



Entergy Nuclear Operations, Inc.  
Entergy Nuclear Northeast  
440 Hamilton Avenue  
White Plains, NY 10601  
Tel 914 272 3400  
Fax 914 272 3205  
mbaldu1@entergy.com

**Michael A. Balduzzi**  
Senior Vice President and  
Chief Operating Officer

October 3, 2007

Mr. James Trapp  
U.S. Nuclear Regulatory Commission – Region I  
DRS/PSB1  
475 Allendale Road  
King of Prussia, PA 19406-1415

Ref: Invitation to Observe Testing of Indian Point Sirens

Dear Mr. Trapp:

Entergy is contracting with the Integrated Acoustics Laboratory of the Georgia Institute of Technology during October - November 2007 for the purpose of evaluating performance of the ATI siren system in various configurations to evaluate possible solutions to the concerns raised in FEMA's report dated September 12, 2007. This facility will be used by Entergy assisted by independent acoustic experts from Blue Ridge Research and Consulting and Wyle Laboratories along with the larger anechoic chamber at Acoustic Technology, Inc., in East Boston, Massachusetts.

A general description of the test plan for the Acoustic Technology and Georgia Tech facilities is attached. We will provide a detailed test plan to FEMA for its review and have requested a meeting with FEMA at the earliest opportunity to review the test program to assure that we are appropriately addressing their concerns.

You are invited to send a representative to observe the testing at the Georgia Tech and ATI facilities. We will provide detailed schedules for our activities as soon as they are completed.

Sincerely,

A handwritten signature in cursive script that reads "Michael A. Balduzzi".

Michael Balduzzi  
Sr. Vice President

Cc: Chris Miller, NRC NSIR  
Anthony Sutton, Commissioner Department of Emergency Services, Westchester County  
Daniel Greeley, Deputy Director, Fire and Emergency Services, Rockland County  
Seamus Leary, Director Fire and Emergency Services Orange County  
Adam Stiebeling, Deputy Commissioner Department of Emergency Services, Putnam County

## **Acoustic Testing**

### **Indian Point Sirens**

#### **Acoustic Technology, Inc**

**Georgia Institute of Technology  
G. W. Woodruff School of Mechanical Engineering  
Atlanta Georgia**

### **Introduction**

Entergy is contracting with the Georgia Institute of Technology, G. W. Woodruff School of Mechanical Engineering for use of its anechoic chamber laboratory during the period October – November 2007. This facility will be used for acoustic testing in addition to testing that is being performed at the larger anechoic chamber at Acoustic Technology in East Boston, Massachusetts. Entergy plans to test the ATI and other sirens in these facilities to address concerns expressed by FEMA in its report dated September 12, 1007. In particular, measurements made with the assistance of Blue Ridge Research and Consulting and Wyle Laboratories are intended to resolve concerns and offer solutions in the following areas:

- Steadiness of the ATI HPSS32 omni-directional siren
- Repeatability of the ATI HPSS 32 omni-directional siren
- Evaluation of methods to increase acoustic output of the HPSS32 omni-directional siren
- An optional activity based on the outcome of tests noted above is a performance comparison of the ATI HPSS32 omni-directional siren with at least one and possibly two other types of siren produced by American Signal Corporation

Measurements will be made in an anechoic chamber to eliminate the sources of uncertainty associated with field measurements, particularly those acoustic measurements made at ground level near the siren.

The Georgia Institute's Integrated Acoustics Laboratory anechoic chamber is described in the institute's internet web site at <http://www.me.gatech.edu/acoustics/IAL/>

The following is a general description of the tests planned at the Integrated Acoustics Laboratory; detailed procedures are being developed for the various tests described.

## **Siren Signal Steadiness**

The HPSS32 siren will be tested in several configurations. The full siren head structure consists of eight horns mounted in two stacks of four centered at 90 degree intervals. One test will sound one of the eight horns with measurements made on the centerline of the horn. A companion test will sound all eight horns. This test is designed to determine the extent to which the stacked horn assembly exhibits a near field phenomenon of constructive and destructive interference which makes measurements at distances within 100 feet performed with a moving microphone problematic. It has been suggested that moving the microphone in accordance with the ANSI S12.14 standard may not be appropriate for this siren configuration. The results of this series of tests will be used to assist in improving near field acoustic output measurement technique which, as FEMA noted in its report of September 12, 2007, may be a significant source of the apparent lack of steadiness observed in both elevated and ground level measurements made by Blue Ridge Research and Consulting during the period March – June 2007.

## **Siren Signal Repeatability**

An evaluation was performed of the data collected by Blue Ridge Research and Consulting during two measurement periods from May 2-10, 2007 and June 5-15, 2007. Data evaluated were for the elevated on axis measurements of four minute duration Leq. During the May 2-10 period 14 measurements were made with a range of +/- 3.15 dBC. During the June 5-15, 2007 period thirty measurements were made on nineteen sirens with a range of +/- 2.65 dBC. This analysis had previously been performed by FEMA and documented in its report dated September 12, 2007. These data demonstrate that the siren output is repeatable. Additional studies will be performed to validate this conclusion at the Woodruff Integrated Acoustics Laboratory at Georgia Tech.

## **Acoustic Output – HPSS32 Sirens**

Several test regimes are planned on siren / amplifier combinations that will be taken from existing units deployed in the field. First the HPSS-32 siren in omnidirectional configuration will be tested in its as-installed configuration. In the first series of test cases individual horns and then the eight horn array will be powered by four 100 watt drivers and existing ATI amplifier.

A second series of tests will be performed using a single horn and the omnidirectional eight horn HPSS32 array with 200 watt drivers powered by the ATI amplifier.

A third series of tests will be performed using the eight horn HPSS32 array with a square wave amplifier provided by American Signal Corporation.

Bi-directional siren tests will be performed in a variety of configurations that are being formulated.

### **Acoustic Directivity**

An array of microphones will be used to evaluate horizontal and vertical directivity of the omni and bi-directional sirens. These data may be used in acoustic sound propagation models being prepared by Wyle laboratories.

### **Acoustic Output American Signal Corporation Siren Units - Optional**

A series of tests that are similar to the acoustic tests using the ATI HPSS-32 sirens being replaced by two different models of sirens supplied by American Signal Corporation may be conducted based on the results of tests on ATI sirens and providing that sufficient time is available.

### **Directionality**

Measurements are planned using multiple microphones to establish horizontal and vertical directionality of the ATI sirens.

### **Application:**

The results of the testing regime are intended to assist in identifying the course of action that will produce a siren configuration that will achieve the sound contours described in the design report submission of January 5, 