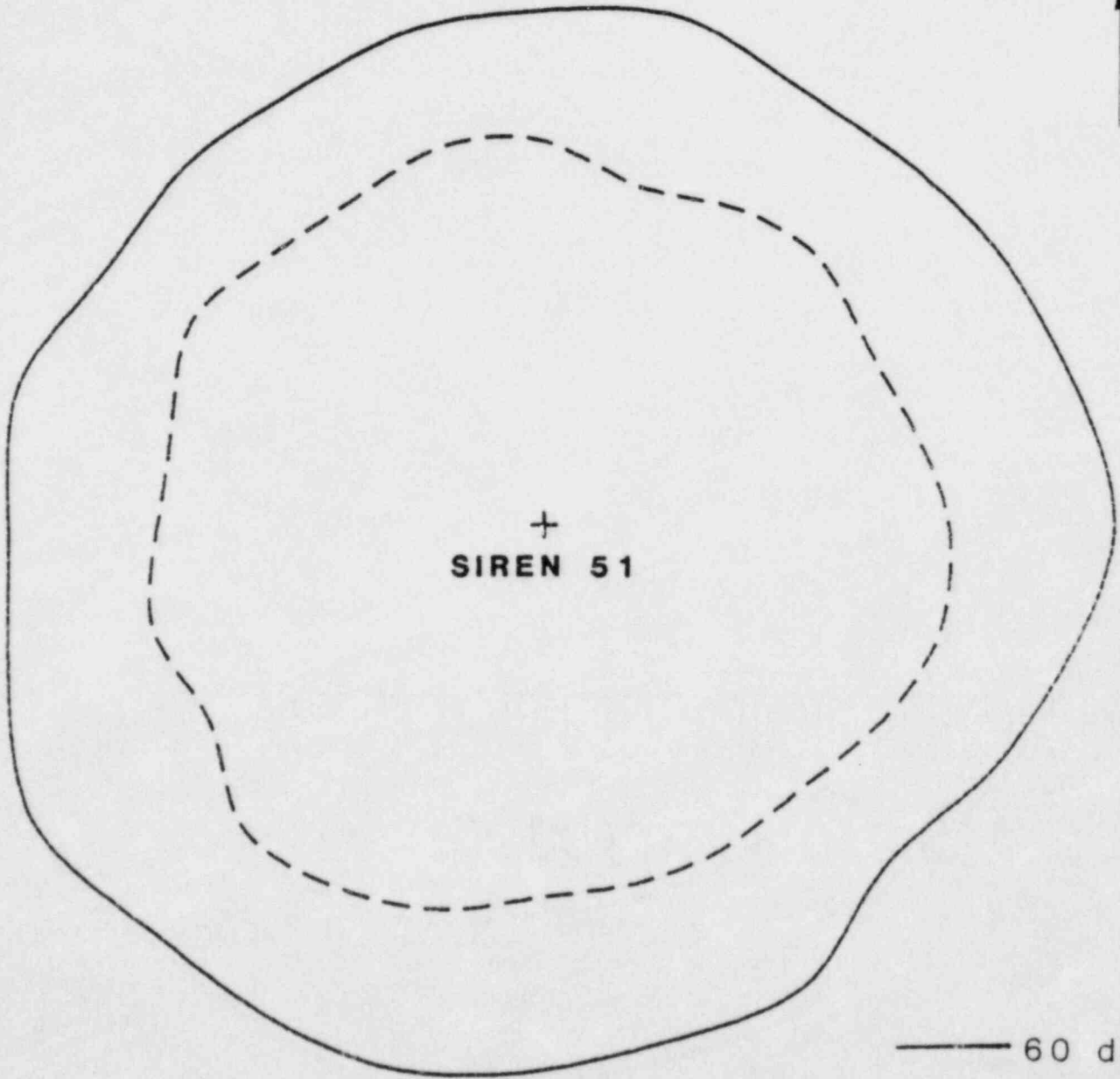


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DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

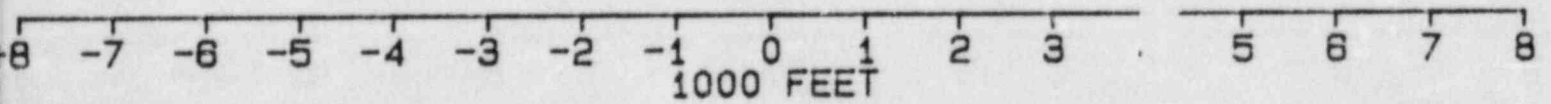
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 51

——— 60 dBC
- - - - 70 dBC



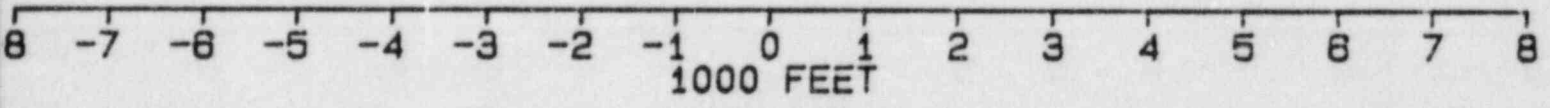
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATT COMPUTER ANALYSIS



+
SIREN 52

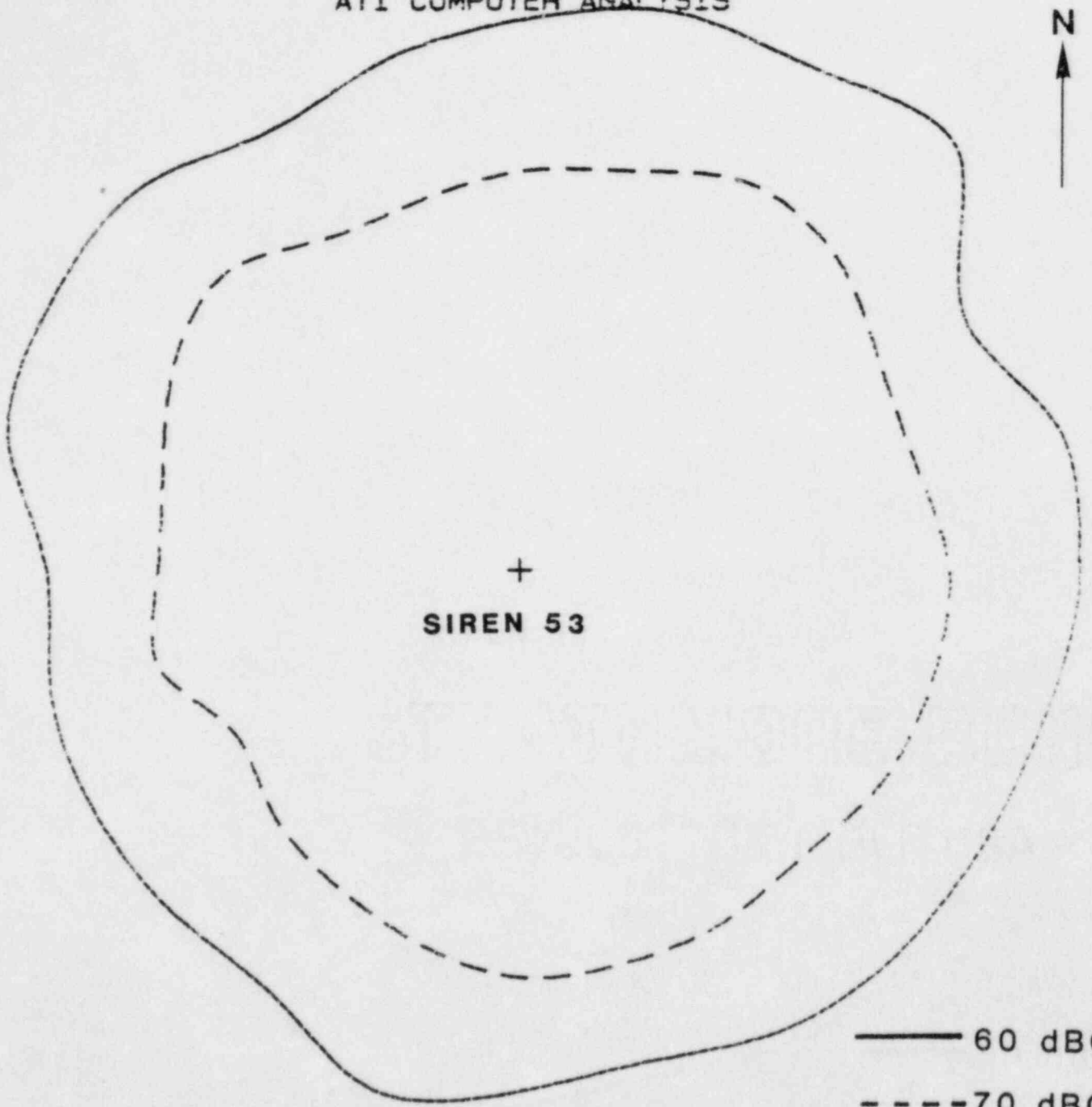
— 60 dBC
- - - 70 dBC



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 53

— 60 dBC
- - - 70 dBC

0 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS

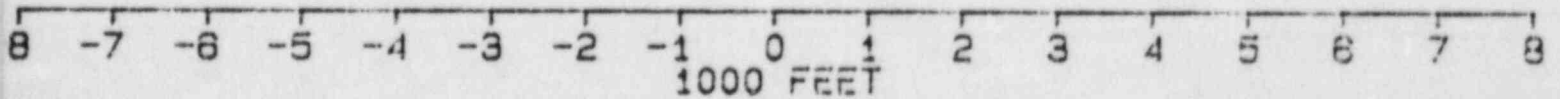


+

SIREN 54

— 60 dBC

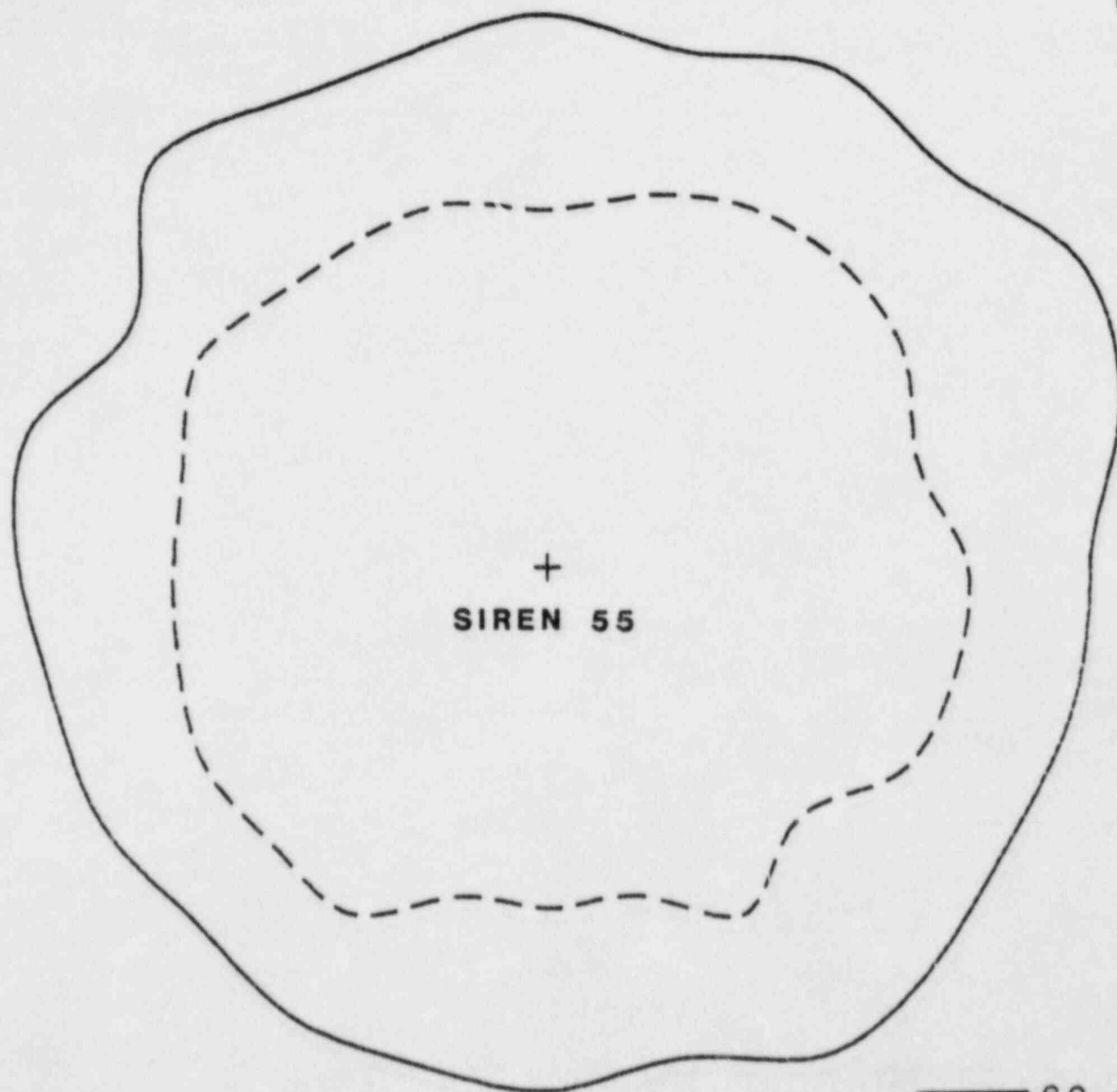
- - - 70 dBC



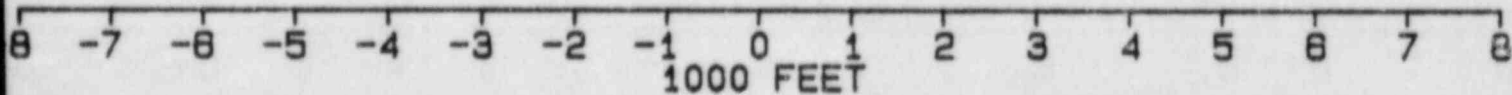
ACOUSTIC TECHNOLOGY INC.

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



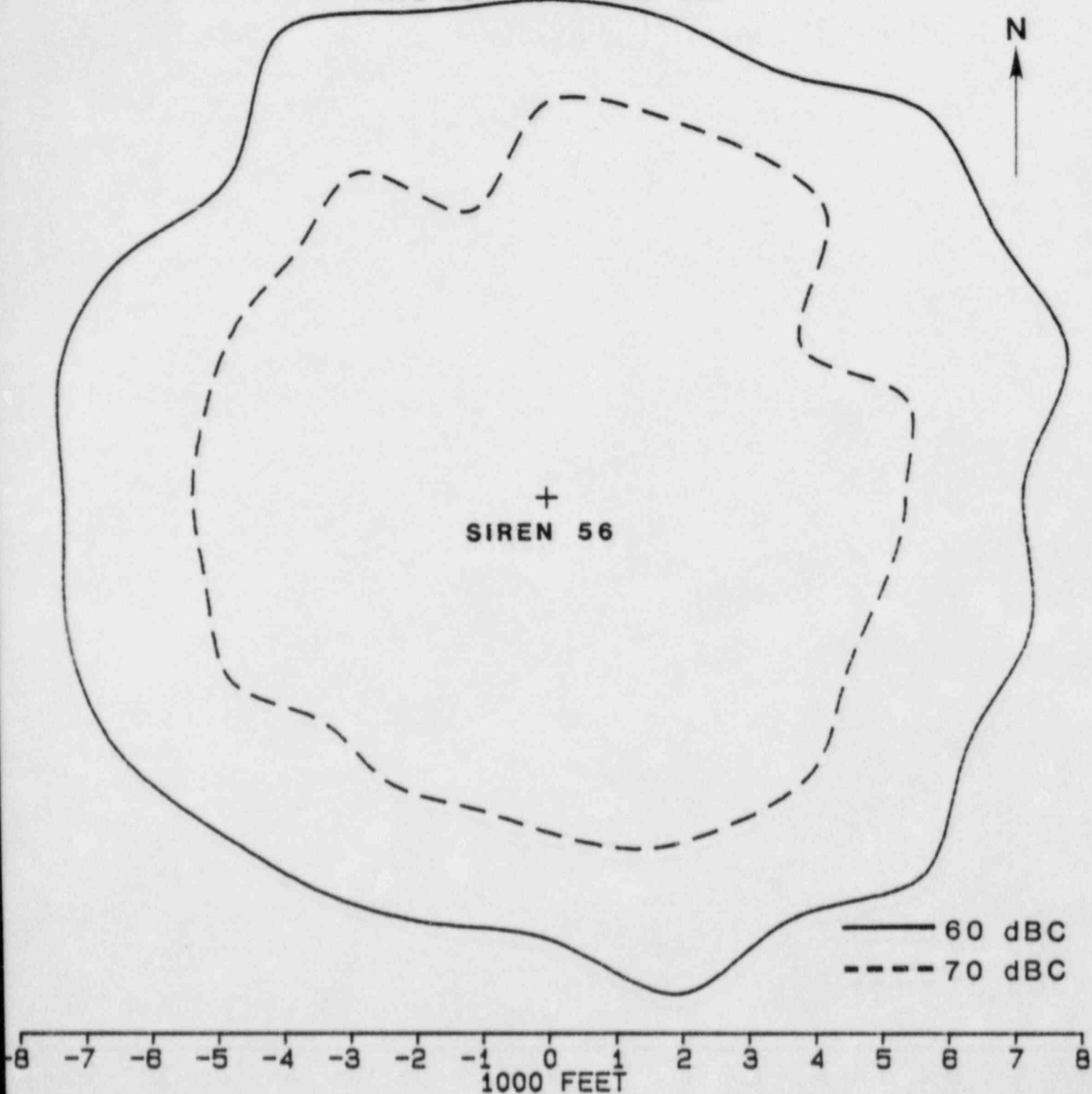
— 60 dBC
- - - 70 dBC



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



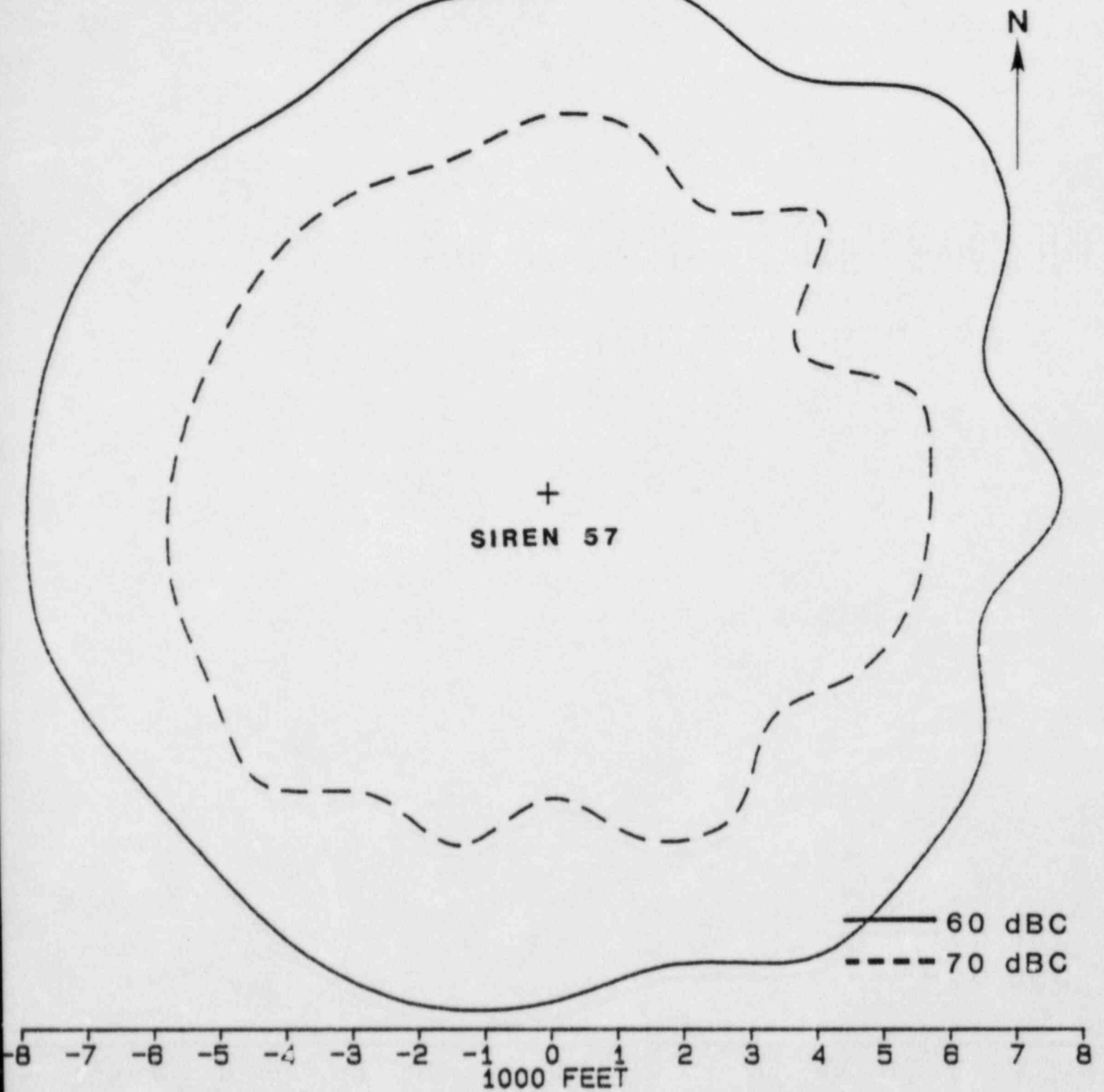
— 60 dBC
- - - 70 dBC



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DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



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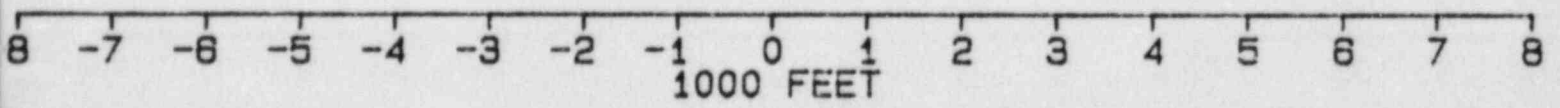
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

ATI COMPUTER ANALYSIS



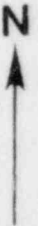
+
SIREN 58

— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



+
SIREN 59

— 60 dBC
- - - 70 dBC

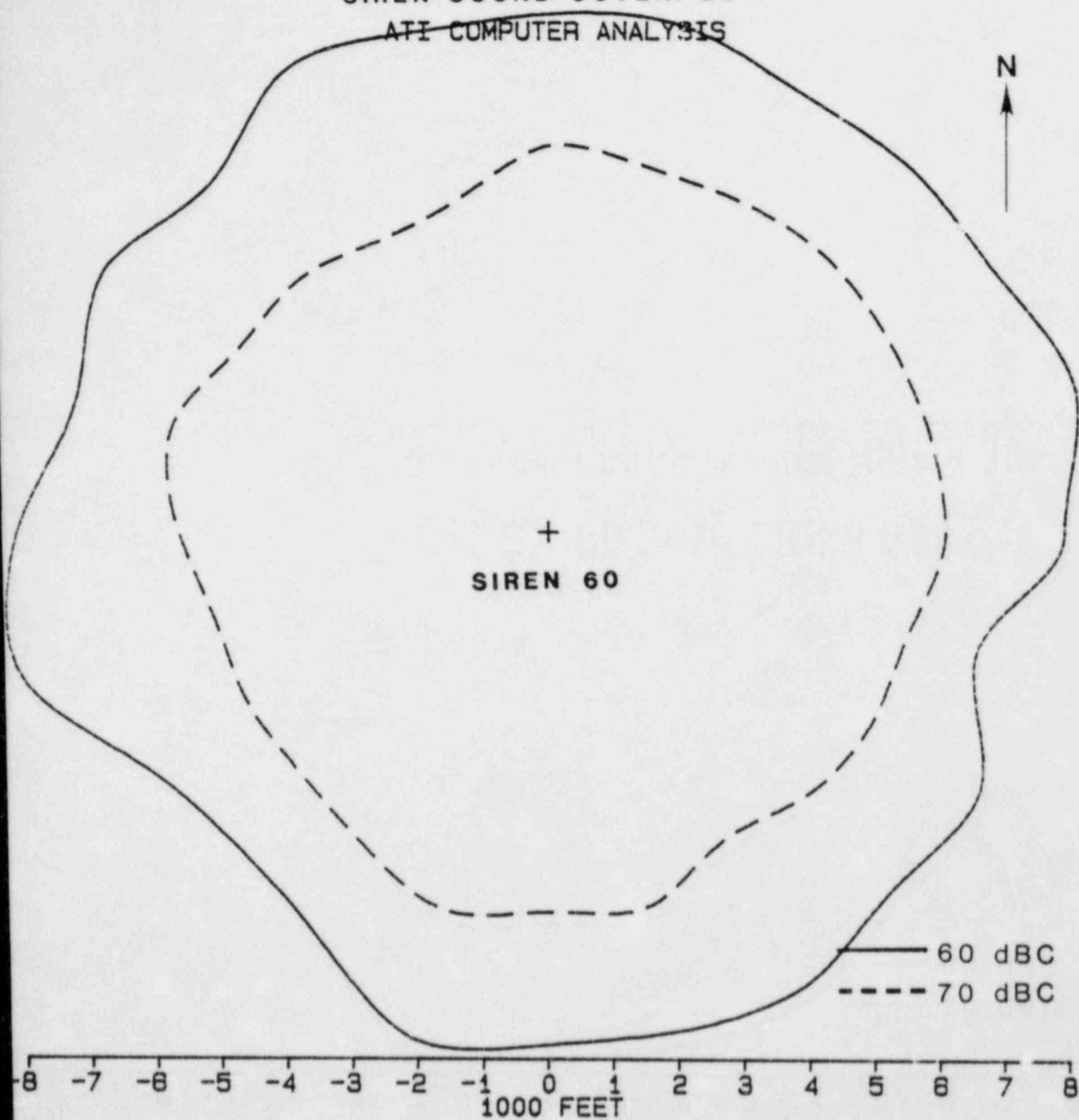
-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

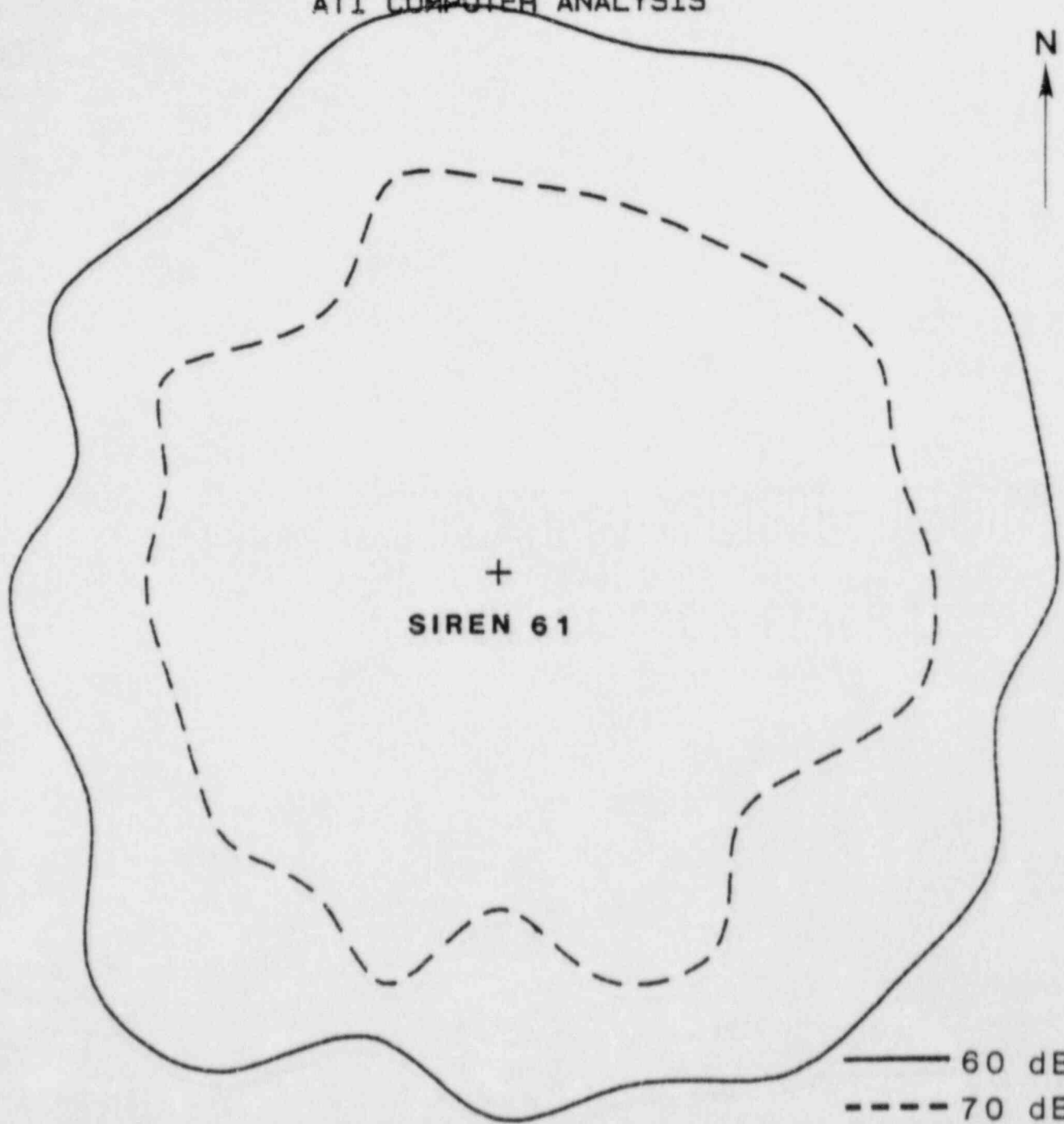
**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



— 60 dBC
- - - 70 dBC

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS



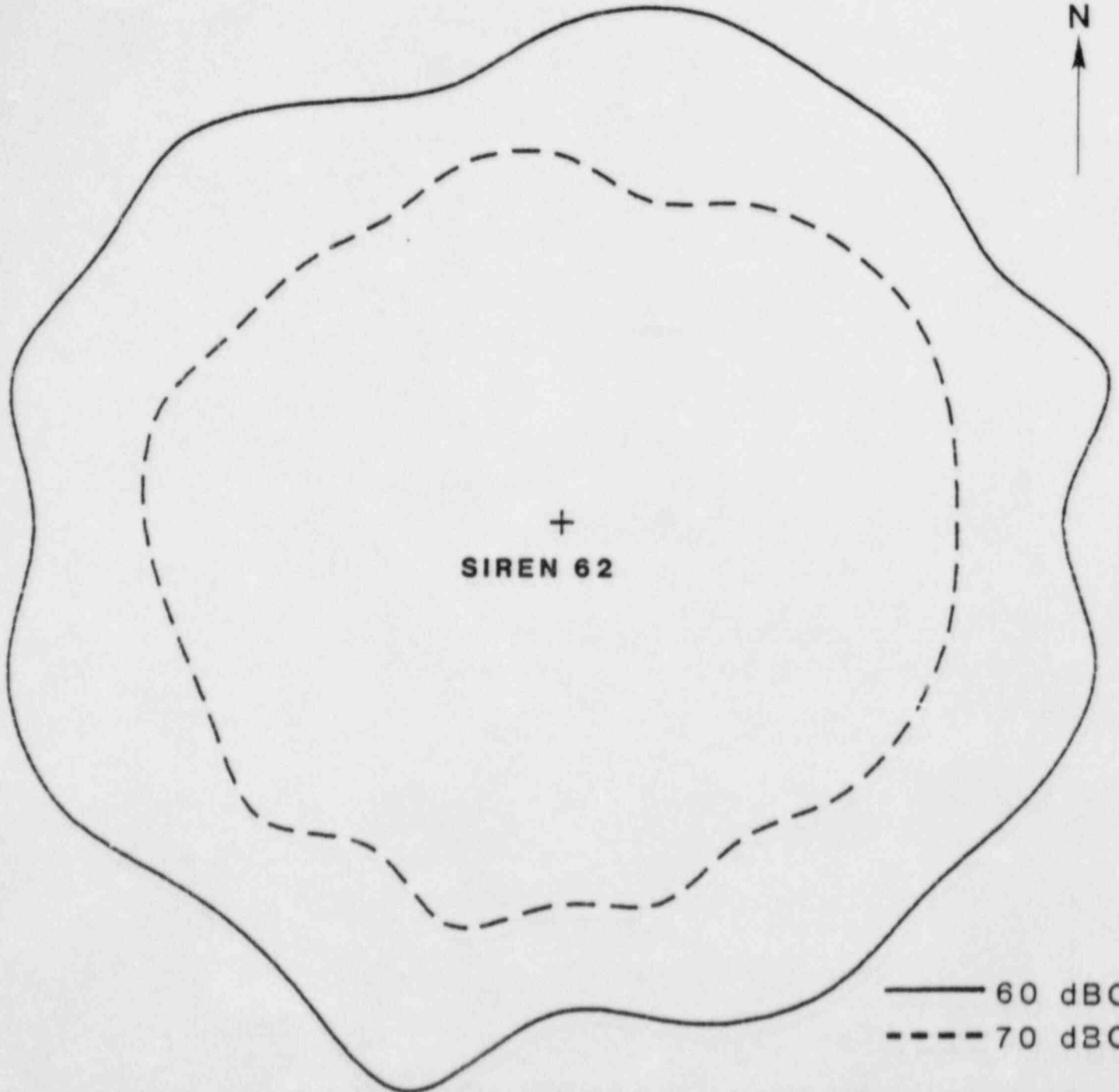
+
SIREN 61

— 60 dB(C)
- - - 70 dB(C)

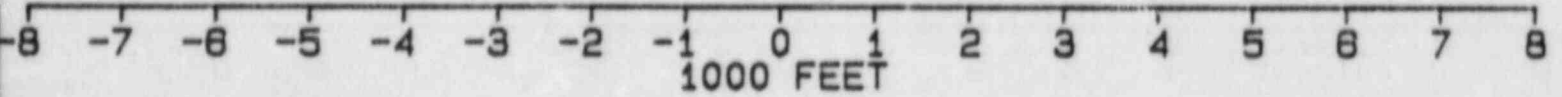
-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**

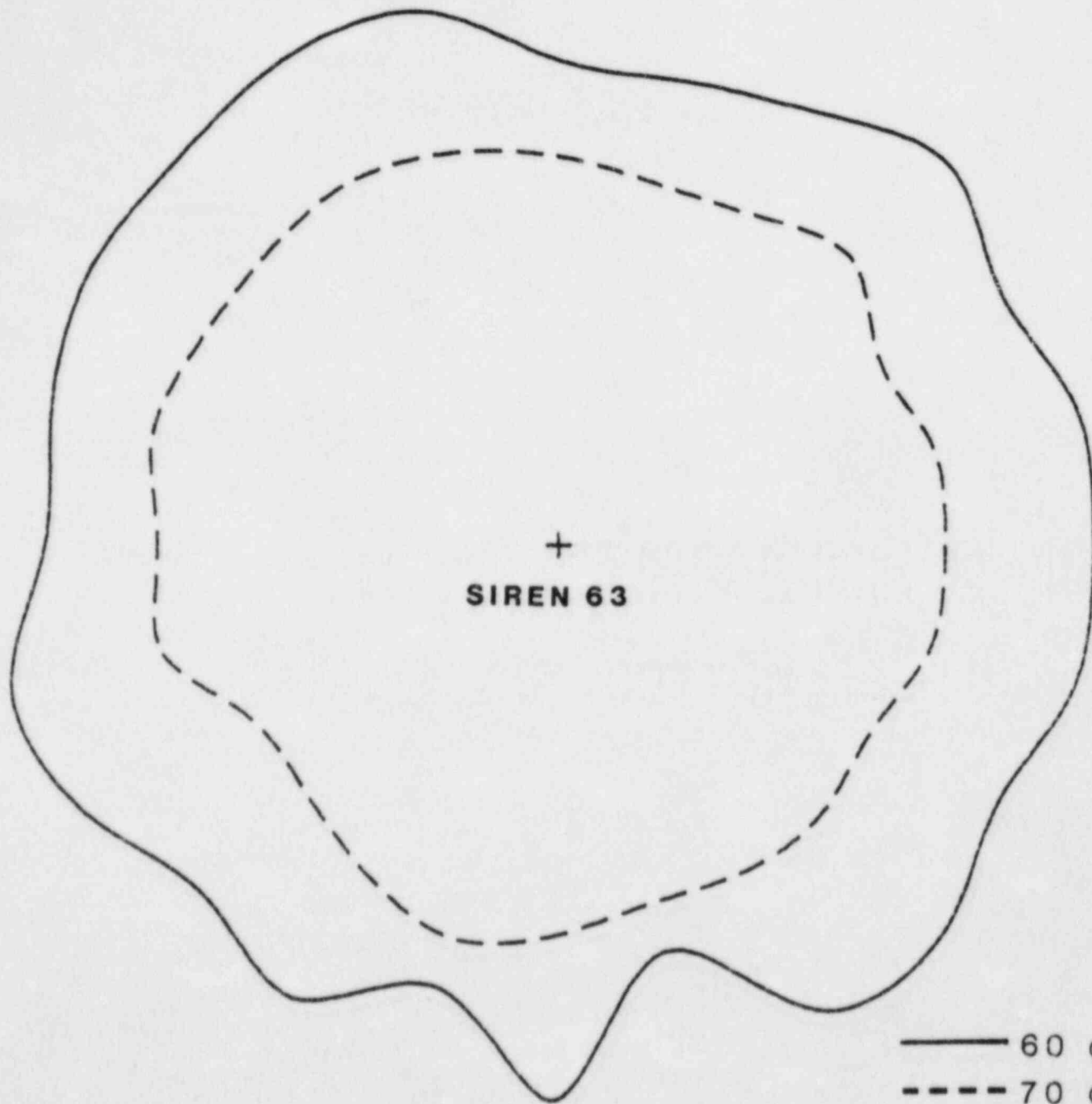


— 60 dBC
- - - 70 dBC



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS

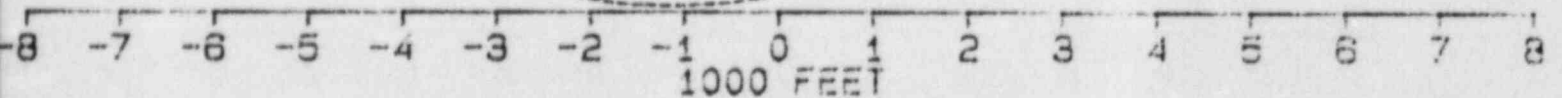


+

SIREN 64

— 60 dBC

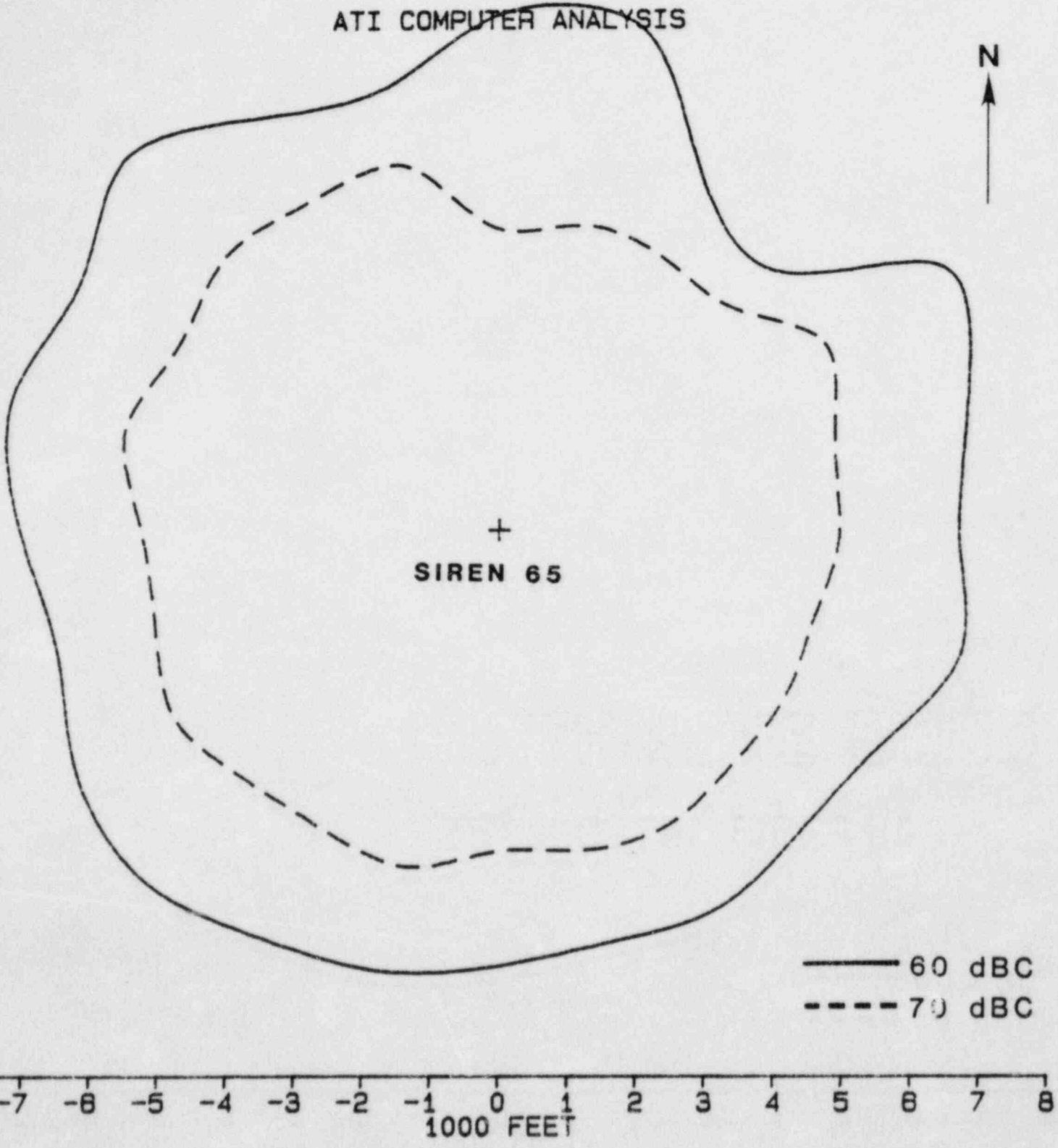
- - - 70 dBC



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



— 60 dBC
- - - 70 dBC

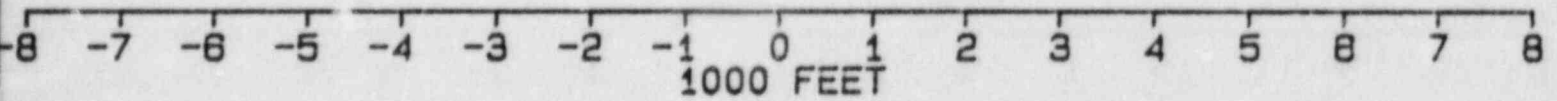
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE
ATT COMPUTER ANALYSIS



SIREN 66

— 60 dBC
- - - 70 dBC



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**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

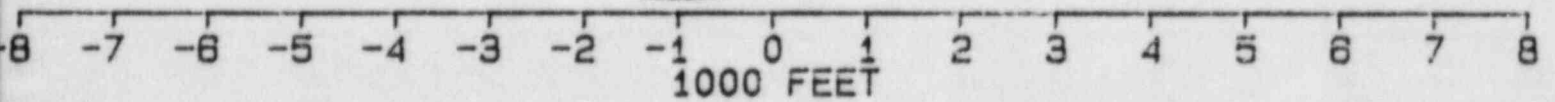
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 67

— 60 dBC
- - - 70 dBC



ACOUSTIC TECHNOLOGY INC.

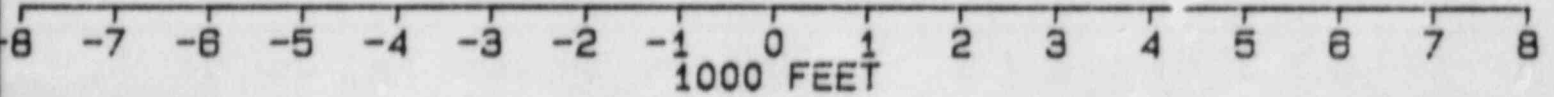
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



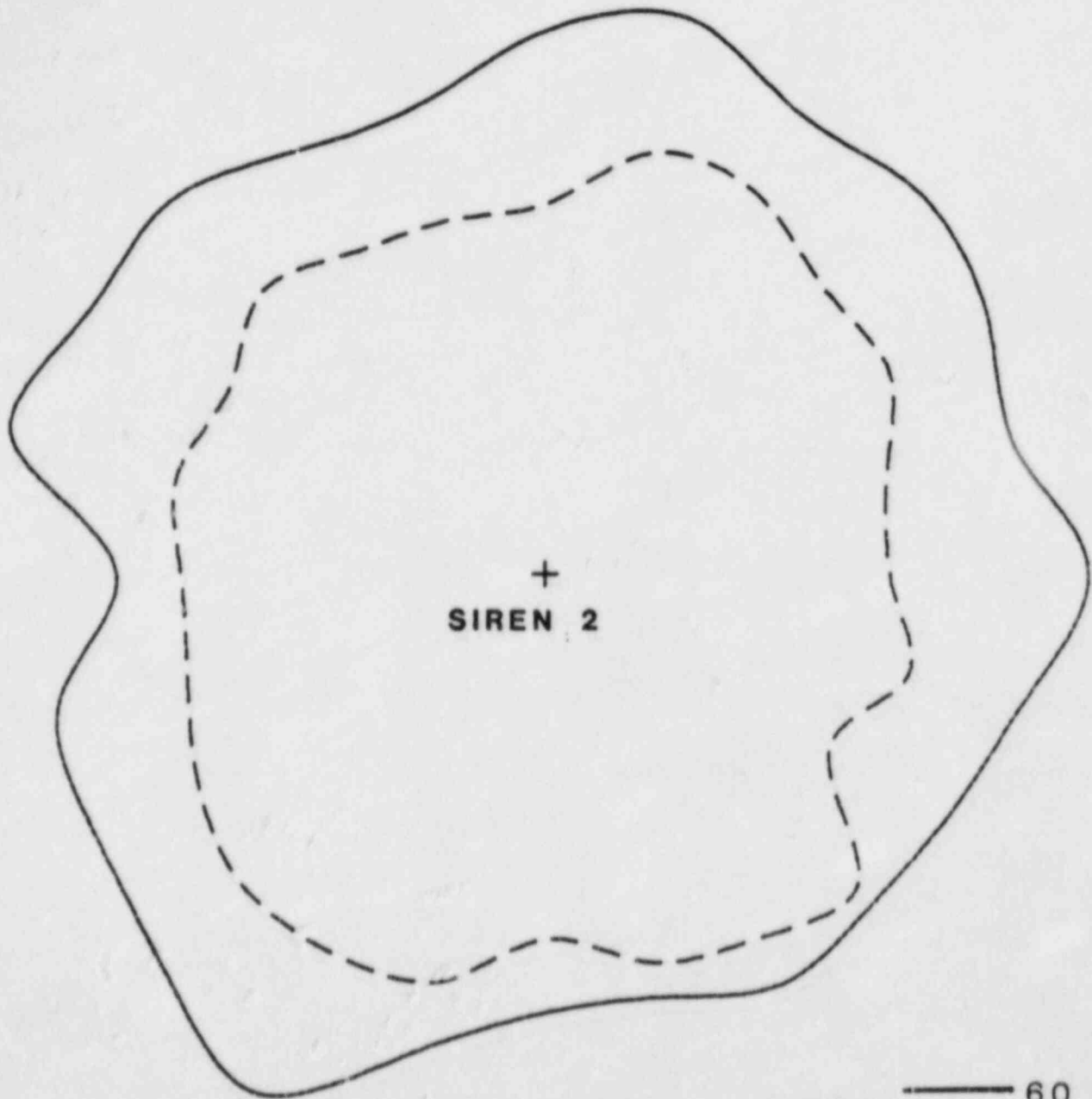
+
SIREN 1

—— 60 dBC
- - - 70 dBC



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

**SIREN SOUND COVERAGE
ATI COMPUTER ANALYSIS**



— 60 dBC
- - - 70 dBC

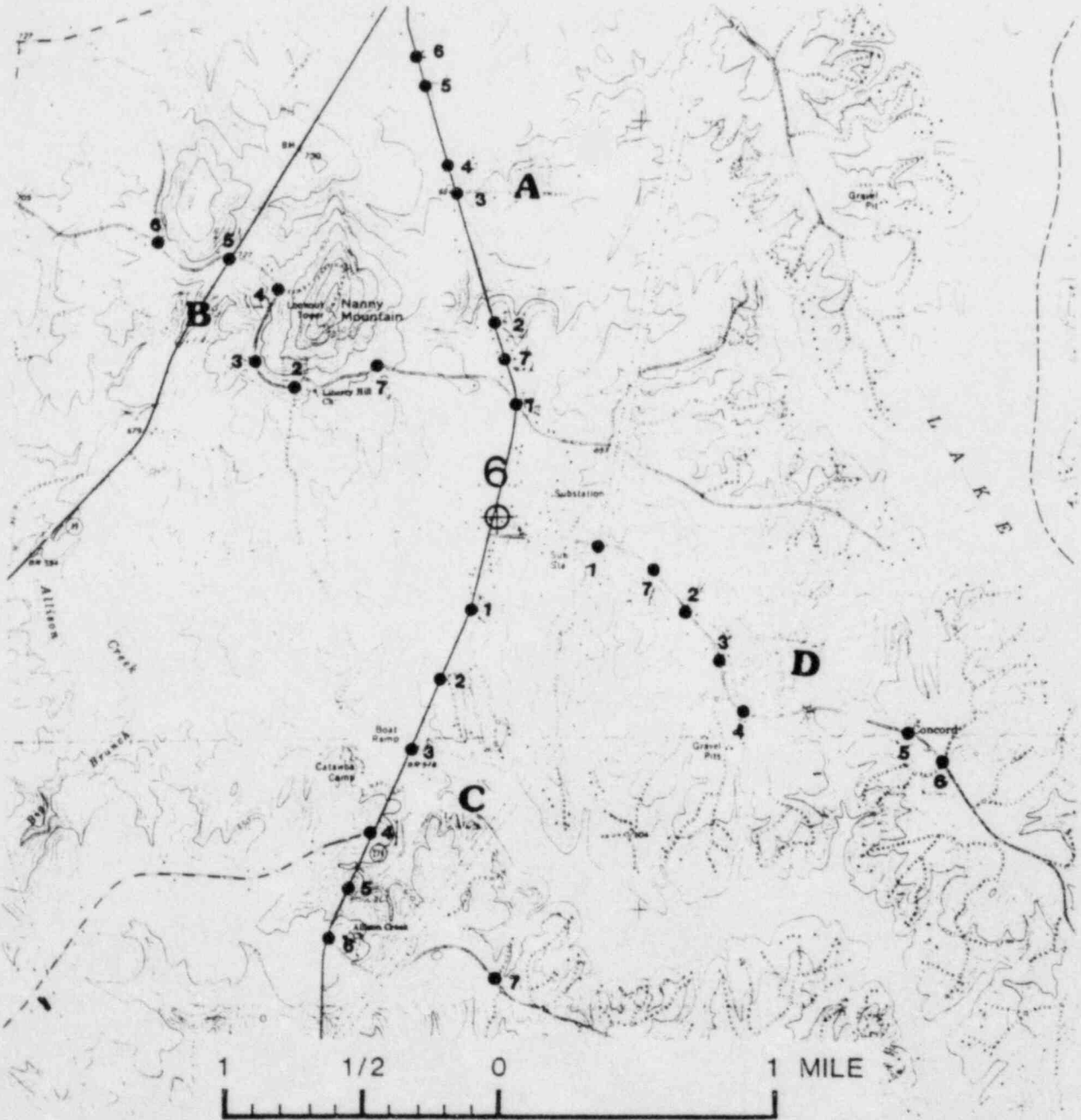
-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8
1000 FEET



ACOUSTIC TECHNOLOGY INC.

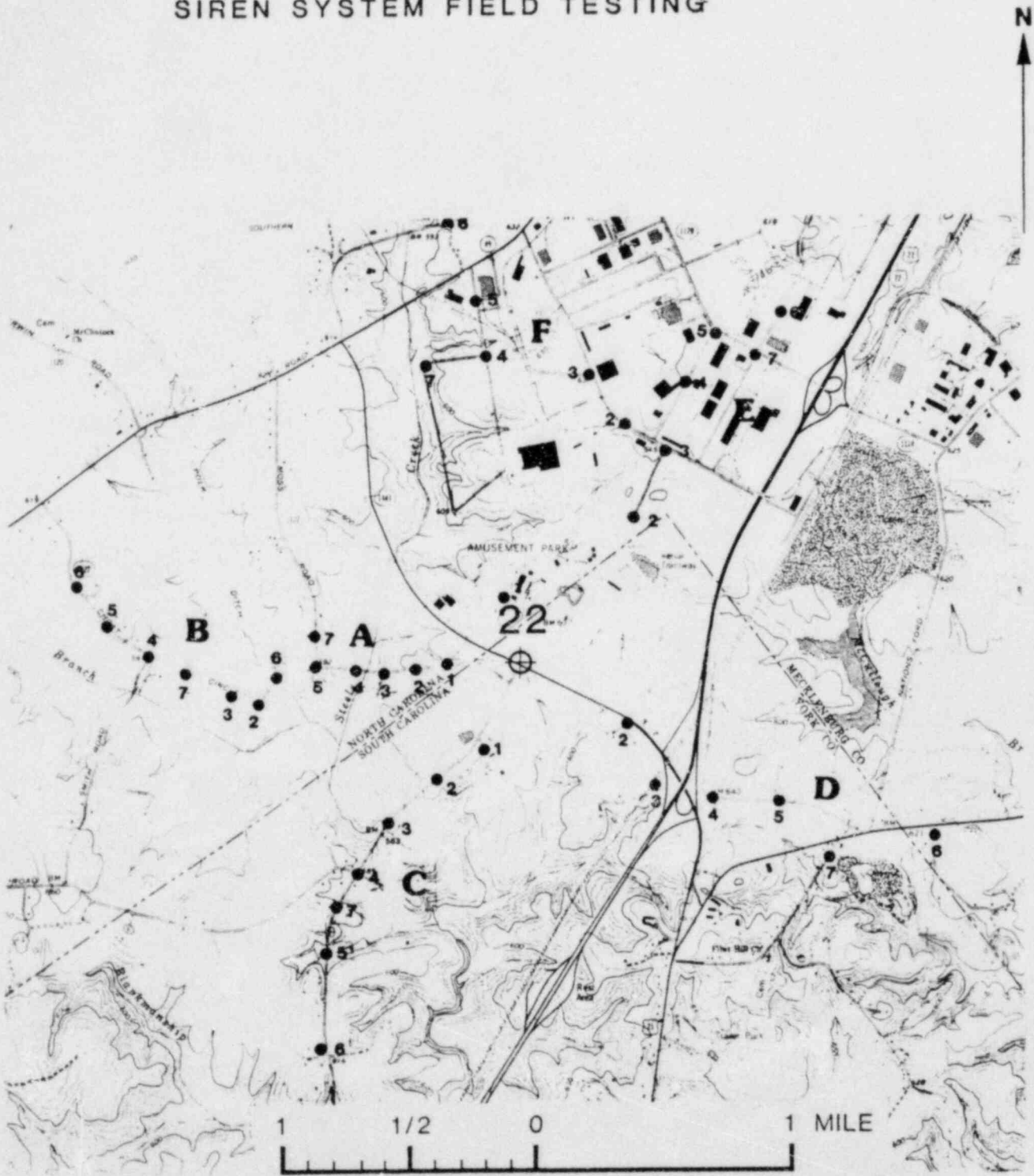
APPENDIX 2: MEASUREMENT LOCATIONS FOR
INDIVIDUAL SIREN TESTING

DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING



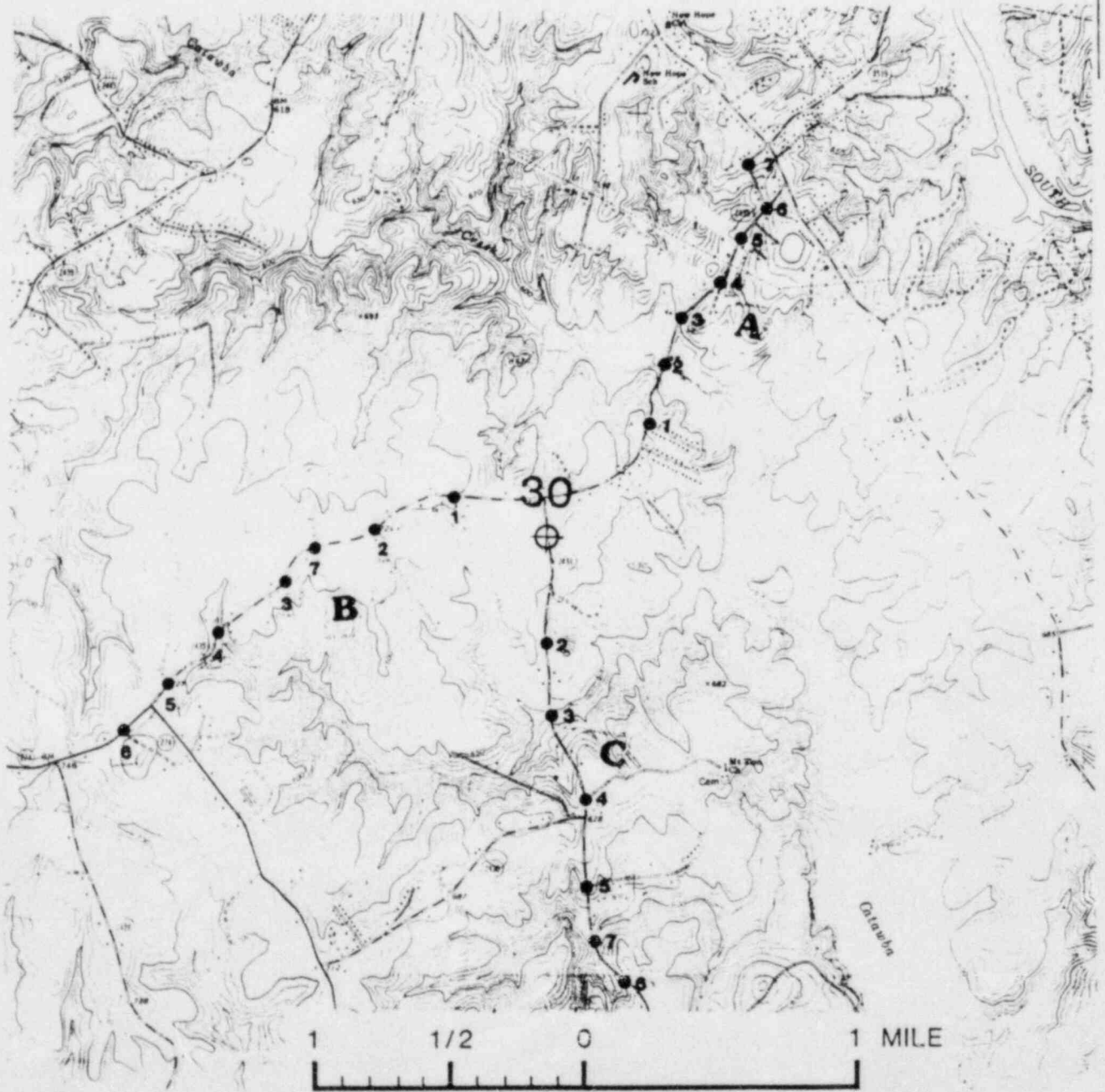
FIELD MEASUREMENT LOCATIONS FOR SIREN 6

DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING



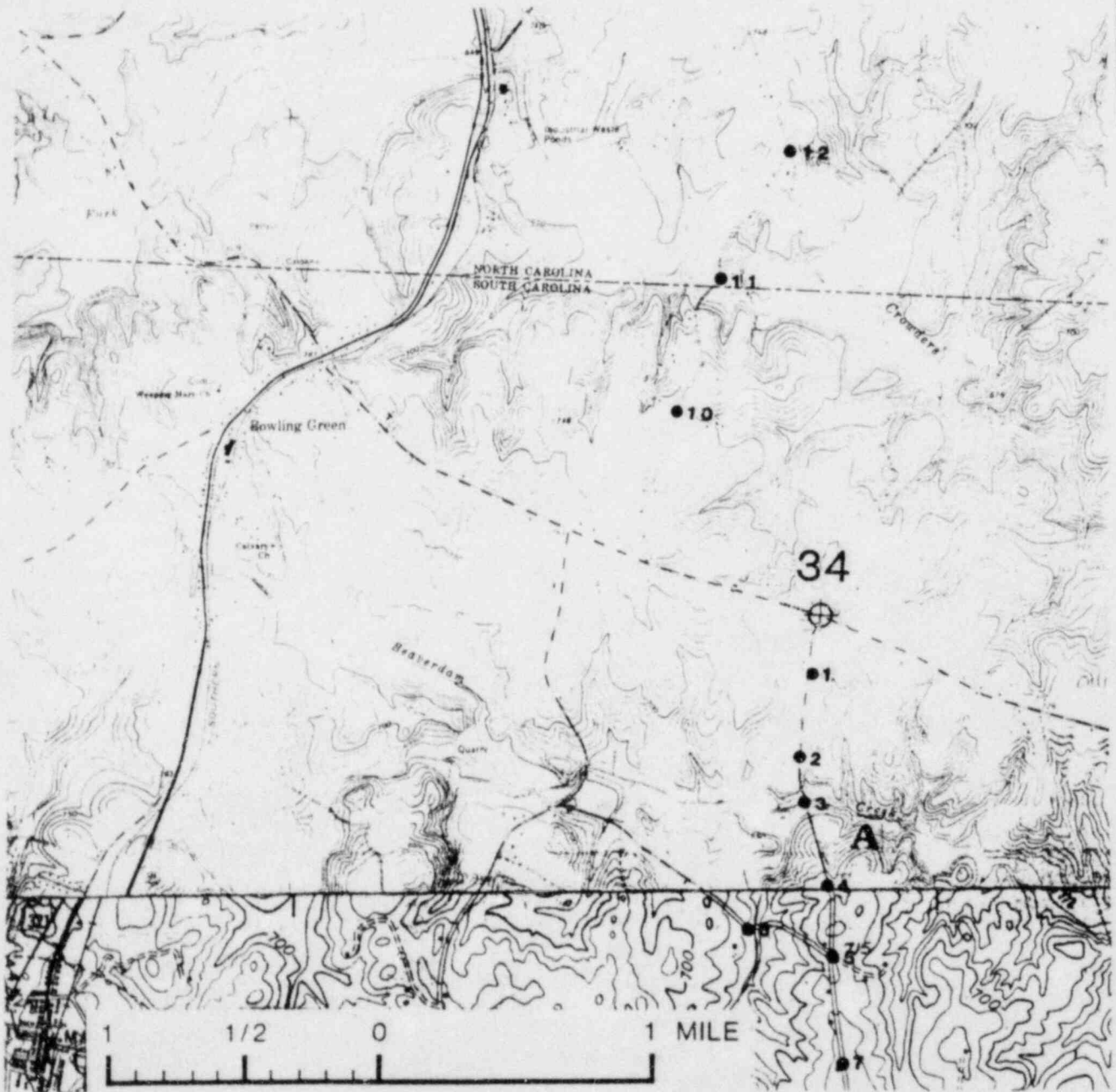
FIELD MEASUREMENT LOCATIONS FOR SIREN 22

DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING



FIELD MEASUREMENT LOCATIONS FOR SIREN 30

DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING

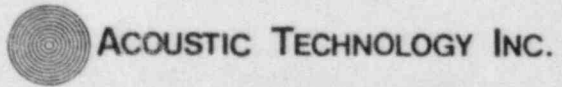


FIELD MEASUREMENT LOCATIONS FOR SIREN 34

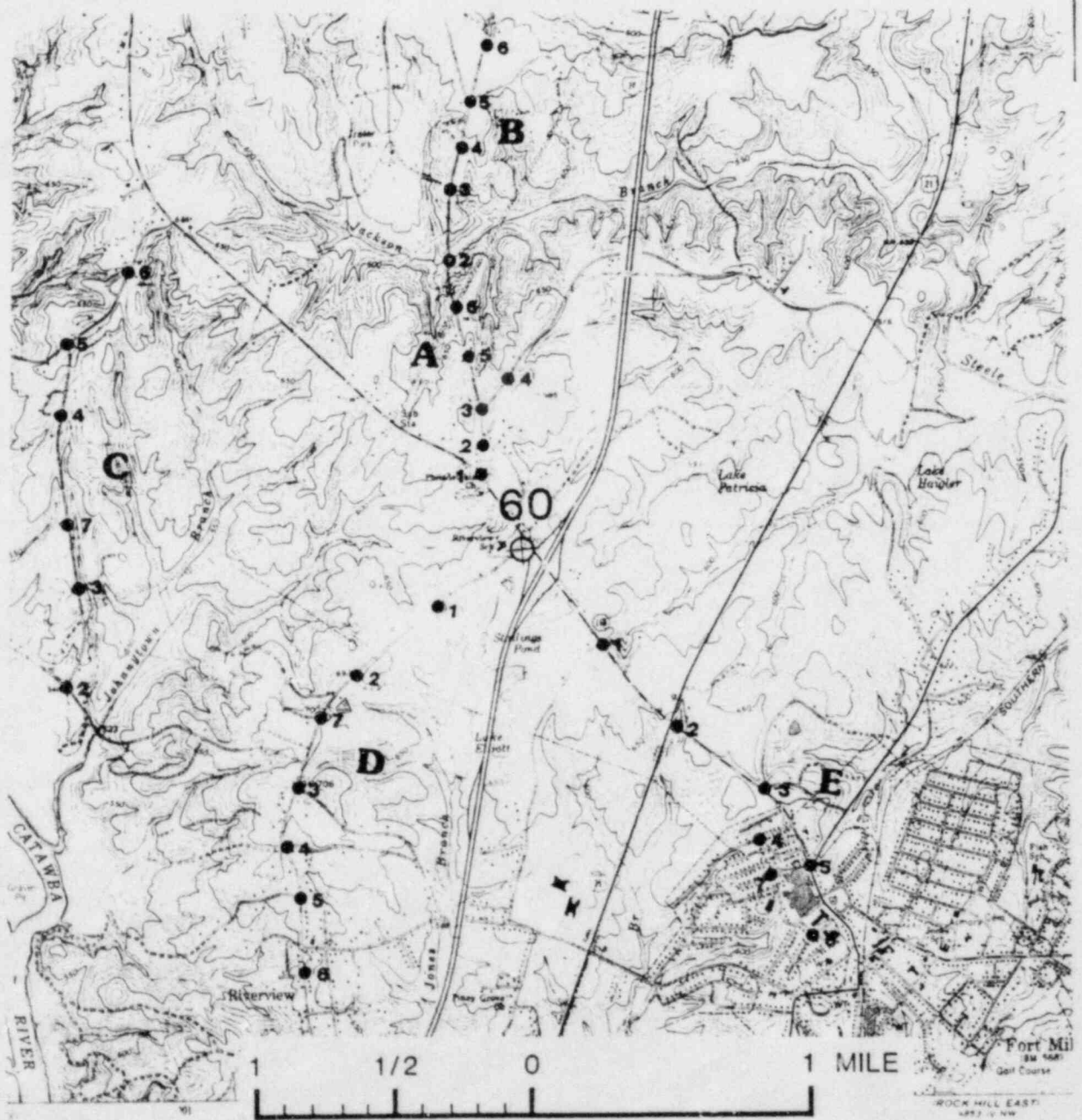
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING



FIELD MEASUREMENT LOCATIONS FOR SIREN 51



DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN SYSTEM FIELD TESTING



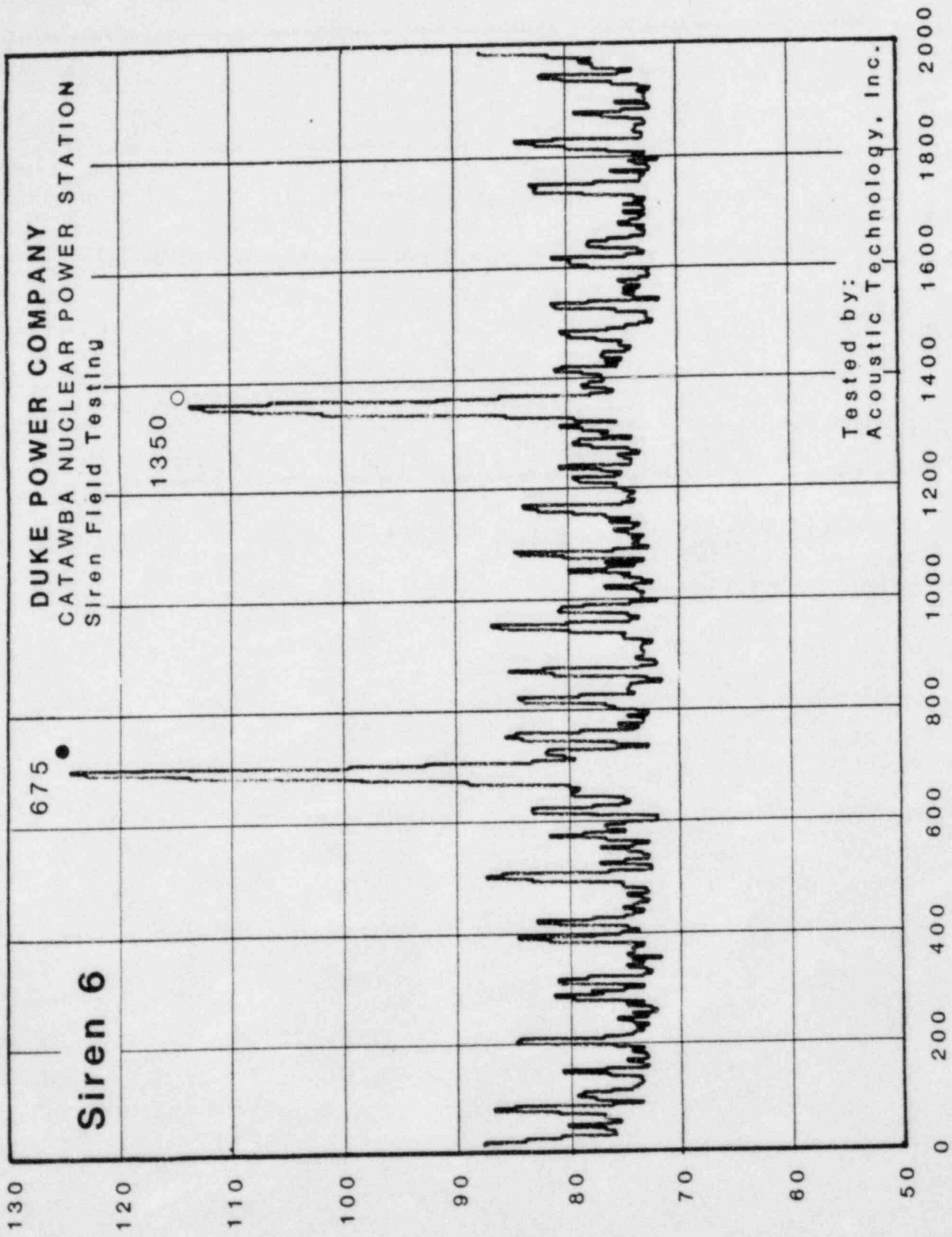
FIELD MEASUREMENT LOCATIONS FOR SIREN 60



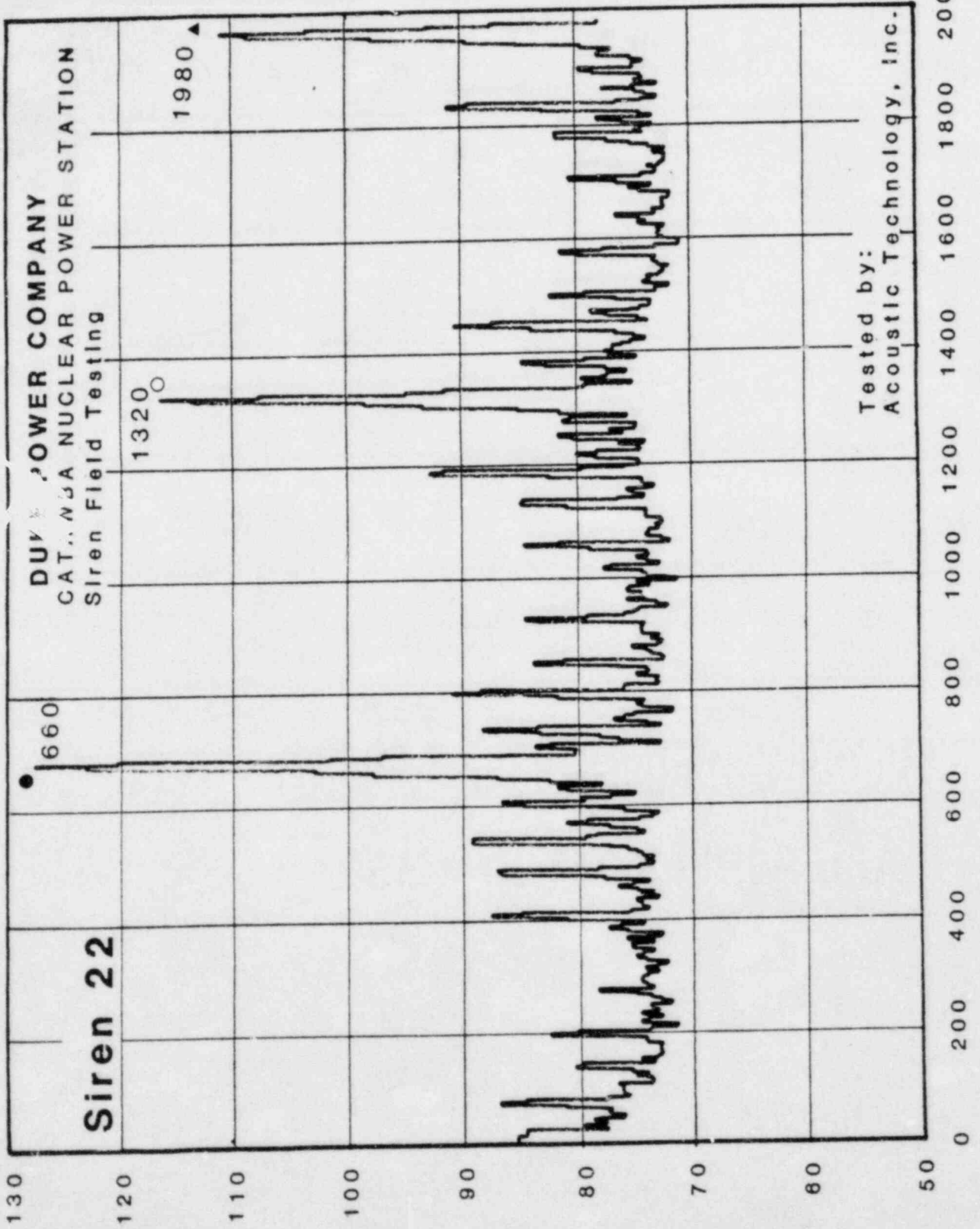
ACOUSTIC TECHNOLOGY INC.

APPENDIX 3: NARROW BAND SPECTRA AT
100 FEET FROM THE SIREN

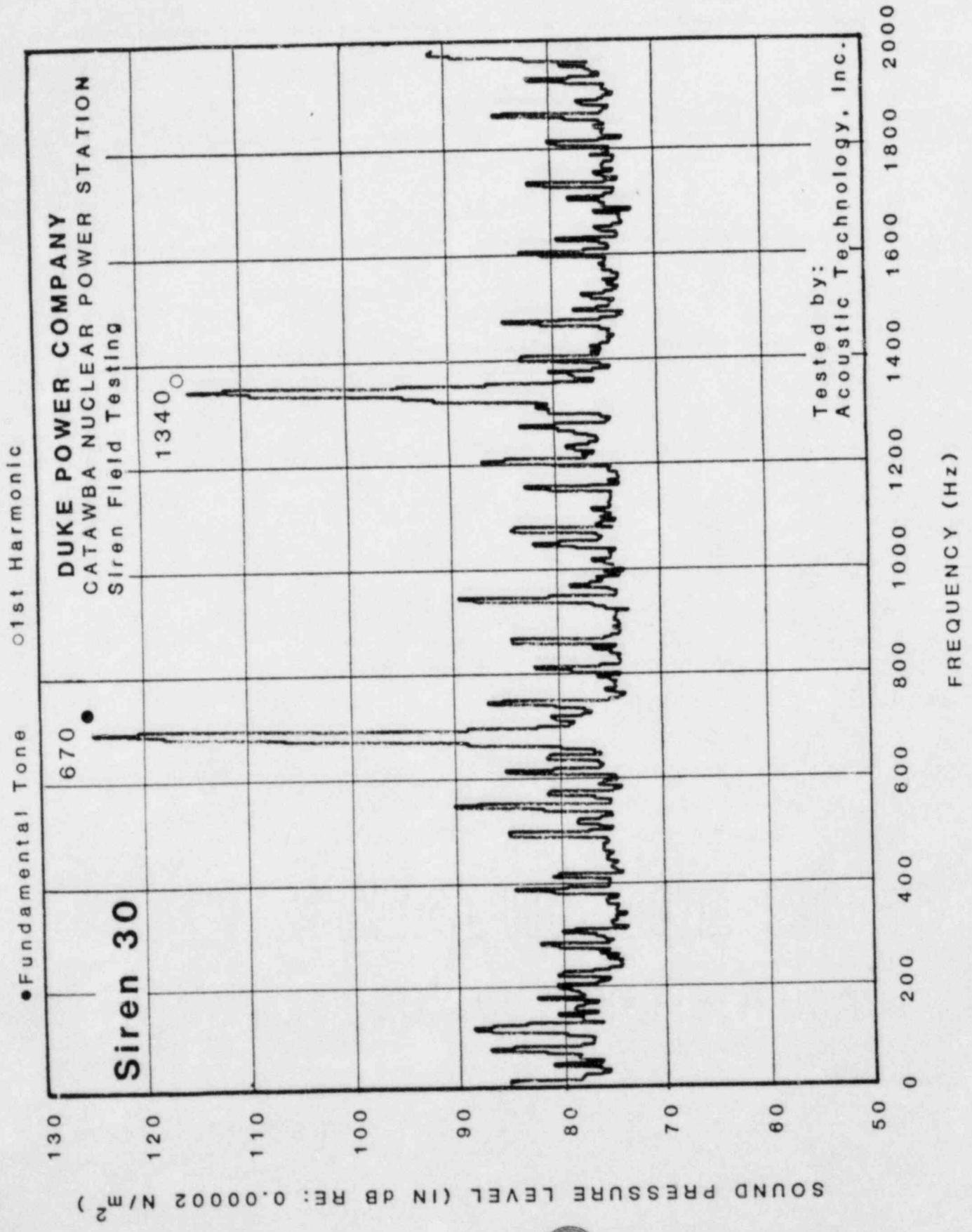
● Fundamental Tone ○ 1st Harmonic



● Fundamental Tone ○ 1st Harmonic ▲ 2nd Harmonic

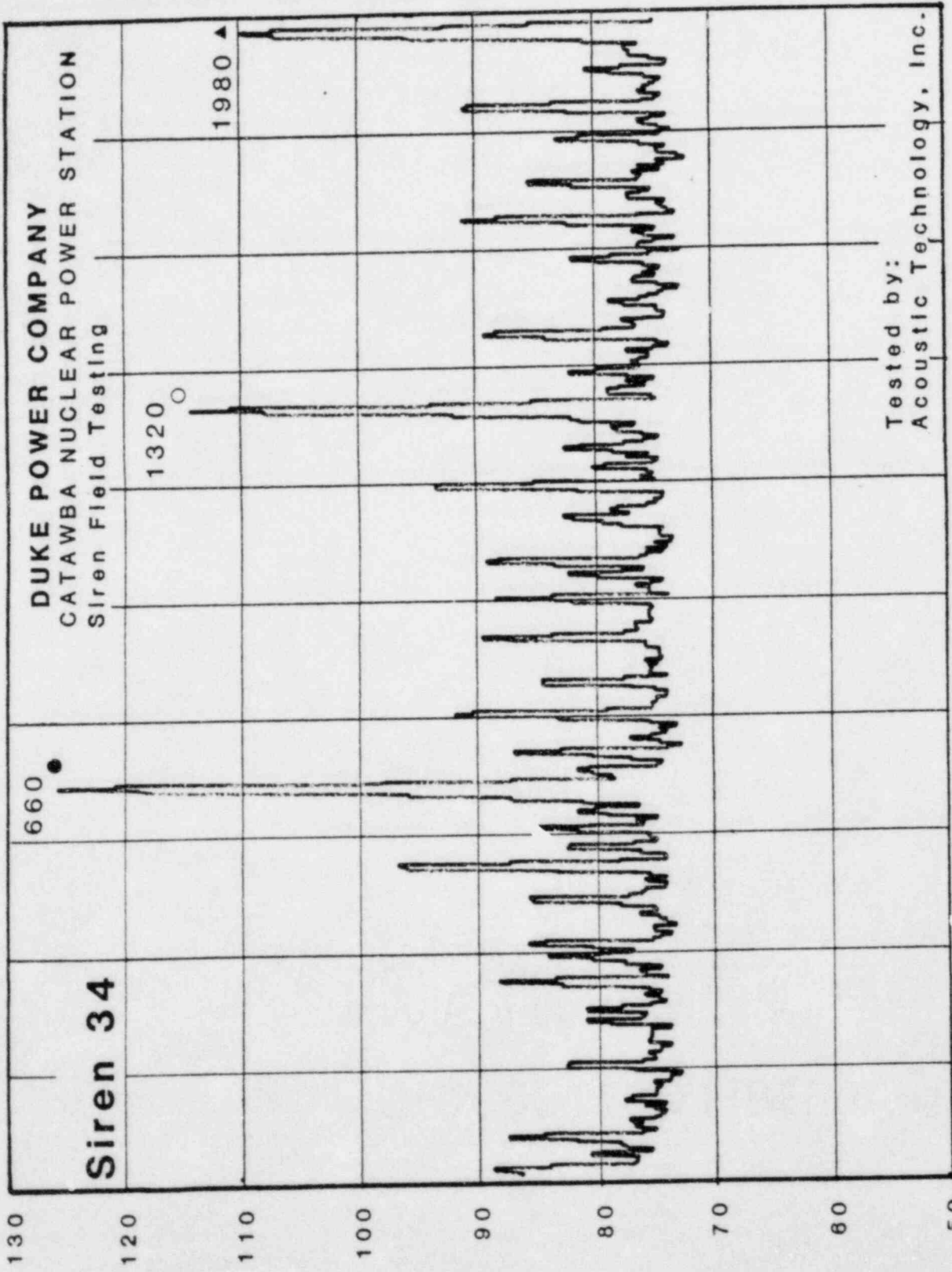


SOUND PRESSURE LEVEL (IN DB RE: 0.00002 N/M²)



ACOUSTIC TECHNOLOGY INC.

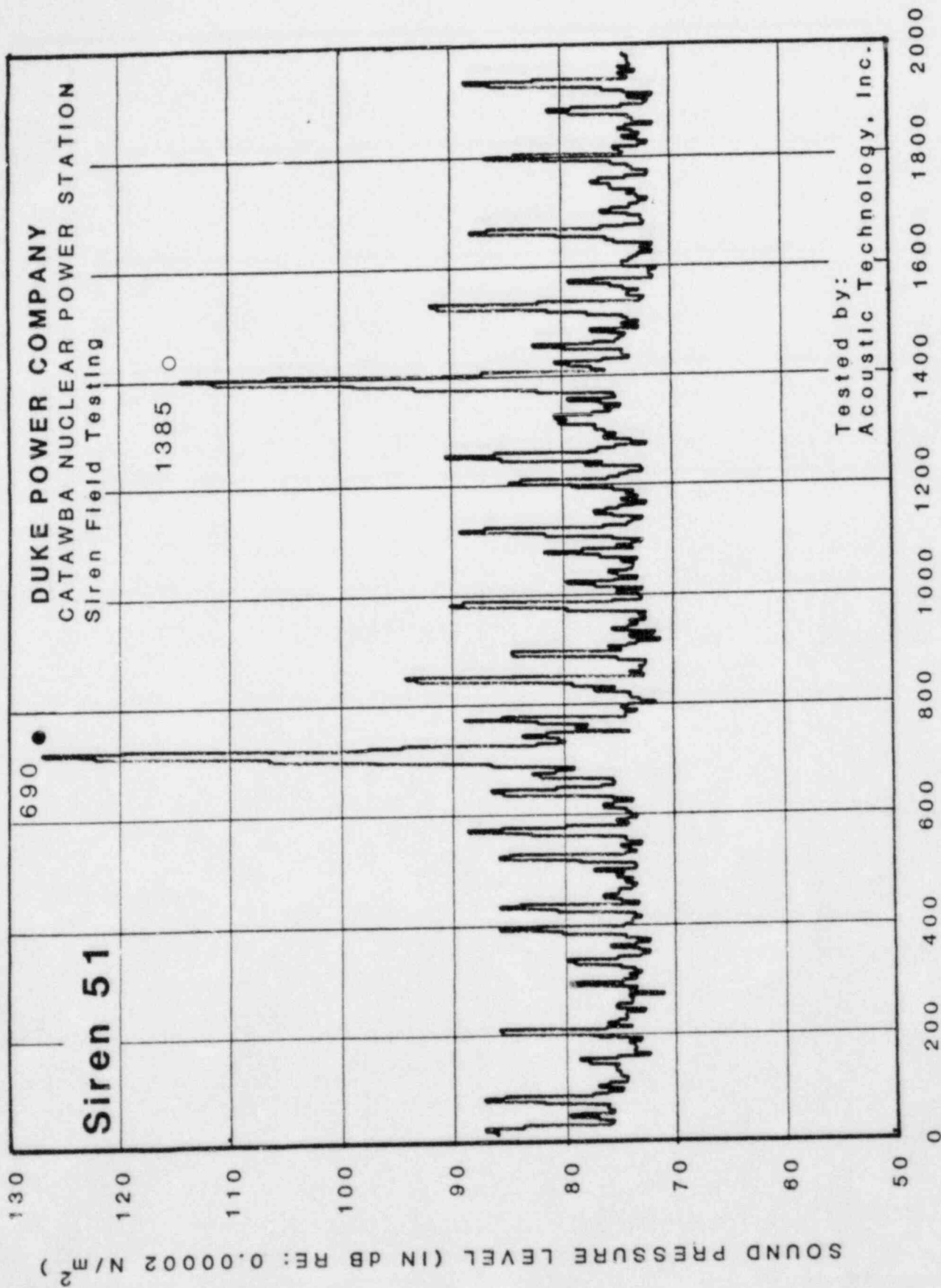
● Fundamental Tone ○ 1st Harmonic ▲ 2nd Harmonic



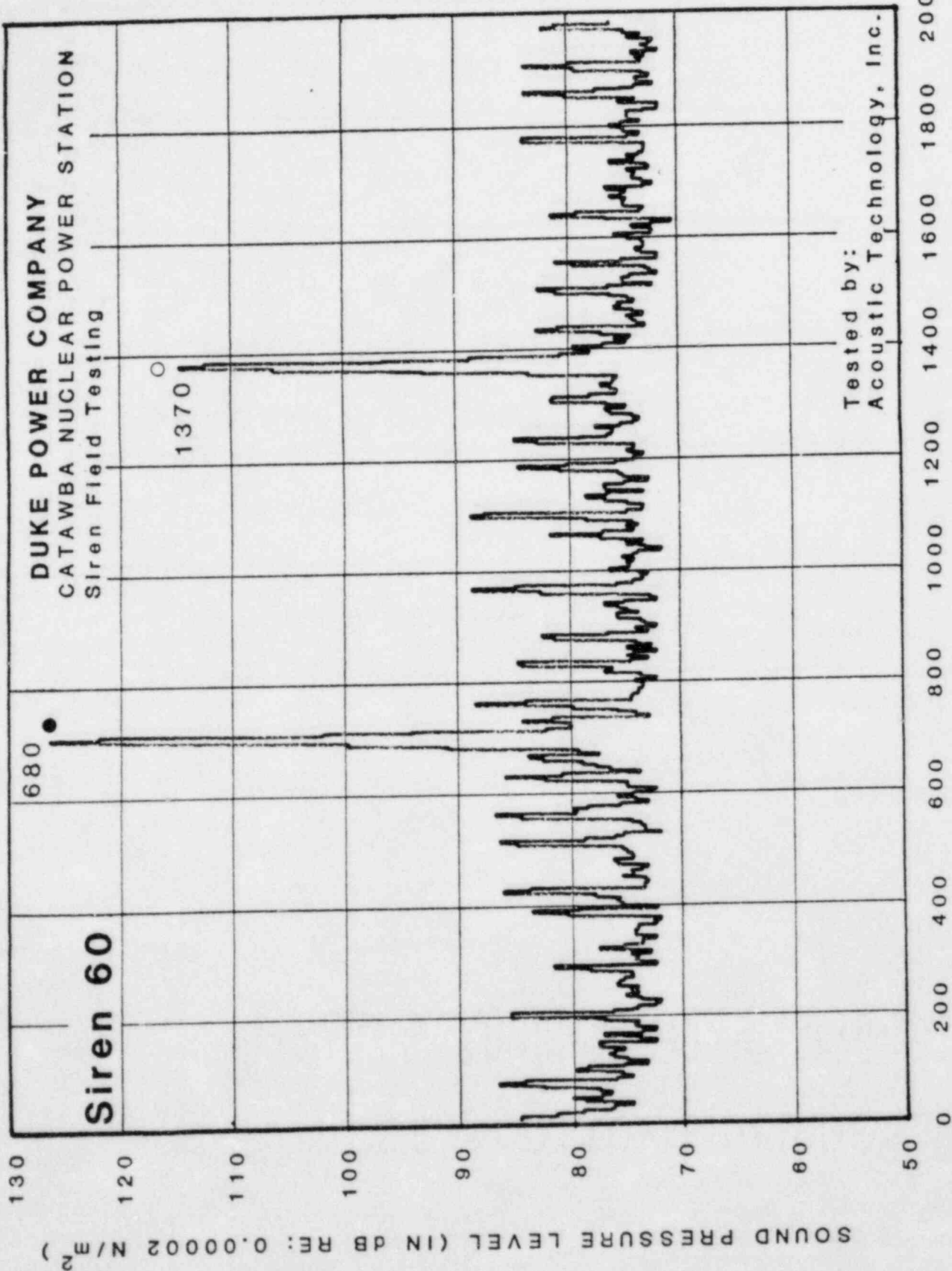
SOUND PRESSURE LEVEL (IN DB RE: 0.00002 N/M²)

Tested by:
Acoustic Technology, Inc.

● Fundamental Tone ○ 1st Harmonic



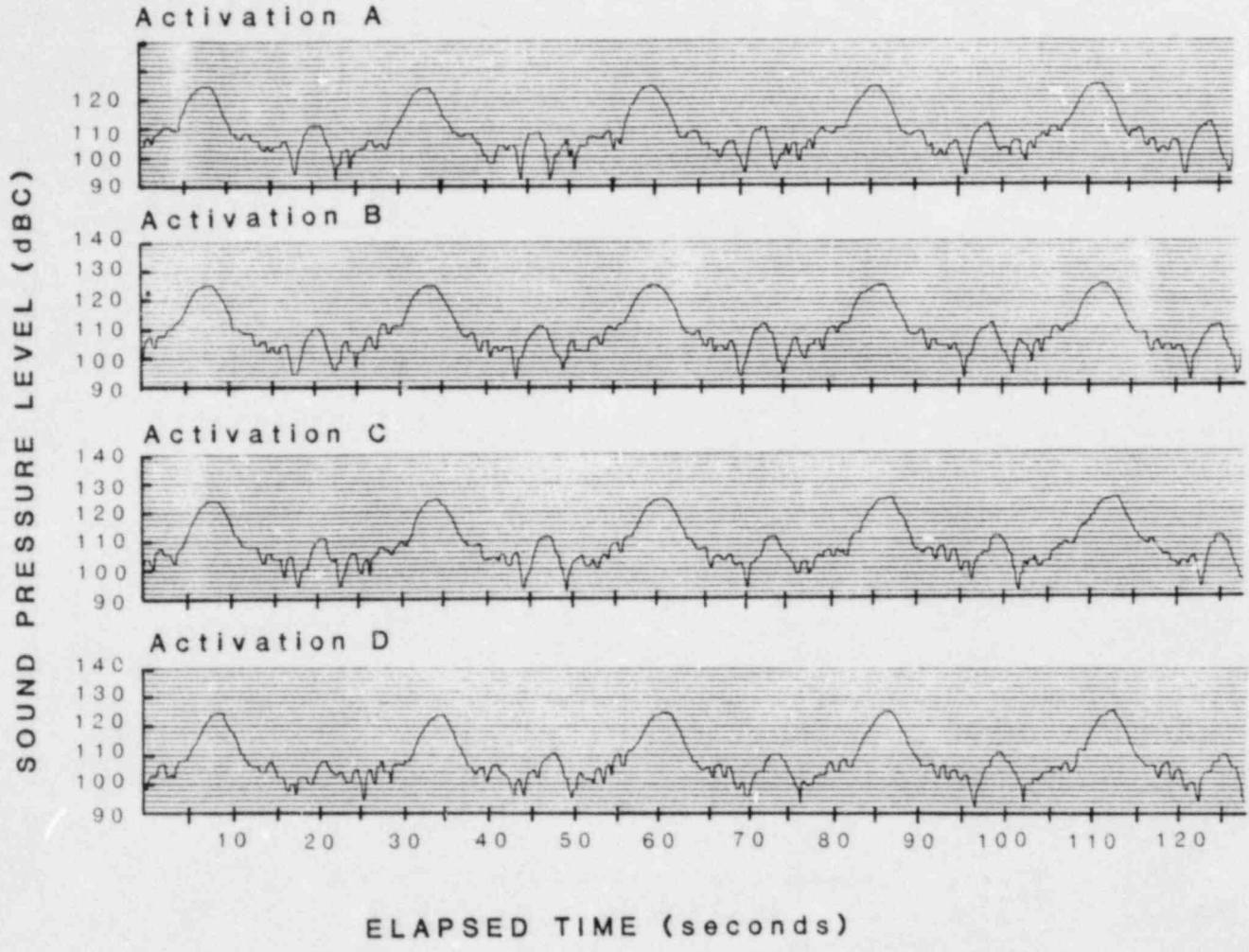
● Fundamental Tone ○ 1st Harmonic



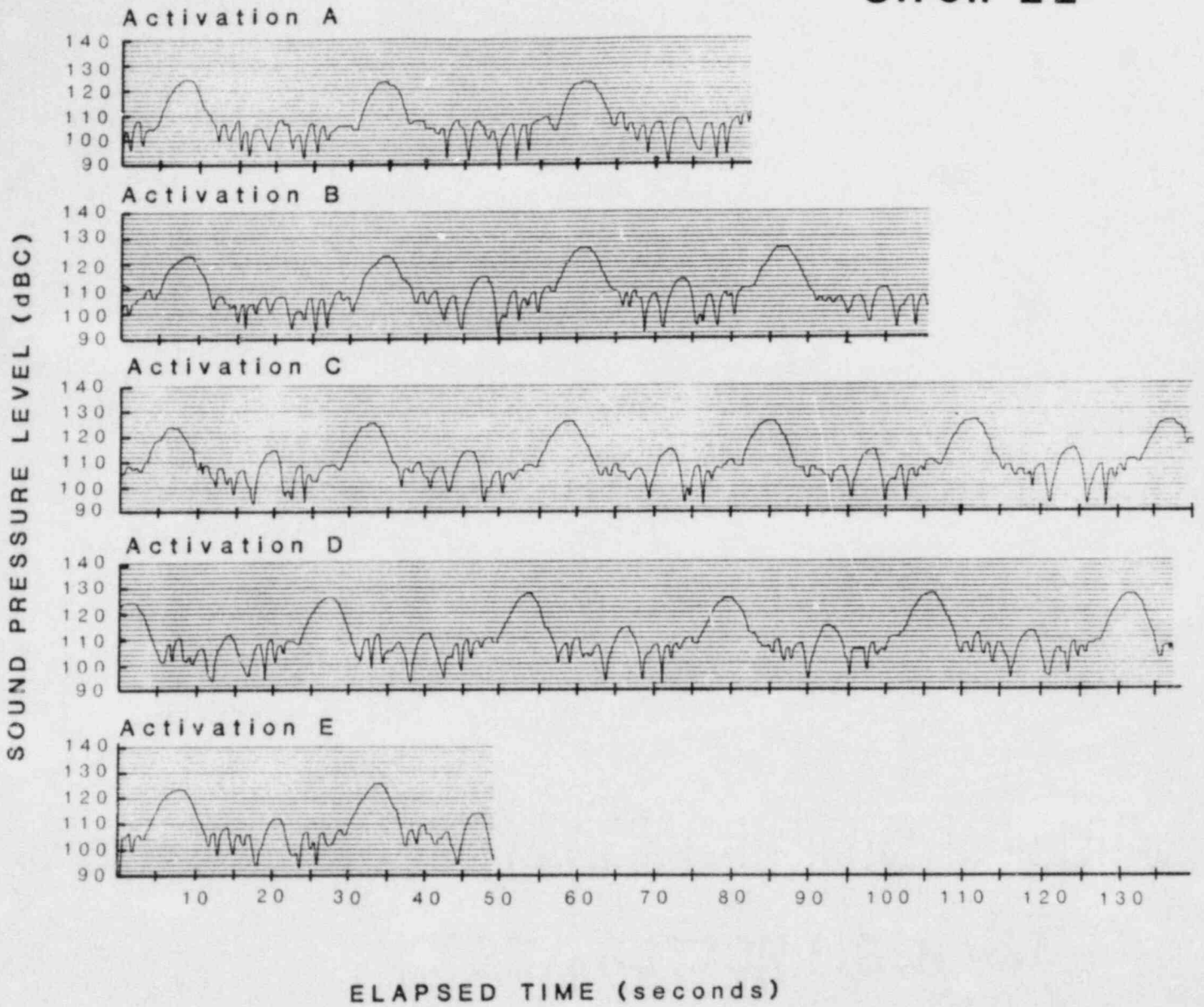
ACOUSTIC TECHNOLOGY INC.

APPENDIX 4: SIREN SIGNAL SOUND PRESSURE LEVEL
VARIATION WITH TIME

Siren 6



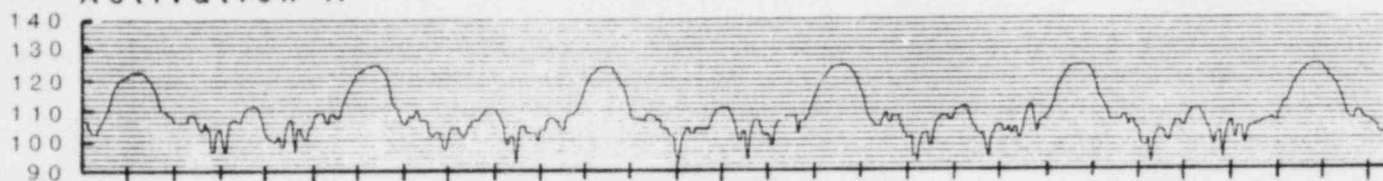
Siren 22



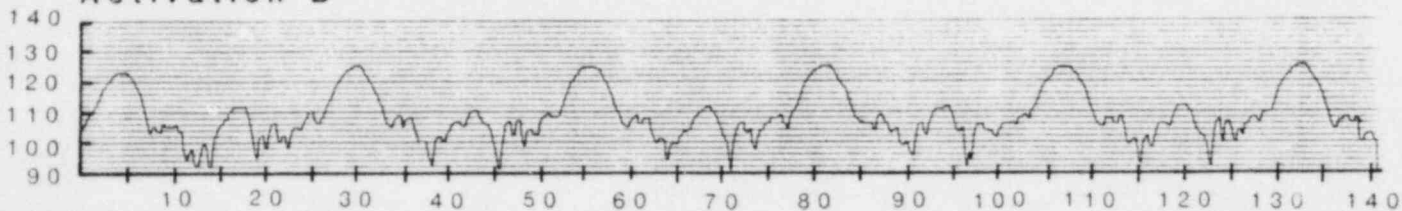
Siren 30

SOUND PRESSURE LEVEL (dBC)

Activation A



Activation B



ELAPSED TIME (seconds)

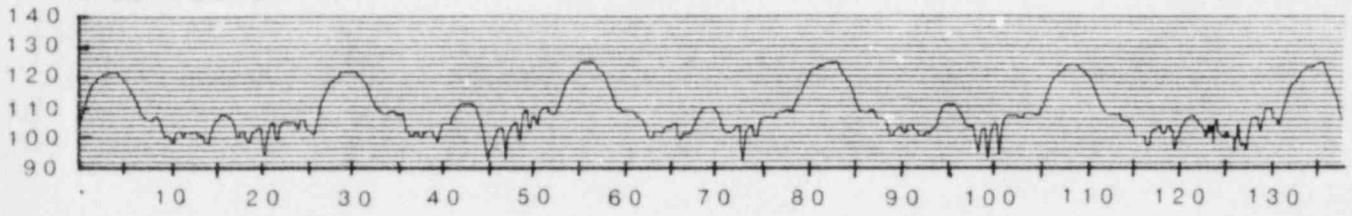


ACOUSTIC TECHNOLOGY INC.

SOUND PRESSURE LEVEL (dBC)

Siren 34

Activation A



ELAPSED TIME (seconds)

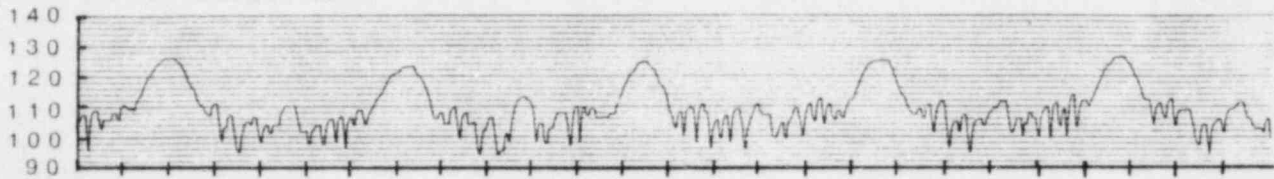


ACOUSTIC TECHNOLOGY INC.

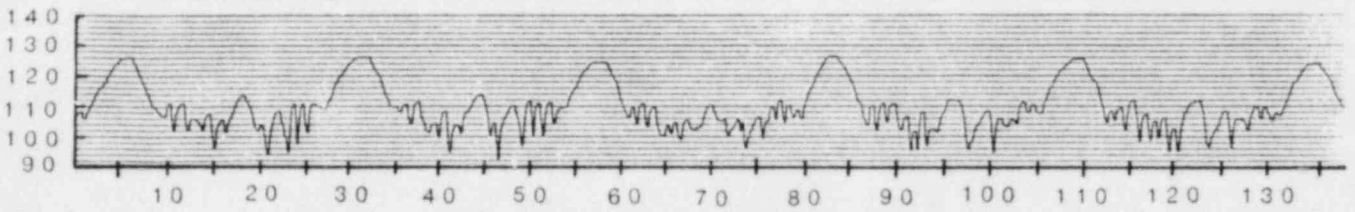
Siren 51

SOUND PRESSURE LEVEL (dBC)

Activation A



Activation B

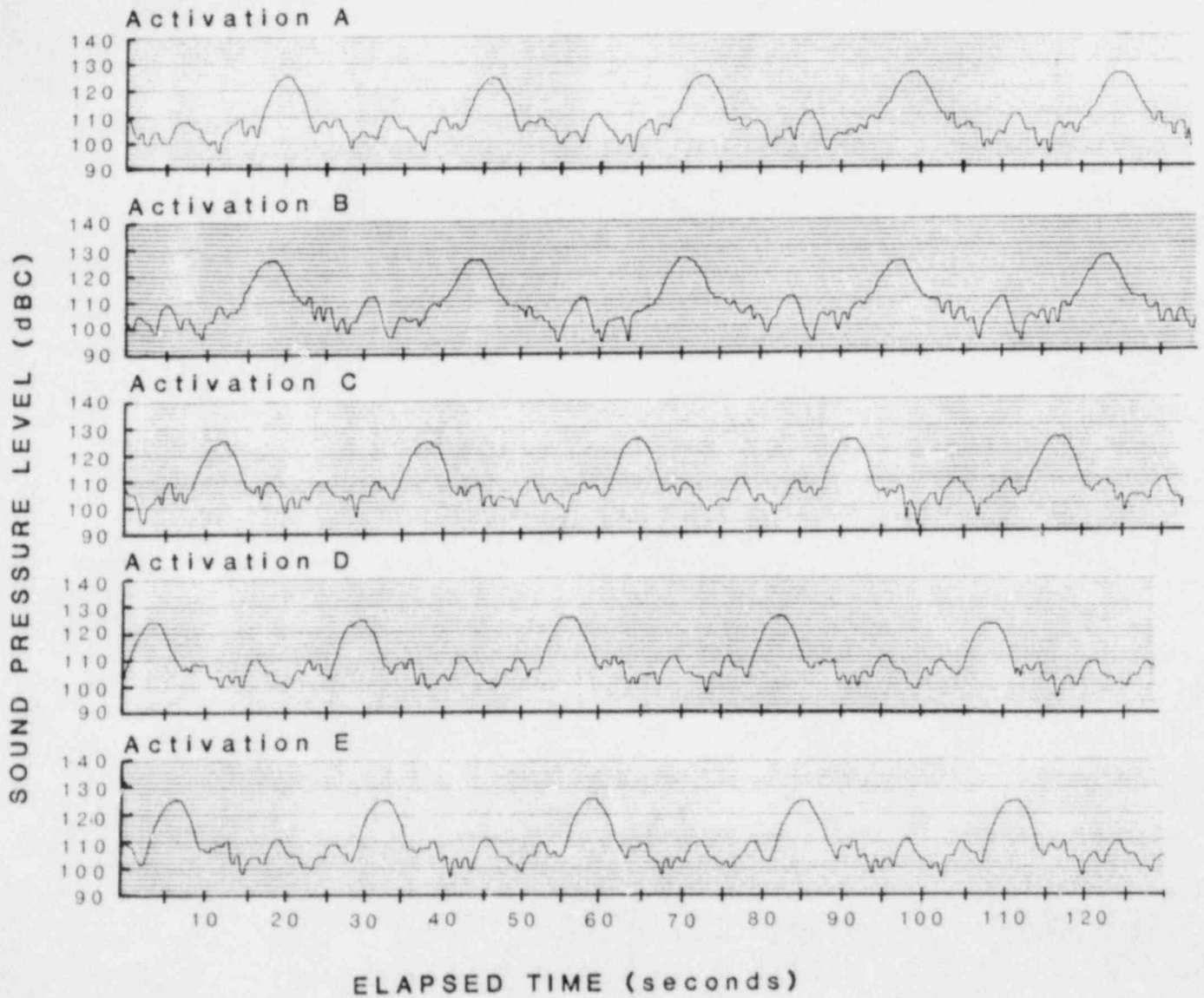


ELAPSED TIME (seconds)



ACOUSTIC TECHNOLOGY INC.

Siren 60



APPENDIX 5: DATA SUMMARY TABLES FOR
INDIVIDUAL SIREN TESTING

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 6 MODEL FSC T-bol t TEST DATE 2/21/84 TIME 10:00 AM
 TEMPERATURE 46°F RELATIVE HUMIDITY 53% WIND 3.5 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
A-1	80	2200	40	78	77	
A-2	92	3800	45 - 55	72	73	
A-3	100	6200	38 - 40	58	60	
A-4	100	6800	37 - 38	61	61	
A-5	100	8400	35 - 44	60	58	
A-6	103	9000	43 - 68	60	56	
A-7	90	3000	47 - 68	72	72	
B-2	148	4600	28 - 35	78	73	
B-3	148	4600	34 - 37	69	69	
B-4	135	6100	45	60	52	8
B-5	138	7200	35 - 44	60	44	8
B-6	140	8500	32 - 33	57	51	8
B-7	130	3700	30	76	76	

DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION
SIREN FIELD TESTING

SIREN NUMBER 6 MODEL FSC T-bolt TEST DATE 2/21/84 TIME 10:00

TEMPERATURE 46°F RELATIVE HUMIDITY 53% WIND 3.5 MPH
* CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
C-1	255	1800	42	94	94	
C-2	250	3200	35 - 45	85	86	
C-3	250	4700	37 - 40	79	79	
C-4	250	6500	40 - 42	71	70	
C-5	250	7600	35 - 40	69	66	
C-6	250	8700	40 - 47	60	57	
C-7	272	8800	35 - 37	65	61	
D-1	345	2000	44	89	90	
D-2	335	4000	40	78	78	
D-3	328	5100	35 - 41	71	70	
D-4	320	6000	36 - 37	67	69	
D-5	335	8900	33 - 34	58	57	
D-6	332	9800	38	53	54	
D-7	340	3200	30 - 50	84	82	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 22 MODEL FSC T-bolt TEST DATE 2/20/84 TIME 9:45 AM
 TEMPERATURE 57°F RELATIVE HUMIDITY 47% WIND 11.5 MPH
 *CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
A-1	180	1500	62 - 70	85	86	
A-2	180	2200	50	86	89	
A-3	180	2800	39	88	88	
A-4	180	3500	43	80	80	
A-5	180	4300	40 - 46	80	79	
A-6	180	5000	46 - 48	77	75	
A-7	180	4300	42 - 50	83	79	
B-2	192	5500	40	73	73	
B-3	190	6000	38	73	72	
B-4	178	7800	42 - 43	65	63	
B-5	175	8700	40 - 60	60	59	
B-6	170	9400	45	61	57	
B-7	180	7000	40 - 45	66	66	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 22 MODEL FSC T-bolt TEST DATE: 2/20/84 TIME 10:25 AM

TEMPERATURE 57°F RELATIVE HUMIDITY 47% WIND 11.5 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
C-1	250	2000	44	93	92	
C-2	235	3000	37 - 40	86	86	
C-3	230	4300	38	81	80	
C-4	234	5500	33 - 34	75	73	
C-5	238	7200	37 - 40	73	64	8
C-6	245	9000	34	65	61	
C-7	235	6300	40 - 44	72	70	
D-2	330	2500	45 - 75	91	89	
D-3	315	3800	52	77	79	
D-4	325	4900	53 - 60	73	73	
D-5	332	6100	48 - 54	70	68	
D-6	338	9200	47 - 68	62	59	
D-7	328	7500	45 - 50	68	63	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 22 MODEL FSC T-bolt TEST DATE 2/20/84 TIME 11:15 AM
 TEMPERATURE 60°F RELATIVE HUMIDITY 38% WIND 11.5 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
E-1	105	1400	47	85	86	
E-2	50	3800	50	78	78	
E-3	55	5300	50	70	70	
E-4	60	6800	46 - 50	68	64	
E-5	60	7800	60 - 80	60	60	
E-6	50	9000	-	55	56	
E-7	50	8000	54 - 64	60	60	
F-2	65	5400	45	65	66	
F-3	75	6100	47	64	66	
F-4	95	6400	36 - 38	71	67	
F-5	95	7500	42 - 60	63	64	
F-6	100	9500	47 - 76	57	57	
F-7	107	6500	40 - 46	63	64	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 30 MODEL FSC T-bolt TEST DATE 2/21/84 TIME 11:15 AM

TEMPERATURE 50° RELATIVE HUMIDITY 45% WIND 6.9 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
A-1	45	3000	34	72	74	
A-2	55	4100	35	66	69	
A-3	58	5000	35 - 42	70	73	
A-4	55	6000	39 - 41	74	72	
A-5	56	7000	37 - 40	66	66	
A-6	54	7700	43	63	62	
A-7	62	8300	43 - 52	58	59	
B-1	158	2000	28	90	90	
B-2	178	3400	30	77	76	
B-3	190	5300	35 - 44	69	70	
B-4	195	6800	35 - 37	70	67	
B-5	200	8000	33 - 37	64	62	
B-6	205	9200	33	55	52	
B-7	182	4600	30 - 40	72	72	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 30 MODEL FSC T-bolt TEST DATE 2/21/84 TIME 11:45
 TEMPERATURE 54^oF RELATIVE HUMIDITY 40% WIND 4.6 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
C-2	270	2100	25	91	92	
C-3	274	3500	32 - 38	80	82	
C-4	280	5200	37 - 39	76	73	
C-5	278	6900	30 - 35	65	61	
C-6	280	8800	34 - 38	63	60	
C-7	278	8000	33 - 37	62	61	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 34 MODEL FSC T-bolt TEST DATE 2/20/84 TIME 1:45 PM

TEMPERATURE 63°F RELATIVE HUMIDITY 35% WIND 8 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
A-1	265	1200	30	102	101	
A-2	260	2700	27 - 30	88	88	
A-3	265	3600	28 - 35	78	83	
A-4	272	5300	35	75	75	
A-5	274	6600	73 - 40	65	66	
A-6	258	6200	28 - 35	71	70	
A-7	275	8700	33 - 35	64	60	

DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN FIELD TESTING

SIREN NUMBER 51 MODEL FSC T-bolt TEST DATE 2/20/84 TIME 3:30 PM
 TEMPERATURE 63° RELATIVE HUMIDITY 35% WIND 5.8 MPH
 * CLOCKWISE FROM NORTH

LOCATION	ANGLE FROM EAST IN DEGREES	DISTANCE FROM SIREN IN FEET	AMBIENT NOISE LEVEL dBA	AVERAGE SIREN SOUND LEVEL (SSL) dBA	COMPUTER PREDICTED SSL IN dBA WITH CORRECTIONS	REMARKS
A-1	118	2400	55 - 60	83	78	
A-2	58	2600	63	72	76	
A-3	42	5000	40 - 44	68	68	
A-4	60	5000	50 - 65	*	66	
A-5	50	6500	50 - 60	*	59	
A-6	45	7500	62 - 75	61	61	
A-7	55	6600	56 - 62	*	59	
				*same as ambient noise		
B-1	270	2000	48 - 50	77	78	
B-2	320	3300	65	70	70	
B-3	335	5000	40 - 45	64	67	
B-4	335	7200	40 - 42	61	60	
B-5	340	8900	42 - 44	55	56	
B-6	330	9700	41 - 44	54	54	
B-7	322	10000	38 - 42	54	54	

APPENDIX 6: AMBIENT NOISE SURVEY
MEASUREMENT LOCATIONS DATA

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>8:40 AM</u> TEMP: <u>46°</u> R.H.: <u>41%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NE</u>	LOCATION: <u>M1</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: At Love Chapel Few Houses Open area with trees all around
---	--	---

Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
45	26	Plane Flying Birds Distant traffic

DATE: <u>2-20-84</u> TIME: <u>9:30 AM</u> TEMP: <u>54°</u> R.H.: <u>59%</u> WIND SPEED: <u>6.9 MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M2</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway(Rt. 51) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Along Rte. 51
---	---	---

Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
52	45	Traffic Birds

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>3:07 PM</u> TEMP: <u>46°</u> R.H.: <u>78%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M3</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: .2 miles off Rt. 312
---	---	--

Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500 630	Cows Traffic noise
56	48 50	

DATE: <u>2-22-84</u> TIME: <u>9:17 AM</u> TEMP: <u>46°</u> R.H.: <u>41%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NE</u>	LOCATION: <u>M4</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 274) <input type="checkbox"/> Other	SITE DESCRIPTION: Union church parking lot
---	--	--

Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500 630	Small aircraft Highway traffic
41	27 28	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>9:45 AM</u> TEMP: <u>50 °</u> R.H.: <u>37 %</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M5</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Near N&S Carolina Boarder North of Siren 34 on County Road 2423	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Small aircraft
	500	630	
38	24	25	

DATE: <u>2-22-84</u> TIME: <u>10:05 AM</u> TEMP: <u>50°</u> R.H.: <u>37%</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M6</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.321) <input type="checkbox"/> Other _____	SITE DESCRIPTION: South of Bowling Green	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Highway traffic
	500	630	
52	37	40	

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-23-84</u> TIME: <u>9:15 AM</u> TEMP: <u>46 °</u> R.H.: <u>83 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>N</u>		LOCATION: <u>M7</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: Choate & Smith Road
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Wind Distant plane flyover Running Water	
	500	630		
49	38	37		

DATE: <u>2-22-84</u> TIME: <u>10:52 AM</u> TEMP: <u>53 °</u> R.H.: <u>33 %</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>		LOCATION: <u>M8</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.321) <input type="checkbox"/> Other _____		SITE DESCRIPTION: Rt. 321 Filbert Presb. Church
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Highway traffic	
	500	630		
55	35	35		

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>11:06 AM</u> TEMP: <u>53°</u> R.H.: <u>33%</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M9</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 321) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Rt. 321 on Fairhope Rd. Flat, few houses, Cannon Mills Co. Plant 19
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		Highway & Factory
	500	630	
49	40	39	

DATE: <u>2-22-84</u> TIME: <u>11:16 AM</u> TEMP: <u>53°</u> R.H.: <u>33%</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M10</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Edgewater Steel Plt. Pkg. Lot. Near York Water Tower
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		Steel Plant
	500	630	
52	40	39	



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>11:26 AM</u> TEMP: <u>53°</u> R.H.: <u>33 %</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M11</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 5) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Black Highway and Knight Rd.
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
36	27	30	Wind, Insect

DATE: <u>2-22-84</u> TIME: <u>11:37 AM</u> TEMP: <u>57°</u> R.H.: <u>31 %</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M12</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 49) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Alongside Highway Few houses Flat land Few trees
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
57	35	35	Wind Car passing by

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>11:47 AM</u> TEMP: <u>57°</u> R.H.: <u>31 %</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M13</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 321) <input type="checkbox"/> Other _____	SITE DESCRIPTION: York High School
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
42	26	25
		Traffic

DATE: <u>2-22-84</u> TIME: <u>11:56 AM</u> TEMP: <u>57°</u> R.H.: <u>31 %</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M14</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 324) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Rt. 324, .5 mile from High School. Near County School Bus Maint Yard. Flat land
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
45	33	34
		Wind Car passing by

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>12:09 PM</u> TEMP: <u>57°</u> R.H.: <u>31 %</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M15</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt. 5) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Flat, near intersection of Rt. 5 and 161 Across from York Electric Corp.	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic
	500	630	
60	44	46	

DATE: <u>2-22-84</u> TIME: <u>12:25 PM</u> TEMP: <u>57 °</u> R.H.: <u>31 %</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M16</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt. 161) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Off Rt. 161 On Shiloh Rd. Flat, wooded, few houses	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic
	500	630	
50	41	40	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>12:33 PM</u> TEMP: <u>57°</u> R.H.: <u>31%</u> WIND SPEED: <u>12 MPH</u> DIRECTION: <u>SSE</u>	LOCATION: <u>M17</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt. 49) <input type="checkbox"/> Other _____	SITE DESCRIPTION: .1 mile on Sherrer Rd. off Rt. 49 Flat - open area with woods around
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
32	27	Wind

DATE: <u>22-22-84</u> TIME: <u>12:51 PM</u> TEMP: <u>58°</u> R.H.: <u>28%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M18</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 55) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Near intersection of Rt. 55 and 54. Wooded and Flat Hilltop area
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
34	28	Wind Insect



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>1:02 PM</u> TEMP: <u>58 °</u> R.H.: <u>28 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M19</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 1.4 mile North of Bethel School North of Siren No. 4. Bethel School Road
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		Wind Birds
	500	630	
33	20	20	

DATE: <u>2-23-84</u> TIME: <u>3:00 PM</u> TEMP: <u>46 °</u> R.H.: <u>78 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M20</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Old Limestone Rd. and Southbend Rd. Flat, breeze and rain
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		Highway trucks & car noise
	500	630	
54	42	43	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>2:23 PM</u> TEMP: <u>60°</u> R.H.: <u>27%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M21</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Pleasant Grove Bap. Church on County Rd. 27 Flat land, few structures and trees
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
38	19	Wind Birds

DATE: <u>2-22-84</u> TIME: <u>2:30 PM</u> TEMP: <u>60°</u> R.H.: <u>27%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M22</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Brandon Rd., 1 ½ miles off Rt. 27 Flat open area
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
30	20	20

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>3:26 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>E</u>		LOCATION: <u>M25</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: Grace Pent. Holiness Church Parking Lot off Hamestead Rd. Flat
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Lawnmower in the distance	
	500	630		
42	22	23		

DATE: <u>2-22-84</u> TIME: <u>3:43 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>		LOCATION: <u>M26</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: 3/4 miles in on Forest Woods Rd. off Rawlinson Road. Flat, trees and houses
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Distant traffic noise Distant hammering	
	500	630		
45	27	28		

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>4:00 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M27</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 522) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Irene St. off Rt. 322 Flat Trees Houses
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
45	33	34

DATE: <u>2-22-84</u> TIME: <u>4:12 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M28</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: .2 miles off Falls Road Flat open and few houses
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
42	33	34



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>4:22 PM</u> TEMP: <u>60 °</u> R.H.: <u>26 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M29</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Falls Rd. Flat Grass No houses
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Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		
		500	630
46	37	40	

DATE: <u>2-23-84</u> TIME: <u>2:52 PM</u> TEMP: <u>46 °</u> R.H.: <u>78 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M30</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 1 mile off 321 North past Cannon Plant
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Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		
		500	630
48	32	34	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>2:43 PM</u> TEMP: <u>46 °</u> R.H.: <u>78 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M31</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Outside of York, 1/2 mile off 321 North
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
53	41	41

DATE: <u>2-23-84</u> TIME: <u>9:04 AM</u> TEMP: <u>46 °</u> R.H.: <u>83 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>N</u>	LOCATION: <u>M32</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt. 551) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Cross Rd. off 557 Hills and wooded No structures
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
40	26	27

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-23-84</u> TIME: <u>9:20 AM</u> TEMP: <u>46 °</u> R.H.: <u>83 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>N</u>	LOCATION: <u>M33</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Intersection off Old Carriage Rd. and Green Pond Rd. .5 miles from Bates Harvey Rd. Few houses and trees top of hill.
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
40	30	32	Truck in the distance Crow Wind noise

DATE: <u>2-23-84</u> TIME: <u>1:40 PM</u> TEMP: <u>45°</u> R.H.: <u>84%</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M34</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 1/2 mile off 161 Flat, few trees
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
48	38	36	Rain Wind Distant traffic

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>1:24 PM</u> TEMP: <u>44°</u> R.H.: <u>83%</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M35</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: Siioh Rd., 1 mile from Rt. 49
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
50	32	34
		Cows Rain Wind

DATE: <u>2-23-84</u> TIME: <u>1:03 PM</u> TEMP: <u>44°</u> R.H.: <u>83%</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M36</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 1½ miles from York on Rt. 49
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
53	34	33
		Traffic on wet road



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>10:44 AM</u> TEMP: <u>46°</u> R.H.: <u>76 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M37</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 1 mile in on Parnaham Rd. off Rt. 55
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	330
34	29	Rt. 55 in distance

DATE: <u>2-23-84</u> TIME: <u>10:55 AM</u> TEMP: <u>46°</u> R.H.: <u>76 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M38</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Flat Few trees West of New Home School .7 miles off Rt. 49 on Sherrer Rd.
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
33	25	Wind Birds



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>12:10 PM</u> TEMP: <u>45°</u> R.H.: <u>83 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M39</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: .2 miles down 324 off Russell Rd. Raining
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
51	40	42

DATE: _____ TIME: _____ TEMP: _____ R.H.: _____ WIND SPEED: _____ DIRECTION: _____	LOCATION: _____ <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION:
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630



**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>8:40 AM</u> TEMP: <u>46 °</u> R.H.: <u>41 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M40</u> <input type="checkbox"/> Urban <input checked="" type="checkbox"/> Suburban <input type="checkbox"/> Rural <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Corner of Nations Ford Road and Downs Rd. (Pineville)
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
53	49	48	Car passing by Distance - plant noise Insect

DATE: <u>2-23-84</u> TIME: <u>12:04 PM</u> TEMP: <u>45 °</u> R.H.: <u>83 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M41</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Russell Rd. & Parris Rd. Flat, open
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
30	18	19	Wind Running Water

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>9:00 AM</u> TEMP: <u>46 °</u> R.H.: <u>41 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ENE</u>		LOCATION: <u>M42</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: Pikeview Rd. and Mark Trailla
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Bird Dog Distant traffic	
	500	630		
46	37	37		

DATE: <u>2-22-84</u> TIME: <u>9:10 AM</u> TEMP: <u>46 °</u> R.H.: <u>41 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ENE</u>		LOCATION: <u>M43</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt.51) <input type="checkbox"/> Other _____		SITE DESCRIPTION: CMANRA Co. on Rt. 51 Flint Hill & Rt. 51
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic Noise on Rt. 51 Insect	
	500	630		
59	49	49		

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>9:15 AM</u> TEMP: <u>46 °</u> R.H.: <u>41 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M44</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: In front of 12243 Nations Ford Rd.	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Dog Distant traffic Insect
	500	630	
44	34	36	

DATE: <u>2-23-84</u> TIME: <u>11:59 AM</u> TEMP: <u>45 °</u> R.H.: <u>83 %</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M45</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Russell Rd. Flat, few trees & residence	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Wind Distant traffic
	500	630	
35	28	30	

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-23-84</u> TIME: <u>11:32 AM</u> TEMP: <u>46 °</u> R.H.: <u>76 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M46</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 5) <input type="checkbox"/> Other	SITE DESCRIPTION: Intersection of Rt. 5 and Adanh Rd. Slight breeze
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
52	34	33
		Truck idling traffic

DATE: <u>2-22-84</u> TIME: <u>9:45 AM</u> TEMP: <u>50 °</u> R.H.: <u>37 %</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M47</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: Along boundary of EPZ End of Hanson from Arrowood
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
50	43	44
		Distant traffic

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
GATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>9:55 AM</u> TEMP: <u>50 °</u> R.H.: <u>37 %</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M48</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 49) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Along Rt. 49 on boundary of EPZ .2 miles from intersection of Rt. 49 and Bean Rd. on Bean Rd.
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
55	45	Traffic Plane flying over

DATE: <u>2-22-84</u> TIME: <u>10:05 AM</u> TEMP: <u>50 °</u> R.H.: <u>37 %</u> WIND SPEED: <u>13 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M49</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: 4800 Lebanon Dr.
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Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
39	31	Dog Wind

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>11:25 AM</u> TEMP: <u>46°</u> R.H.: <u>76%</u> WIND SPEED: <u>15MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M50</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: South of Newport on Adanh Rd., 1/2 mile off Rt. 5	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Distant birds Aircraft
	500	630	
35	23	25	

DATE: <u>2-22-84</u> TIME: <u>11:00 AM</u> TEMP: <u>53°</u> R.H.: <u>33%</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M51</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: End of Rt. 1115 (Island Point)	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Distant traffic Wind Aircraft flying over Dog barking
	500	630	
38	29	29	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>11:15 AM</u> TEMP: <u>53°</u> R.H.: <u>33%</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M52</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Small Highway (Rt. 1116) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Along 1116 In front of residences
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
33	24	24
No traffic noise Bird (very quiet)		

DATE: <u>2-22-84</u> TIME: <u>11:30 AM</u> TEMP: <u>53°</u> R.H.: <u>33%</u> WIND SPEED: <u>11 MPH</u> DIRECTION: <u>ENE</u>	LOCATION: <u>M53</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential (Scattered) <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Intersection of Youngblood road and Dogwood Rd.
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
36	28	29
Aircraft flying over Distant traffic Wind		

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>11:45 AM</u> TEMP: <u>45°</u> R.H.: <u>83%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>NW</u>	LOCATION: <u>M58</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Intersection of Rt. 131 and Rt. 2431	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic Rain
	500	630	
47	39	39	

DATE: <u>2-20-84</u> TIME: <u>12:35 PM</u> TEMP: <u>60°</u> R.H.: <u>38%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>NNE</u>	LOCATION: <u>M59</u> <input type="checkbox"/> Urban <input checked="" type="checkbox"/> Suburban <input type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt. 160) <input type="checkbox"/> Other _____	SITE DESCRIPTION: East of Fort Mill In front of 76	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic noise Wind Distant chain saw noise
	500	630	
44	32	33	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>1:05 PM</u> TEMP: <u>58°</u> R.H.: <u>28%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M60</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: South of Fort Mill (about 1 mile) Underneath Transmission Line
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
44	33	34	Wind Tree due to wind

DATE: <u>2-22-84</u> TIME: <u>1:20 PM</u> TEMP: <u>58°</u> R.H.: <u>28%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M61</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: S.E. of Fort Mill
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Ambient Sound Levels (dB)			Background Noise Source
A-WT	One-Third Octave Band (Hz)		
	500	630	
32	25	26	Dog Wind on tree

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>11:10 AM</u> TEMP: <u>46 °</u> R.H.: <u>76 %</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>NNW</u>	LOCATION: <u>M62</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: End of 2622 Lake Wylie Shore	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Dog barking Wind Birds
	500	630	
41	33	34	

DATE: <u>2-22-84</u> TIME: <u>1:55 PM</u> TEMP: <u>60 °</u> R.H.: <u>27 %</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M63</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: Red River In front of School 200 ft. from Fan	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Passing car Fan noise from small plant
	500	630	
55	46	46	

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>2:00 PM</u> TEMP: <u>60°</u> R.H.: <u>27 %</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>		LOCATION: <u>M64</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: South of Red River Entrance of Bass Mobile Home Park	
Ambient Sound Levels (dB)			Background Noise Source		
A-WT	One-Third Octave Band (Hz)				
	500	630			
56	40	40	Traffic Noise People talking Traffic noise in the distance		

DATE: <u>2-22-84</u> TIME: <u>2:15 PM</u> TEMP: <u>60°</u> R.H.: <u>27 %</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>		LOCATION: <u>M65</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: South of Red River Intersection of Strings	
Ambient Sound Levels (dB)			Background Noise Source		
A-WT	One-Third Octave Band (Hz)				
	500	630			
54	40	40	Traffic Noise Plane flying over Wind		

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>2:25 PM</u> TEMP: <u>60 °</u> R.H.: <u>27 %</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M66</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: South of Red River Yellow Area
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
57	48	47
Traffic in the distance Bird Plane flying over		

DATE: <u>2-22-84</u> TIME: <u>2:35 PM</u> TEMP: <u>60 °</u> R.H.: <u>27 %</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M67</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: At Rock Grove Ch.
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
46	35	35
Traffic in the distance Bird Emergency vehicle		

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>3:10 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M68</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: South of Rock Hill
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
31	24	29
	People talking (Music)(Radio) Wind Car passing Bird	

DATE: <u>2-22-84</u> TIME: <u>3:10 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>9 MPH</u> DIRECTION: <u>E</u>	LOCATION: <u>M69</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) Other small plant	SITE DESCRIPTION: In front of Nazareth School South of Rock Hill Near Construction Site
Ambient Sound Levels (dB)		Background Noise Source
A-WT	One-Third Octave Band (Hz)	
	500	630
56	46	46
	Construction Noise Small Plant	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>3:40 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>		LOCATION: <u>M70</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: N.W. of Rock Hill	
Ambient Sound Levels (dB)			Background Noise Source		
A-WT	One-Third Octave Band (Hz)		Plane flying Dog barking		
	500	630			
48	38	38			

DATE: <u>2-23-84</u> TIME: <u>10:45 AM</u> TEMP: <u>46°</u> R.H.: <u>76%</u> WIND SPEED: <u>15 MPH</u> DIRECTION: <u>NNW</u>		LOCATION: <u>M71</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: North edge of EPZ boundary Near Paradise Point	
Ambient Sound Levels (dB)			Background Noise Source		
A-WT	One-Third Octave Band (Hz)		Dog barking Birds Car passing by		
	500	630			
55	45	45			

**AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION**

DATE: <u>2-22-84</u> TIME: <u>4:10 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>		LOCATION: <u>M72</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: Homestead Road North of Rock Hill
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Wind Distant traffic Aircraft flying over	
	500	630		
45	37	38		

DATE: <u>2-22-84</u> TIME: <u>4:35 PM</u> TEMP: <u>60°</u> R.H.: <u>26%</u> WIND SPEED: <u>10 MPH</u> DIRECTION: <u>E</u>		LOCATION: <u>M73</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____		SITE DESCRIPTION: North of Fort Mill One block off of Rt. 21
Ambient Sound Levels (dB)			Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Cars passing by Distant train noise	
	500	630		
50	40	40		



AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>4:45 PM</u> TEMP: <u>59°</u> R.H.: <u>27%</u> WIND SPEED: <u>8 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M74</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input checked="" type="checkbox"/> Along Major Highway (Rt. 21) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Intersection of Rt. 21 and Rt. 2 (by-pass)	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Traffic Noise (constant traffic flow) Rush hour
	500	630	
65	55	55	

DATE: <u>2-22-84</u> TIME: <u>5:00 PM</u> TEMP: <u>59°</u> R.H.: <u>27%</u> WIND SPEED: <u>8 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M75</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Near Intersection of Smith & Hamilton	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Distant traffic noise Birds
	500	630	
35	25	24	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-22-84</u> TIME: <u>5:25 PM</u> TEMP: <u>59 °</u> R.H.: <u>27 %</u> WIND SPEED: <u>8 MPH</u> DIRECTION: <u>ESE</u>	LOCATION: <u>M76</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Along Lake Wylie Very exclusive area	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Dog barking Plane flyover Birds
	500	630	
35	24	23	

DATE: <u>2-23-84</u> TIME: <u>10:30 AM</u> TEMP: <u>46 °</u> R.H.: <u>79 %</u> WIND SPEED: <u>14 MPH</u> DIRECTION: <u>N</u>	LOCATION: <u>M77</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.1116) <input type="checkbox"/> Other _____	SITE DESCRIPTION: Along Rt. 1116 with extremely low traffic	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Sound of running water Birds Dog barking
	500	630	
39	28	29	

AMBIENT BACKGROUND NOISE SURVEY
DUKE POWER COMPANY
CATAWBA NUCLEAR POWER STATION

DATE: <u>2-23-84</u> TIME: <u>10:15 AM</u> TEMP: <u>46 °</u> R.H.: <u>79 %</u> WIND SPEED: <u>14 MPH</u> DIRECTION: <u>N</u>	LOCATION: <u>M78</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway (Rt.) <input type="checkbox"/> Other	SITE DESCRIPTION: End of Island Point Rd. Shore of Lake Wylie	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Birds Dog barking Wind Distant traffic
	500	630	
37	30	31	

DATE: <u>2-23-84</u> TIME: <u>9:55 AM</u> TEMP: <u>46 °</u> R.H.: <u>79 %</u> WIND SPEED: <u>14 MPH</u> DIRECTION: <u>N</u>	LOCATION: <u>M79</u> <input type="checkbox"/> Urban <input type="checkbox"/> Suburban <input checked="" type="checkbox"/> Rural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Along Major Highway(Rt.) <input type="checkbox"/> Other _____	SITE DESCRIPTION: End of state rd. along Lake Wylie	
Ambient Sound Levels (dB)		Background Noise Source	
A-WT	One-Third Octave Band (Hz)		Plane flyover (distant) Birds Wind
	500	630	
40	31	29	

MAP 1: 60 AND 70 dBC SIREN ACOUSTIC COVERAGE WITHIN
THE EPZ OF CATAWBA NUCLEAR STATION FOR
SUMMER AVERAGE METEOROLOGICAL CONDITIONS

DOCUMENT/ PAGE PULLED

ANO. 8406230033

NO. OF PAGES 1

REASON

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MAP 2: 50 dBC CONTOURS FOR AREAS OUTSIDE OF
60 dBC COVERAGE AND MEASURING LOCATIONS
FOR BACKGROUND AMBIENT NOISE SURVEY



ACOUSTIC TECHNOLOGY INC.

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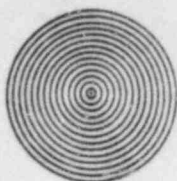
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ACOUSTIC TECHNOLOGY, INC.

22 UNION WHARF
BOSTON, MA 02109

(617) 367-0164

May 7, 1984

Mr. R. Mike Glover
Emergency Planning & Preparedness
Duke Power Company
422 South Church Street
Charlotte, NC 28242

Dear Mr. Glover:

Enclosed please find an addendum to the report Analysis, Verification, and Testing of the Siren Prompt Notification System for the Catawba Nuclear Station, including a revised Map 1 and 2. In addition, 60 and 70 dBC siren contour computer analyses and siren sound level computer outputs for 10 additional sirens are included in the addendum.

It can be concluded from our independent review, verification, and field testing that the siren warning system within the 10-mile EPZ of Catawba Nuclear Station would fully meet the criteria of FEMA-43 with the incorporation of these 10 additional sirens.

If you have any questions, please feel free to call me at (617) 367-0164.

Sincerely,

M. Reada Bassiouni
Acoustic Technology, Inc.

Enclosure

MRB/mjc

ADDENDUM

(May 2, 1984)

TO REPORT FOR

ANALYSIS, VERIFICATION, AND TESTING
OF THE SIREN PROMPT NOTIFICATION SYSTEM
FOR THE CATAMBA NUCLEAR STATION

APRIL - 1984 (Issued on April 10, 1984)

PREPARED FOR:

DUKE POWER COMPANY

CHARLOTTE, NORTH CAROLINA



ACOUSTIC TECHNOLOGY INC.

-ADDENDUM-

Based upon the analysis and specific area coverage recommended for additional evaluation as outlined in ATI's report " Analysis, Verification, and Testing of the Siren Prompt Notification System for the Catawba Nuclear Station" submitted to Duke Power Company on April 10, 1984, 10 additional high-power sirens (rated 125 dBC at 100 feet) are recommended to fully comply with the requirements of FEMA-43. The purpose of this addendum is to present the results of the siren coverage which incorporates the additional siren sound coverage. The original maps 1 and 2 have been revised to include the coverage of the additional sirens.

These additional sirens were mainly located in areas with large population density and/or relatively high ambient background noise level, which are indicated as sirens 68 through 77 on revised maps 1 and 2. By using the ATI computer model, 70, 60, and 50 dBC siren contours were calculated for these additional sirens. Computer analysis of 60 and 70 dBC contours and computer outputs of siren sound pressure level are attached with this addendum. The revised map 1 indicates areas covered by the 70 and 60 dBC siren contours for the entire siren system which indicates the additional 10 sirens.

A field inspection was conducted to verify population distribution of regions A through F on the original map 1. From the additional sirens and field inspection, the areas with population density greater than 2000 persons per square mile were found to be fully covered by at least 70 dBC siren signal as shown on the revised map 1.



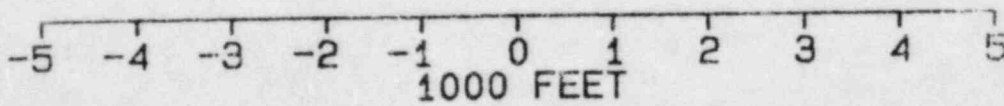
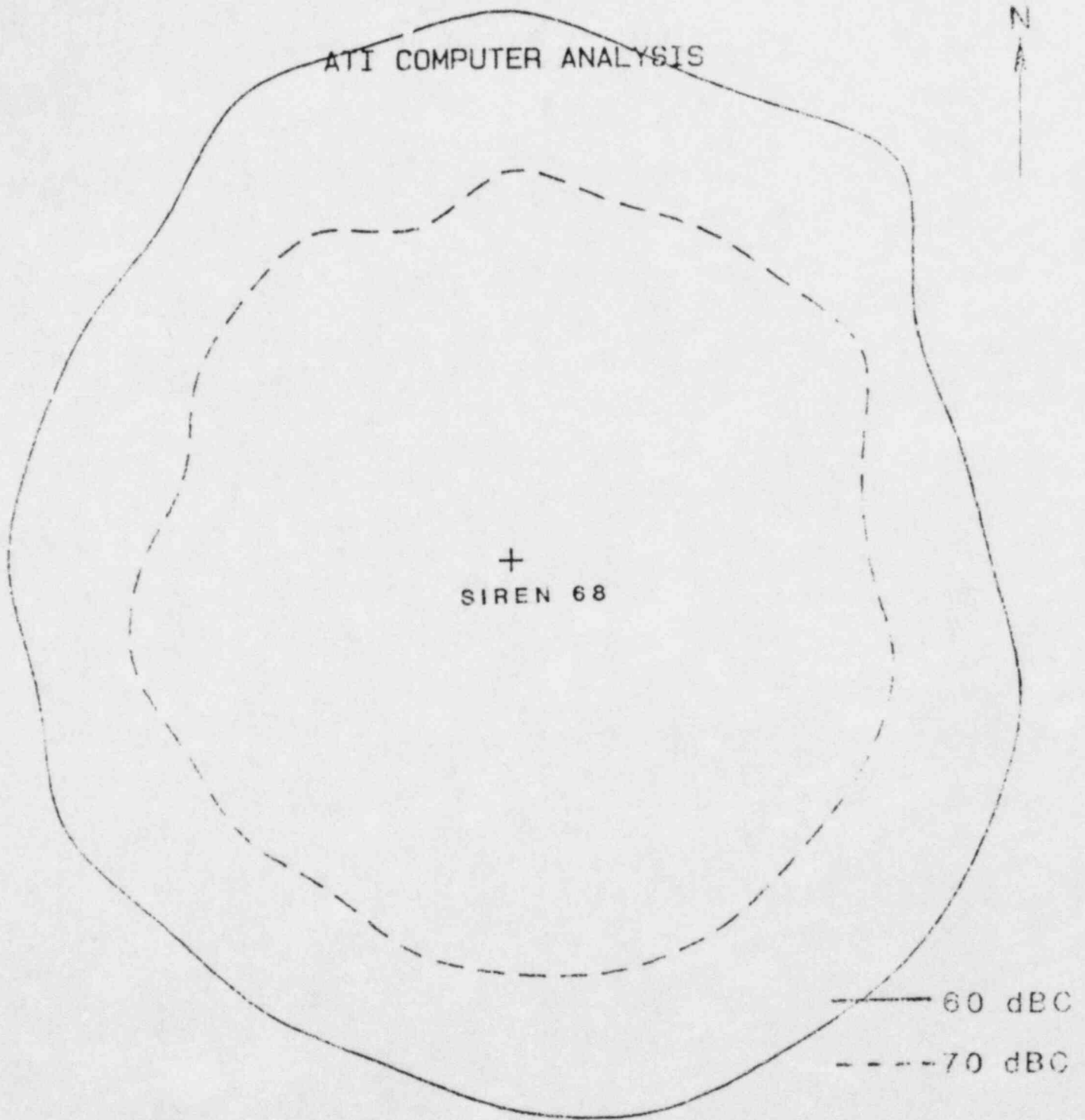
The revised map 2 presents areas outside of a 60 dBC coverage, 50 dBC siren contours and measured ambient background noise level for regions outside 60 dBC siren coverage. The additional sirens provide adequate siren coverage in Regions 4, 9, 10 and 16 on the original map 2 which were not adequately covered before the incorporation of the additional sirens. The revised map 2 indicates that regions 1 through 23 are covered by an adequate siren signal of the 10 dB above the measured ambient background noise level.

Therefore, with the addition of these 10 sirens it can be concluded that essentially 100% of the public within the 10-mile EPZ of Catawba Nuclear Station is provided adequate alert coverage by a siren notification system which is in full compliance with FEMA-43 requirements.



**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION**

SIREN SOUND COVERAGE



ACOUSTIC TECHNOLOGY INC.

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

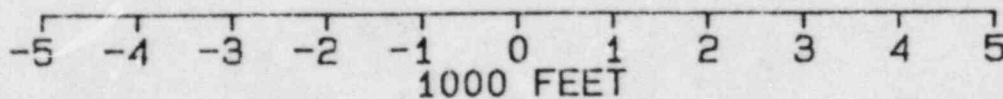
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 69

— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

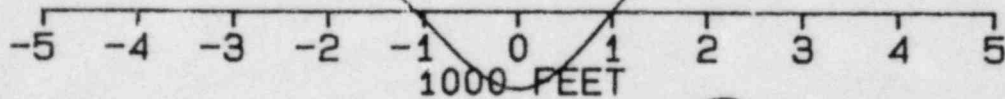
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 70

—— 60 dBC
- - - - 70 dBC



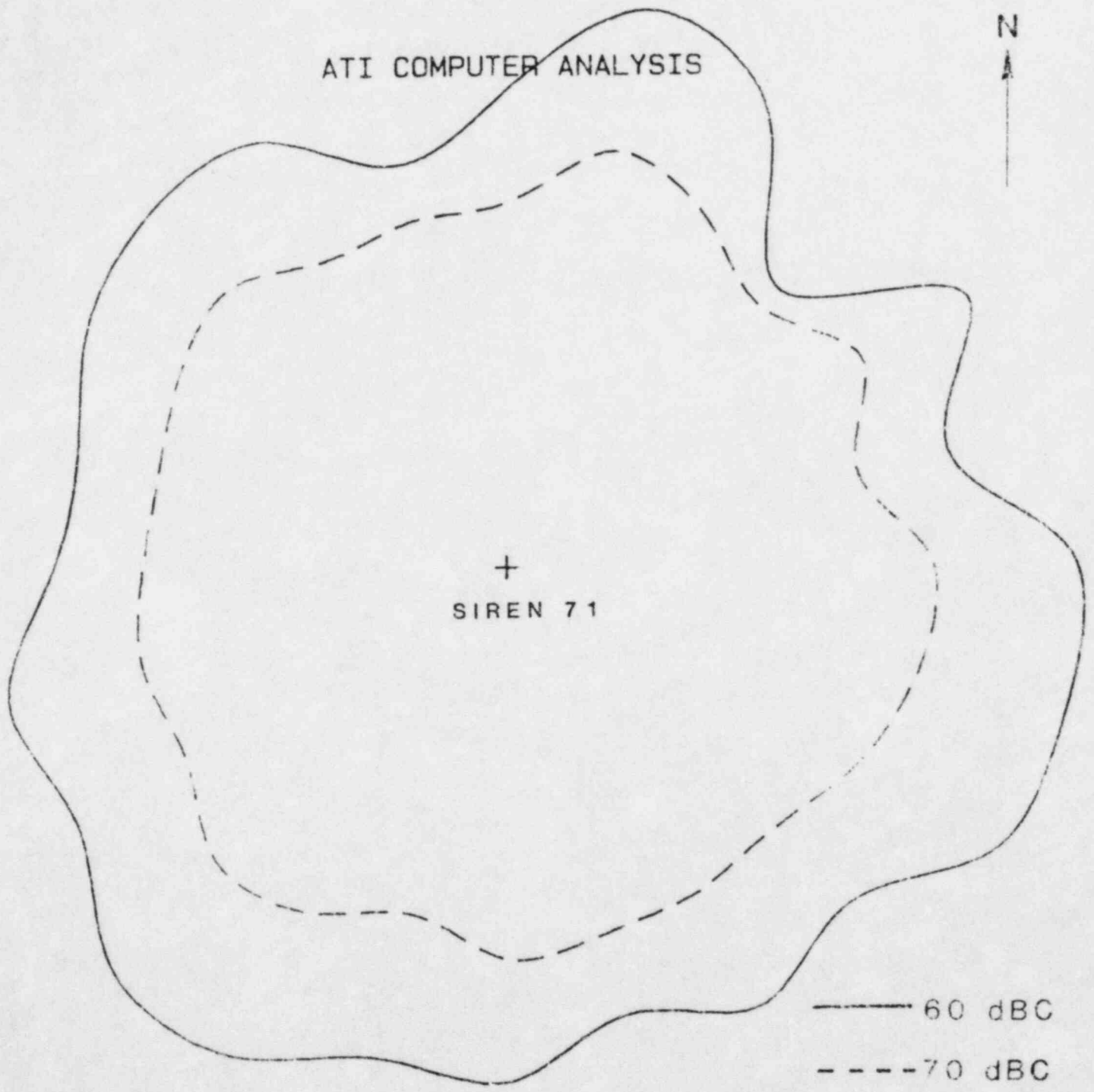
ACOUSTIC TECHNOLOGY INC.

**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

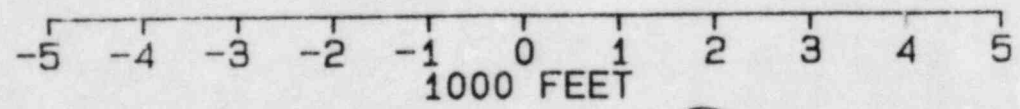
ATI COMPUTER ANALYSIS



+
SIREN 71



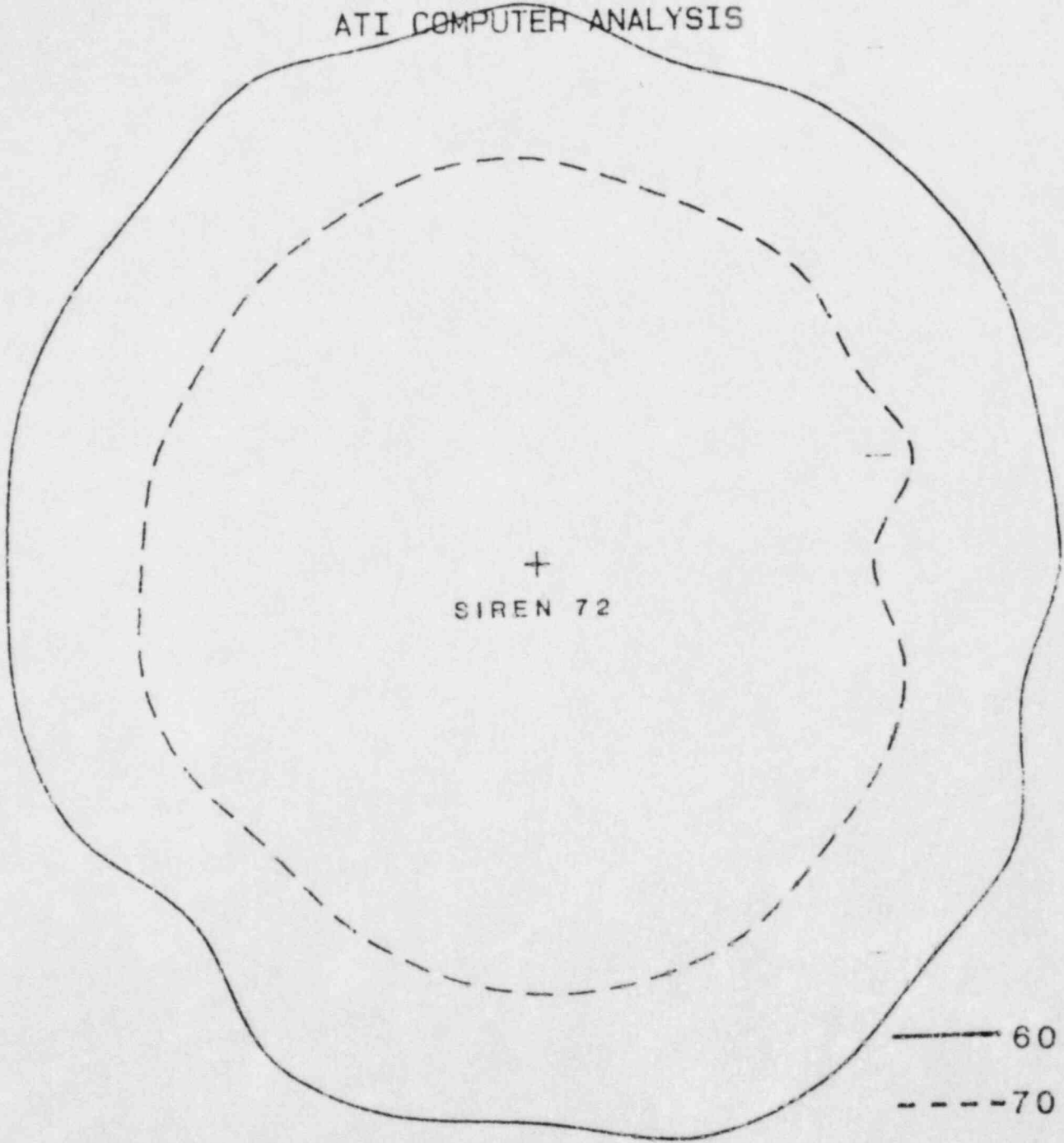
— 60 dBC
- - - 70 dBC



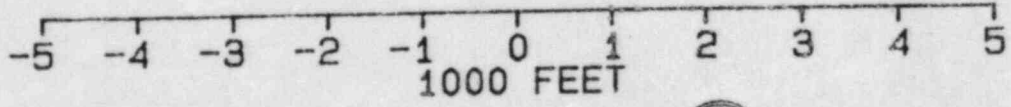
DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS

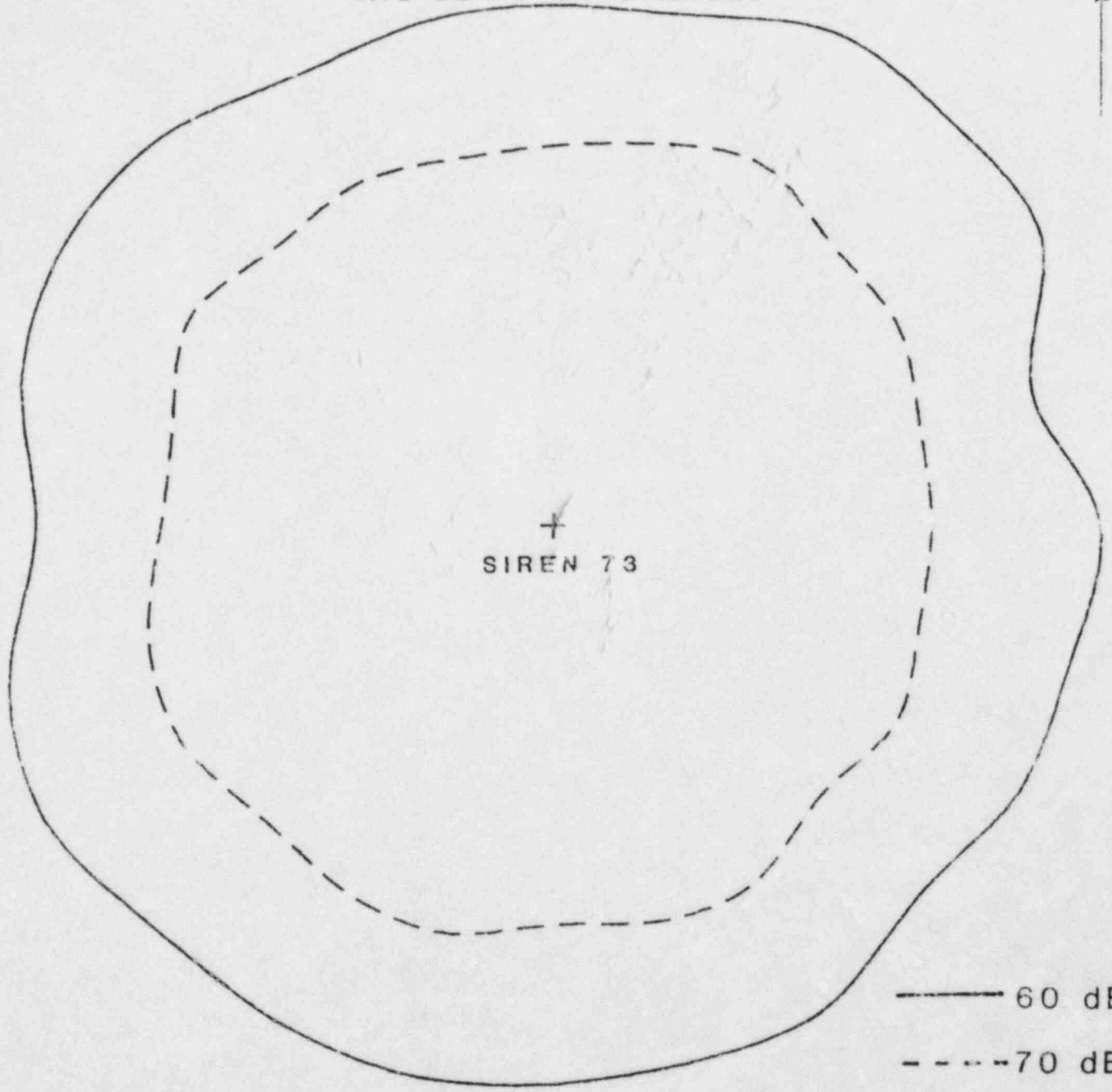


—— 60 dBC
---- 70 dBC



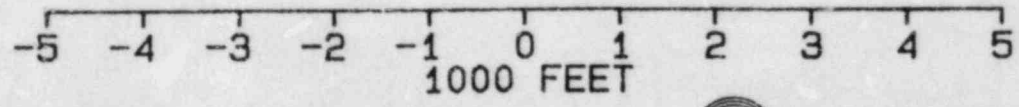
**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

ATI COMPUTER ANALYSIS



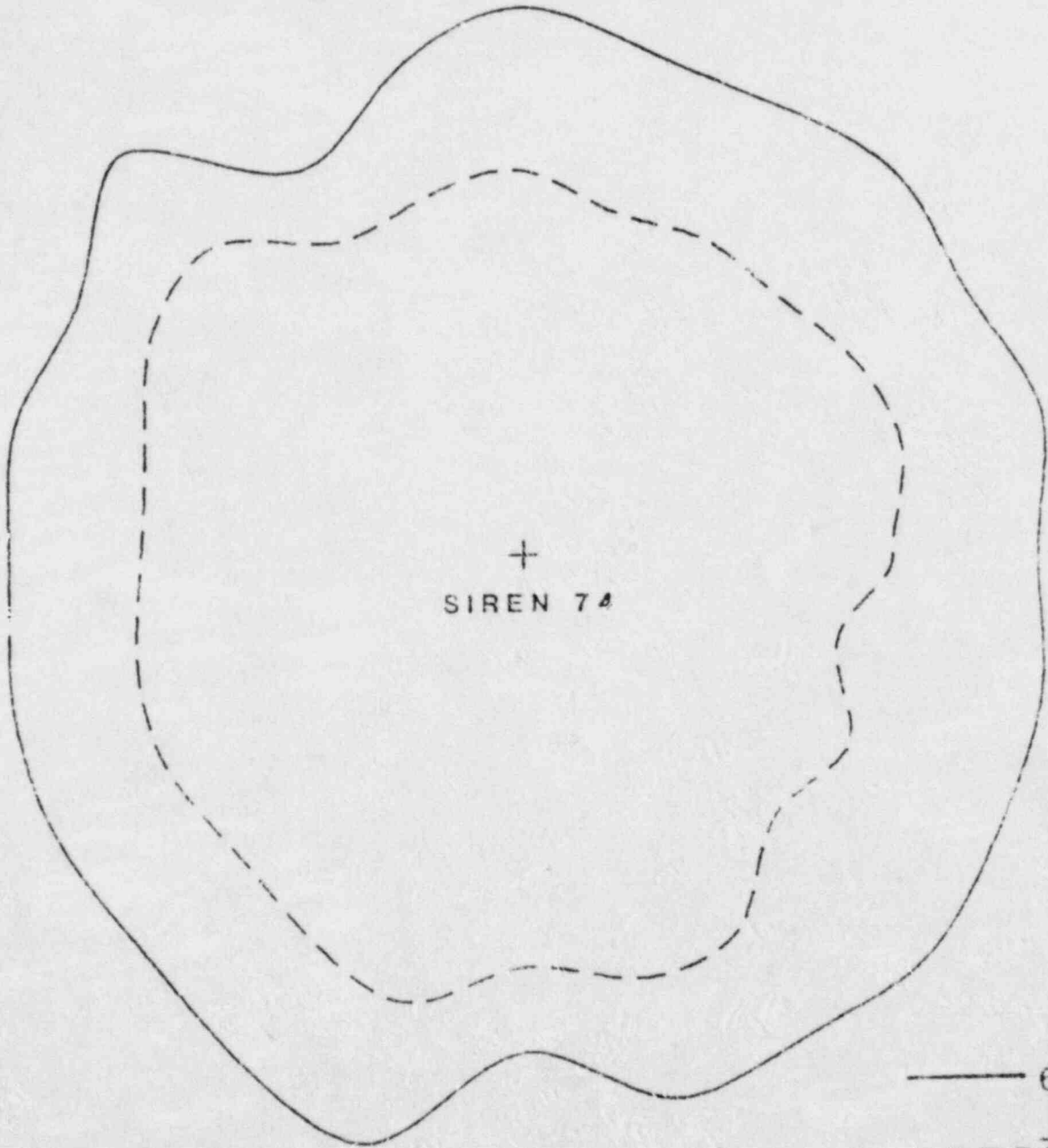
+
SIREN 73

——— 60 dBC
- - - - 70 dBC

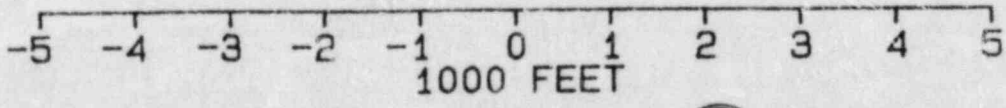


**DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
SIREN SOUND COVERAGE**

ATI COMPUTER ANALYSIS



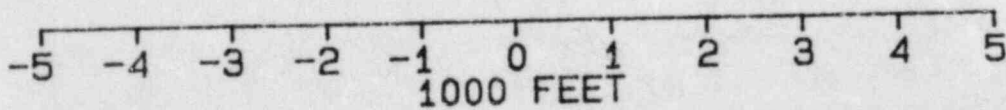
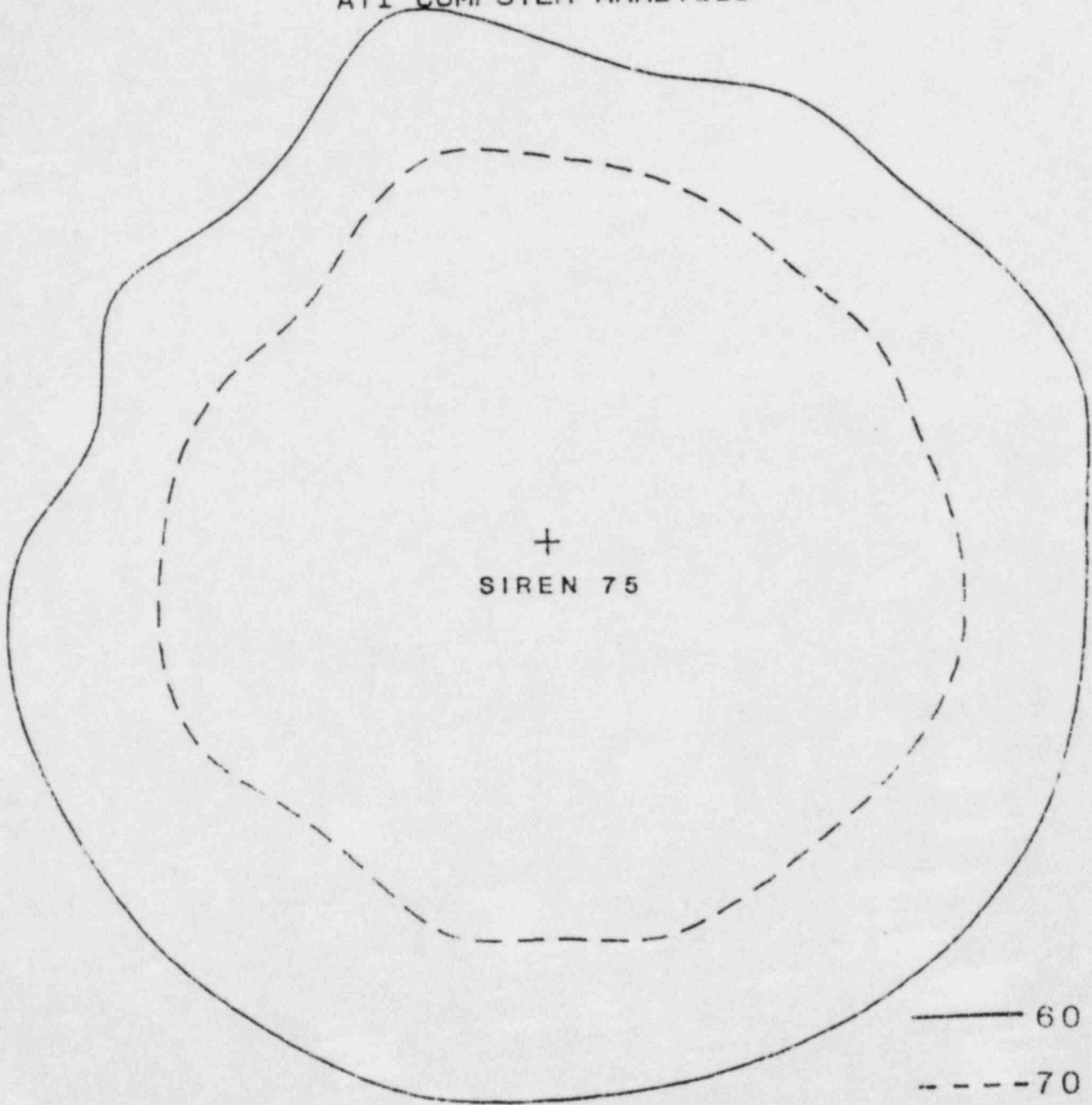
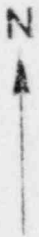
— 60 dBC
- - - 70 dBC



DUKE POWER COMPANY CATAWBA NUCLEAR STATION

SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS

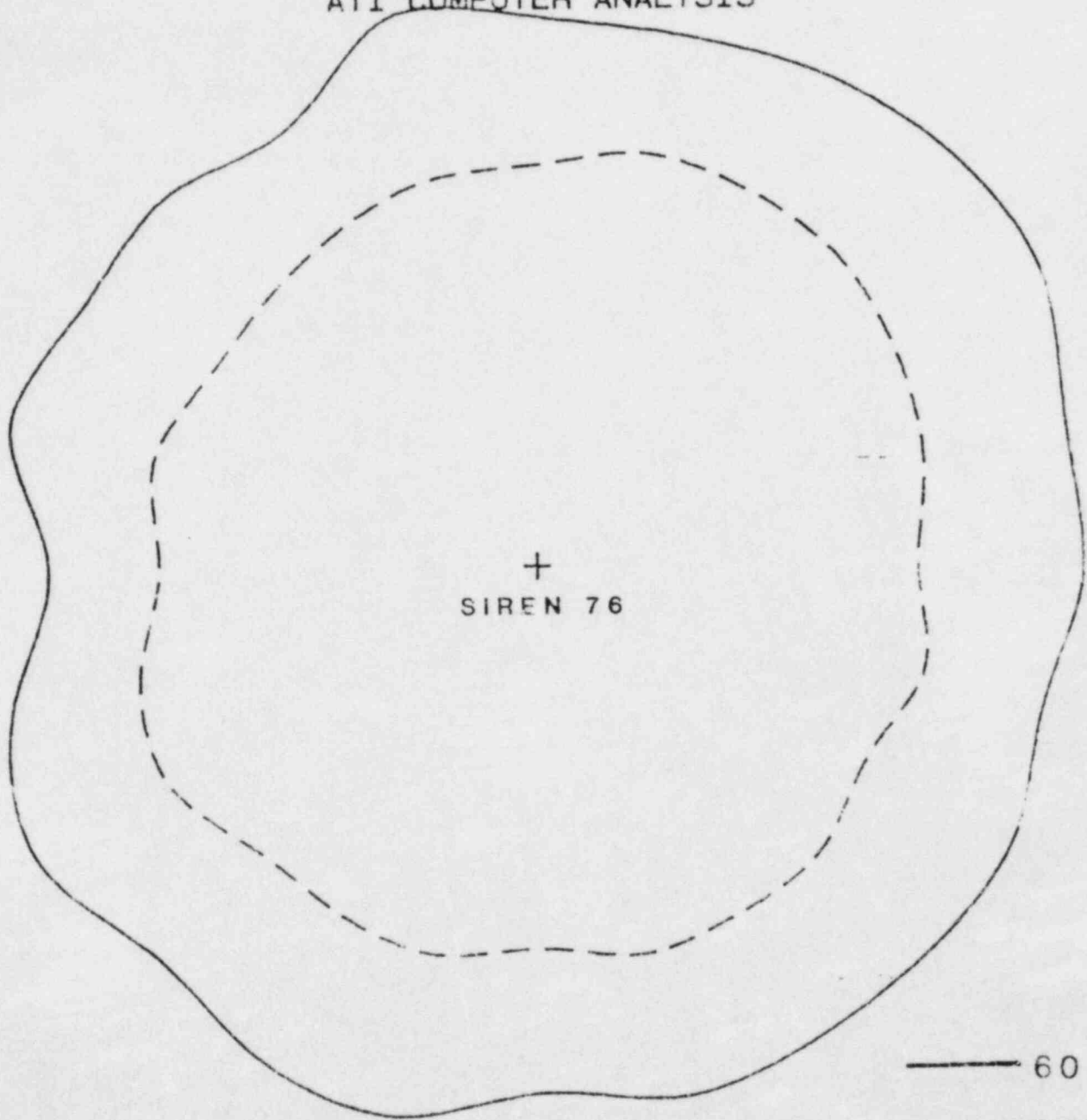


ACOUSTIC TECHNOLOGY INC.

DUKE POWER COMPANY CATAWBA NUCLEAR STATION

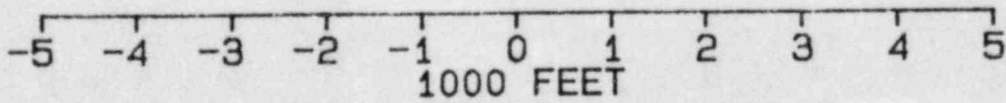
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 76

— 60 dBC
- - - 70 dBC



ACOUSTIC TECHNOLOGY INC.

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION

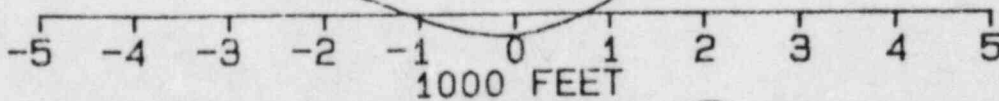
SIREN SOUND COVERAGE

ATI COMPUTER ANALYSIS



+
SIREN 77

— 60 dBC
--- 70 dBC



COMPUTER ANALYSIS BY
ACOUSTIC TECHNOLOGY

SIREN NUMBER CATAMBA-48
MINE POWER COMPANY
CATAMBA NUCLEAR POWER STATION
SIREN SOUND PRESSURE LEVELS

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																		
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500
0	98	87	83	79	74	69	66	65	60	58	57	56	55	54	53	52	51	49	48
15	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	48	45
30	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
45	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
60	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
75	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
90	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
100	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
120	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
135	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
150	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
165	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
180	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
195	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
210	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
225	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
240	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
255	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
270	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
285	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
300	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
315	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
330	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45
345	98	86	82	78	73	68	65	64	59	57	56	55	54	53	52	51	49	47	45

SIREN MODEL FSC CHIMBERBOLT
SIREN HEIGHT 50. FEET
WEATHER SEASON AVERAGE SUMMER
WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED 5.0 MPH
MEAN TEMPERATURE 71.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY 64.0 %

SIREN NUMBER CATAWBA-39
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 - 110.	102.	98.	94.	90.	87.	85.	82.	78.	74.	71.	68.	66.	63.	61.	57.	58.	56.	55.	53.	
15 - 110.	102.	98.	94.	90.	88.	85.	82.	77.	74.	71.	68.	67.	63.	61.	58.	56.	55.	53.	51.	
30 - 110.	102.	98.	94.	90.	87.	81.	82.	79.	76.	72.	70.	67.	65.	63.	60.	58.	56.	55.	53.	
45 - 110.	102.	98.	94.	90.	88.	85.	79.	77.	75.	72.	70.	68.	65.	63.	60.	58.	56.	55.	53.	
60 - 110.	102.	98.	94.	90.	87.	83.	78.	76.	74.	72.	70.	68.	65.	62.	60.	58.	56.	55.	53.	
75 - 110.	102.	98.	94.	90.	87.	82.	78.	74.	71.	66.	68.	66.	64.	61.	59.	57.	55.	53.	51.	
90 - 110.	102.	98.	94.	90.	89.	82.	78.	76.	72.	70.	68.	66.	64.	61.	59.	57.	55.	53.	51.	
105 - 110.	102.	98.	94.	86.	87.	77.	76.	76.	72.	69.	67.	64.	62.	55.	57.	55.	54.	52.	50.	
120 - 110.	102.	98.	94.	88.	81.	81.	78.	76.	73.	69.	67.	63.	60.	58.	56.	54.	52.	50.	48.	
135 - 110.	102.	98.	94.	88.	84.	79.	75.	74.	71.	67.	65.	63.	62.	58.	56.	54.	53.	51.	49.	
150 - 110.	102.	98.	91.	88.	83.	79.	75.	70.	69.	67.	64.	62.	62.	50.	47.	47.	47.	46.	45.	
165 - 110.	102.	98.	94.	87.	84.	80.	76.	74.	69.	63.	62.	62.	60.	56.	53.	53.	50.	51.	50.	
180 - 110.	102.	98.	94.	89.	84.	80.	78.	74.	71.	69.	65.	63.	63.	54.	60.	51.	51.	50.	50.	
195 - 110.	102.	98.	94.	90.	86.	82.	76.	74.	71.	69.	63.	62.	60.	60.	58.	56.	54.	52.	50.	
210 - 110.	102.	98.	94.	90.	85.	82.	77.	73.	71.	68.	67.	62.	61.	56.	54.	53.	54.	52.	50.	
225 - 110.	102.	98.	94.	98.	84.	81.	77.	73.	71.	69.	65.	62.	64.	50.	57.	55.	53.	51.	49.	
240 - 110.	102.	98.	94.	88.	84.	82.	77.	75.	72.	69.	65.	63.	61.	59.	57.	55.	53.	51.	49.	
255 - 110.	102.	98.	94.	90.	84.	82.	77.	76.	74.	71.	67.	65.	63.	61.	58.	56.	55.	53.	51.	
270 - 110.	102.	98.	94.	90.	87.	82.	75.	76.	73.	71.	68.	65.	63.	61.	59.	57.	55.	54.	52.	
285 - 110.	102.	98.	94.	90.	86.	83.	75.	77.	74.	71.	68.	65.	63.	60.	58.	56.	54.	52.	50.	
300 - 110.	102.	98.	94.	90.	87.	84.	81.	77.	74.	72.	70.	67.	64.	56.	61.	59.	57.	55.	53.	
315 - 110.	102.	98.	94.	90.	80.	84.	81.	78.	76.	73.	70.	68.	65.	63.	61.	59.	57.	55.	53.	
330 - 110.	102.	98.	94.	90.	86.	84.	77.	78.	75.	71.	69.	59.	65.	62.	60.	58.	56.	54.	52.	
345 - 110.	102.	98.	94.	85.	89.	85.	81.	77.	74.	71.	68.	60.	60.	57.	56.	60.	58.	54.	54.	52.

SIREN MODEL FSC THUNDERBOLT
 SIREN HEIGHT 50 FEET
 WEATHER SEASON AVERAGE SUMMER
 WIND DIRECTION 225.0 DEGREES CLOCKWISE FROM NORTH
 WIND SPEED 6.7 MPH
 MEAN TEMPERATURE 77.4 DEGREES FAHRENHEIT
 MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-70
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE :
 FROM EAST (DEG)

		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	-	110.	102.	98.	94.	90.	86.	84.	80.	77.	74.	71.	69.	60.	59.	62.	59.	57.	55.	54.	52.
15	-	110.	102.	98.	94.	90.	81.	85.	81.	75.	73.	71.	63.	67.	63.	57.	58.	56.	55.	53.	51.
30	-	110.	102.	98.	94.	90.	86.	77.	81.	77.	73.	70.	67.	65.	62.	60.	57.	51.	55.	53.	51.
45	-	110.	102.	98.	93.	90.	86.	82.	79.	76.	68.	71.	67.	63.	60.	58.	57.	55.	53.	51.	49.
60	-	110.	102.	97.	93.	87.	82.	71.	77.	71.	71.	69.	67.	65.	63.	60.	56.	54.	53.	51.	49.
75	-	110.	102.	98.	93.	88.	84.	81.	78.	76.	73.	69.	63.	57.	63.	58.	58.	56.	55.	53.	51.
90	-	110.	102.	98.	93.	87.	84.	82.	76.	69.	68.	70.	68.	66.	63.	55.	58.	56.	55.	53.	51.
105	-	110.	102.	97.	93.	88.	80.	77.	77.	73.	70.	71.	69.	65.	61.	59.	57.	55.	54.	52.	52.
120	-	110.	102.	98.	84.	90.	86.	75.	73.	75.	72.	74.	71.	68.	65.	63.	61.	59.	57.	55.	53.
135	-	110.	102.	98.	94.	90.	86.	84.	76.	71.	75.	74.	71.	69.	67.	63.	67.	60.	59.	56.	55.
150	-	110.	102.	90.	94.	90.	88.	74.	76.	77.	77.	75.	72.	70.	67.	63.	62.	60.	58.	56.	54.
165	-	110.	102.	98.	94.	90.	88.	85.	82.	80.	78.	75.	73.	70.	67.	63.	61.	55.	56.	57.	55.
180	-	110.	102.	98.	94.	90.	88.	85.	82.	80.	77.	75.	72.	69.	66.	63.	60.	58.	56.	54.	52.
195	-	110.	102.	98.	86.	90.	88.	85.	82.	80.	78.	75.	72.	69.	66.	64.	61.	59.	57.	56.	54.
210	-	110.	102.	98.	94.	90.	88.	85.	82.	80.	77.	75.	72.	70.	67.	64.	61.	57.	58.	56.	54.
225	-	110.	102.	98.	94.	90.	89.	84.	82.	80.	76.	69.	69.	66.	67.	65.	62.	60.	58.	57.	55.
240	-	110.	102.	98.	94.	90.	88.	84.	80.	77.	75.	69.	64.	68.	67.	67.	66.	61.	57.	57.	55.
255	-	110.	102.	98.	94.	90.	88.	83.	79.	76.	74.	68.	67.	61.	60.	61.	56.	56.	55.	54.	54.
270	-	110.	102.	98.	94.	90.	88.	83.	80.	73.	71.	70.	71.	68.	61.	61.	61.	61.	59.	57.	56.
285	-	110.	102.	98.	94.	90.	86.	82.	80.	78.	75.	72.	69.	67.	65.	67.	53.	55.	55.	57.	55.
300	-	110.	102.	98.	94.	90.	88.	84.	80.	77.	64.	72.	70.	62.	66.	60.	57.	58.	59.	57.	55.
315	-	110.	102.	98.	94.	90.	88.	85.	82.	79.	77.	73.	71.	68.	66.	64.	62.	60.	58.	57.	55.
330	-	110.	102.	98.	94.	90.	86.	85.	82.	77.	74.	72.	70.	63.	63.	62.	61.	59.	57.	56.	54.
345	-	110.	102.	98.	94.	90.	82.	84.	80.	76.	73.	71.	69.	60.	59.	60.	60.	58.	56.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-71
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	98.	94.	90.	87.	83.	73.	74.	75.	72.	70.	67.	65.	62.	60.	58.	56.	54.	52.
15	110.	102.	98.	94.	90.	86.	85.	81.	76.	70.	67.	64.	57.	58.	55.	52.	52.	51.	50.	48.
30	110.	102.	98.	94.	90.	88.	84.	81.	78.	75.	71.	68.	66.	62.	59.	57.	55.	54.	52.	50.
45	110.	102.	98.	88.	90.	88.	84.	79.	73.	70.	55.	60.	59.	57.	58.	56.	56.	55.	53.	51.
60	110.	102.	98.	94.	90.	85.	82.	78.	76.	73.	70.	67.	65.	62.	58.	55.	53.	51.	49.	48.
75	110.	102.	98.	94.	90.	88.	85.	81.	78.	75.	72.	70.	67.	65.	62.	60.	58.	56.	54.	52.
90	110.	102.	98.	94.	90.	87.	82.	80.	74.	70.	67.	64.	60.	51.	47.	46.	46.	46.	45.	44.
105	110.	102.	98.	94.	90.	85.	81.	78.	75.	69.	65.	55.	53.	51.	50.	49.	48.	47.	46.	44.
120	110.	102.	98.	94.	89.	85.	81.	76.	73.	69.	66.	63.	61.	59.	57.	55.	53.	51.	49.	48.
135	110.	102.	98.	94.	90.	86.	83.	78.	75.	72.	70.	67.	63.	60.	57.	54.	52.	50.	49.	47.
150	110.	102.	98.	94.	88.	82.	75.	77.	72.	71.	69.	65.	61.	58.	57.	54.	52.	50.	49.	47.
165	110.	102.	98.	93.	85.	82.	80.	77.	74.	70.	66.	61.	58.	59.	57.	48.	48.	47.	45.	44.
180	110.	102.	98.	92.	85.	81.	79.	73.	71.	71.	65.	61.	59.	57.	56.	53.	51.	50.	48.	46.
195	110.	102.	98.	92.	86.	84.	80.	78.	73.	71.	69.	65.	63.	61.	58.	54.	52.	50.	49.	47.
210	110.	102.	98.	94.	90.	84.	82.	79.	76.	71.	67.	66.	64.	59.	60.	55.	54.	53.	53.	51.
225	110.	102.	98.	94.	90.	87.	83.	80.	77.	74.	71.	68.	65.	59.	61.	59.	57.	55.	53.	51.
240	110.	102.	98.	94.	90.	86.	83.	79.	75.	72.	70.	68.	65.	63.	61.	56.	56.	55.	53.	51.
255	110.	102.	98.	94.	90.	87.	83.	78.	74.	69.	67.	65.	63.	60.	57.	54.	52.	50.	49.	47.
270	110.	102.	98.	94.	90.	81.	83.	80.	76.	72.	69.	67.	63.	60.	57.	54.	52.	50.	49.	47.
285	110.	102.	98.	94.	90.	86.	82.	78.	75.	71.	68.	64.	58.	56.	55.	53.	51.	50.	48.	46.
300	110.	102.	98.	94.	89.	85.	81.	78.	75.	71.	67.	65.	63.	60.	50.	56.	54.	52.	50.	48.
315	110.	102.	98.	94.	90.	86.	83.	79.	75.	71.	68.	67.	61.	57.	57.	53.	51.	50.	48.	46.
330	110.	102.	98.	94.	90.	86.	84.	80.	77.	73.	70.	67.	57.	63.	61.	59.	57.	55.	54.	52.
345	110.	102.	98.	94.	90.	88.	85.	81.	77.	75.	72.	69.	67.	63.	62.	60.	58.	54.	54.	52.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-73
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	67.	65.	62.	60.	57.	54.	53.	51.	49.	47.
15 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	66.	65.	59.	58.	58.	54.	53.	53.	51.	49.
30 -	110.	102.	97.	92.	87.	84.	80.	77.	73.	70.	68.	63.	64.	61.	59.	56.	54.	53.	51.	49.
45 -	110.	102.	97.	92.	87.	84.	80.	77.	73.	70.	67.	66.	60.	61.	59.	56.	54.	53.	51.	49.
60 -	110.	102.	97.	92.	87.	83.	80.	77.	74.	71.	69.	67.	64.	61.	59.	56.	54.	53.	51.	49.
75 -	110.	102.	97.	92.	87.	83.	80.	77.	73.	70.	67.	65.	62.	58.	56.	53.	51.	49.	48.	46.
90 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	66.	63.	61.	58.	56.	53.	51.	49.	48.	46.
105 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	66.	63.	61.	58.	56.	53.	51.	49.	46.	46.
120 -	110.	102.	97.	92.	87.	83.	79.	77.	73.	70.	67.	63.	61.	58.	57.	54.	53.	51.	49.	47.
135 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	70.	67.	65.	63.	60.	58.	55.	54.	52.	51.	48.
150 -	110.	102.	97.	92.	86.	85.	82.	79.	75.	72.	69.	67.	64.	61.	59.	55.	54.	52.	50.	48.
165 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	70.	67.	65.	63.	60.	59.	56.	54.	53.	51.	49.
180 -	110.	102.	97.	92.	87.	83.	80.	77.	73.	70.	66.	63.	61.	58.	57.	54.	53.	51.	49.	47.
195 -	110.	102.	97.	93.	89.	85.	81.	78.	75.	72.	69.	67.	64.	61.	59.	56.	54.	53.	51.	49.
210 -	110.	102.	97.	92.	89.	85.	82.	79.	75.	72.	70.	67.	65.	63.	60.	58.	56.	54.	52.	50.
225 -	110.	102.	97.	93.	89.	85.	81.	78.	75.	72.	68.	66.	64.	61.	59.	56.	54.	53.	51.	49.
240 -	110.	102.	97.	93.	88.	85.	81.	79.	75.	72.	69.	67.	64.	61.	59.	56.	54.	53.	51.	49.
255 -	110.	102.	97.	93.	88.	85.	81.	79.	75.	72.	69.	67.	64.	61.	59.	56.	54.	53.	51.	49.
270 -	110.	102.	97.	93.	86.	84.	80.	77.	73.	70.	68.	66.	63.	60.	59.	56.	54.	53.	51.	49.
285 -	110.	102.	97.	93.	88.	84.	80.	78.	74.	71.	68.	66.	62.	60.	58.	55.	54.	52.	50.	48.
300 -	110.	102.	97.	92.	87.	83.	80.	77.	73.	71.	68.	66.	63.	60.	59.	55.	54.	52.	50.	48.
315 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	66.	63.	61.	58.	57.	54.	53.	51.	49.	47.
330 -	110.	102.	97.	92.	87.	84.	80.	77.	73.	70.	67.	65.	62.	59.	58.	55.	54.	52.	50.	48.
345 -	110.	102.	97.	92.	87.	83.	79.	76.	72.	69.	66.	63.	62.	59.	57.	54.	53.	51.	49.	47.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

SIREN NUMBER CATAWBA-74
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)		DISTANCE FROM SIREN (FEET)																	
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	97.	92.	86.	79.	76.	72.	69.	66.	63.	60.	57.	57.	54.	52.	50.	49.	46.	44.
15 -	110.	102.	97.	92.	88.	83.	78.	73.	71.	67.	65.	62.	58.	56.	53.	51.	49.	47.	45.	44.
30 -	110.	102.	96.	90.	85.	82.	78.	76.	70.	66.	63.	60.	56.	55.	52.	45.	45.	44.	43.	41.
45 -	110.	102.	95.	89.	83.	79.	76.	71.	69.	65.	63.	61.	58.	58.	52.	46.	45.	43.	42.	40.
60 -	110.	102.	95.	87.	83.	78.	76.	72.	68.	62.	62.	60.	56.	56.	53.	51.	49.	47.	45.	44.
75 -	110.	102.	96.	89.	84.	79.	78.	70.	69.	66.	62.	60.	57.	57.	54.	52.	50.	48.	46.	44.
90 -	110.	102.	97.	90.	86.	83.	79.	74.	70.	68.	63.	62.	59.	57.	52.	50.	48.	46.	44.	43.
105 -	110.	102.	97.	93.	88.	84.	78.	72.	69.	65.	62.	59.	57.	53.	51.	49.	48.	46.	45.	43.
120 -	110.	102.	97.	93.	86.	81.	77.	72.	68.	61.	59.	56.	56.	57.	54.	51.	49.	49.	47.	45.
135 -	110.	102.	97.	92.	86.	83.	78.	76.	73.	71.	67.	63.	61.	58.	54.	50.	48.	46.	44.	43.
150 -	110.	102.	97.	93.	88.	85.	81.	77.	72.	70.	66.	60.	56.	54.	53.	49.	47.	45.	44.	43.
165 -	110.	102.	97.	93.	89.	85.	80.	76.	71.	67.	65.	61.	57.	54.	52.	47.	47.	46.	44.	43.
180 -	110.	102.	97.	93.	89.	84.	79.	76.	70.	66.	62.	60.	57.	55.	53.	50.	50.	48.	46.	44.
195 -	110.	102.	97.	93.	88.	81.	77.	73.	72.	68.	64.	62.	57.	54.	56.	53.	51.	49.	48.	46.
210 -	110.	102.	97.	93.	90.	84.	78.	74.	72.	69.	65.	62.	59.	58.	52.	51.	50.	49.	49.	47.
225 -	110.	102.	97.	93.	90.	85.	79.	74.	72.	69.	66.	63.	59.	58.	56.	54.	52.	50.	48.	46.
240 -	110.	102.	97.	93.	90.	85.	81.	78.	73.	70.	68.	65.	62.	58.	56.	54.	53.	51.	49.	47.
255 -	110.	102.	97.	93.	88.	84.	80.	78.	75.	72.	69.	67.	64.	60.	58.	55.	54.	52.	50.	48.
270 -	110.	102.	97.	93.	88.	83.	79.	76.	72.	69.	64.	62.	53.	52.	52.	50.	49.	48.	47.	46.
285 -	110.	102.	97.	92.	87.	83.	79.	76.	69.	71.	67.	63.	61.	54.	57.	54.	52.	50.	48.	46.
300 -	110.	102.	97.	93.	86.	82.	79.	77.	73.	70.	66.	63.	60.	58.	56.	53.	51.	49.	48.	46.
315 -	110.	102.	97.	93.	85.	81.	78.	74.	65.	69.	66.	65.	61.	58.	55.	53.	51.	49.	47.	45.
330 -	110.	102.	97.	93.	85.	79.	77.	75.	69.	69.	66.	63.	59.	57.	53.	51.	49.	47.	45.	44.
345 -	110.	102.	97.	93.	83.	79.	74.	67.	67.	65.	65.	62.	58.	55.	52.	51.	49.	47.	45.	44.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM N00: 0
WIND SPEED	6.7 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.0 %

SIREN NUMBER CATAWBA-75
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

	ANGLE COUNTERCLOCKWISE FROM EAST (DEG)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	110.	102.	97.	93.	90.	85.	80.	76.	73.	71.	68.	65.	61.	59.	56.	54.	52.	50.	48.	46.
15	120.	102.	97.	93.	89.	84.	80.	76.	72.	69.	63.	65.	63.	60.	57.	56.	54.	52.	50.	48.
30	110.	102.	97.	93.	89.	84.	79.	74.	71.	69.	64.	65.	60.	59.	56.	52.	50.	48.	46.	44.
45	110.	102.	97.	93.	89.	85.	80.	76.	71.	68.	61.	63.	59.	57.	49.	48.	48.	47.	46.	45.
60	110.	102.	97.	93.	88.	84.	78.	74.	72.	68.	64.	62.	59.	56.	54.	52.	50.	48.	46.	44.
75	110.	102.	97.	92.	84.	84.	80.	76.	73.	68.	63.	60.	57.	54.	51.	50.	49.	46.	44.	43.
90	110.	102.	97.	90.	78.	84.	81.	76.	72.	69.	67.	63.	58.	55.	51.	50.	48.	44.	44.	43.
105	110.	102.	96.	91.	88.	83.	78.	76.	69.	70.	67.	65.	63.	59.	56.	53.	51.	49.	48.	46.
120	110.	102.	96.	91.	88.	82.	78.	74.	71.	68.	62.	60.	55.	56.	51.	50.	48.	46.	44.	43.
135	110.	102.	97.	91.	86.	84.	78.	72.	68.	65.	62.	59.	56.	54.	52.	51.	49.	47.	45.	44.
150	110.	102.	97.	91.	86.	84.	78.	72.	70.	67.	64.	62.	58.	57.	54.	51.	49.	47.	45.	44.
165	110.	102.	97.	92.	87.	83.	78.	75.	72.	68.	63.	59.	57.	51.	49.	48.	47.	46.	45.	43.
180	110.	102.	97.	92.	88.	83.	79.	76.	72.	69.	66.	63.	61.	58.	56.	55.	53.	51.	49.	48.
195	110.	102.	97.	93.	88.	81.	72.	73.	73.	70.	67.	65.	63.	60.	58.	55.	54.	52.	50.	48.
210	110.	102.	97.	93.	88.	81.	72.	72.	73.	70.	67.	64.	62.	60.	58.	56.	54.	52.	50.	48.
225	110.	102.	97.	92.	88.	80.	80.	77.	72.	66.	65.	66.	63.	60.	57.	55.	54.	52.	50.	48.
240	110.	102.	97.	92.	88.	83.	80.	77.	73.	66.	68.	65.	62.	60.	57.	54.	53.	51.	49.	47.
255	110.	102.	97.	93.	88.	84.	80.	77.	73.	70.	68.	65.	63.	60.	59.	56.	54.	52.	50.	48.
270	110.	102.	97.	93.	88.	83.	80.	76.	73.	70.	67.	64.	62.	60.	58.	56.	54.	52.	50.	48.
285	110.	102.	97.	93.	88.	83.	80.	76.	73.	71.	68.	65.	63.	60.	57.	55.	53.	51.	49.	48.
300	110.	102.	97.	93.	87.	83.	80.	76.	73.	70.	68.	66.	64.	60.	57.	51.	54.	53.	51.	49.
315	110.	102.	97.	92.	88.	83.	80.	77.	73.	70.	68.	66.	63.	61.	58.	54.	53.	51.	49.	47.
330	110.	102.	97.	93.	89.	84.	80.	77.	74.	71.	69.	66.	63.	61.	57.	54.	53.	51.	49.	47.
345	110.	102.	97.	93.	89.	85.	81.	78.	74.	72.	69.	65.	63.	59.	56.	53.	51.	49.	48.	46.

SIREN MODEL	FSC THUNDERBOLT
SIREN HEIGHT	50. FEET
WEATHER SEASON	AVERAGE SUMMER
WIND DIRECTION	225.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED	3.2 MPH
MEAN TEMPERATURE	77.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY	54.9 %

COMPUTER ANALYSIS BY
ACOUSTIC TECHNOLOGY

SIREN NUMBER CATAMBA-76
DUKE POWER COMPANY
CATAMBA NUCLEAR POWER STATION
SIREN SOUND PRESSURE LEVELS

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0	102	98	92	87	83	79	74	71	68	65	62	61	58	54	52	50	48	46	44	44
15	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
30	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
45	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
60	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
75	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
90	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
105	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
120	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
135	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
150	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
165	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
180	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
195	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
210	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
225	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
240	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
255	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
270	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
285	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
300	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
315	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
330	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44
345	110	102	97	90	86	81	76	72	69	66	63	61	58	54	52	50	48	46	44	44

SIREN MODEL TSC THUNDERBOLT
SIREN HEIGHT 65. FEET
WEATHER SEASON AVERAGE SUMMER
WIND DIRECTION 205.0 DEGREES CLOCKWISE FROM NORTH
WIND SPEED 6.7 MPH
MEAN TEMPERATURE 74.4 DEGREES FAHRENHEIT
MEAN RELATIVE HUMIDITY 54.0 %

SIREN NUMBER CATAWBA-77
 DUKE POWER COMPANY
 CATAWBA NUCLEAR POWER STATION
 SIREN SOUND PRESSURE LEVELS

COMPUTER ANALYSIS BY
 ACOUSTIC TECHNOLOGY

ANGLE COUNTERCLOCKWISE FROM EAST (DEG)	DISTANCE FROM SIREN (FEET)																			
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000
0 -	110.	102.	98.	94.	90.	85.	82.	77.	73.	70.	67.	65.	63.	58.	56.	54.	53.	52.	51.	51.
15 -	110.	102.	98.	94.	90.	86.	81.	77.	74.	70.	67.	65.	63.	61.	59.	57.	56.	54.	52.	50.
30 -	110.	102.	98.	94.	88.	84.	79.	76.	73.	71.	64.	67.	65.	62.	60.	57.	55.	54.	52.	50.
45 -	110.	102.	98.	94.	88.	83.	79.	77.	74.	72.	69.	65.	63.	57.	59.	56.	54.	52.	51.	49.
60 -	110.	102.	98.	91.	85.	81.	76.	73.	72.	65.	67.	64.	62.	59.	55.	56.	54.	52.	51.	49.
75 -	110.	102.	98.	93.	87.	84.	80.	77.	74.	72.	69.	65.	62.	60.	58.	56.	54.	53.	51.	49.
90 -	110.	102.	98.	93.	87.	83.	74.	76.	65.	67.	69.	67.	61.	62.	56.	59.	57.	55.	53.	51.
105 -	110.	102.	98.	92.	88.	84.	81.	71.	73.	74.	71.	69.	67.	64.	62.	59.	57.	55.	53.	49.
120 -	110.	102.	98.	93.	88.	86.	83.	79.	76.	68.	69.	69.	66.	63.	60.	57.	55.	53.	51.	49.
135 -	110.	102.	98.	94.	90.	86.	82.	79.	77.	75.	72.	69.	66.	63.	59.	57.	55.	53.	51.	49.
150 -	110.	102.	98.	93.	89.	86.	81.	80.	77.	75.	73.	69.	65.	63.	60.	58.	56.	55.	53.	51.
165 -	110.	102.	98.	93.	89.	85.	82.	80.	73.	75.	73.	70.	67.	64.	62.	54.	59.	57.	55.	53.
180 -	110.	102.	98.	94.	90.	86.	83.	81.	77.	75.	73.	70.	67.	65.	64.	61.	59.	57.	55.	53.
195 -	110.	102.	98.	94.	90.	87.	82.	79.	77.	75.	69.	67.	66.	66.	64.	60.	58.	56.	55.	53.
210 -	110.	102.	98.	94.	90.	88.	83.	79.	77.	75.	71.	70.	67.	63.	61.	61.	59.	57.	55.	53.
225 -	110.	102.	98.	94.	90.	88.	84.	82.	77.	75.	72.	69.	66.	65.	62.	60.	58.	56.	54.	52.
240 -	110.	102.	98.	94.	90.	87.	84.	80.	77.	75.	71.	71.	68.	64.	61.	60.	58.	56.	54.	52.
255 -	110.	102.	98.	94.	89.	86.	82.	79.	77.	74.	71.	69.	67.	65.	63.	59.	60.	58.	56.	54.
270 -	110.	102.	98.	93.	79.	82.	80.	81.	77.	75.	72.	66.	68.	65.	63.	61.	59.	57.	55.	53.
285 -	110.	102.	98.	94.	90.	87.	84.	81.	79.	75.	72.	69.	66.	64.	61.	58.	56.	55.	53.	51.
300 -	110.	102.	98.	94.	90.	89.	85.	82.	78.	76.	72.	68.	66.	64.	61.	59.	57.	55.	54.	52.
315 -	110.	102.	98.	94.	90.	88.	84.	80.	77.	74.	71.	69.	66.	64.	61.	59.	57.	55.	54.	52.
330 -	110.	102.	98.	94.	90.	88.	83.	77.	75.	73.	71.	69.	66.	64.	61.	59.	57.	55.	54.	52.
345 -	110.	102.	98.	94.	90.	86.	84.	79.	76.	71.	67.	65.	63.	59.	56.	55.	54.	53.	53.	51.

SIREN MODEL
 SIREN HEIGHT
 WEATHER SEASON
 WIND DIRECTION
 WIND SPEED
 MEAN TEMPERATURE
 MEAN RELATIVE HUMIDITY

FSC THUNDERBOLT
 50. FEET
 AVERAGE SUMMER
 225.0 DEGREES CLOCKWISE FROM NORTH
 6.7 MPH
 77.4 DEGREES FAHRENHEIT
 54.0 %

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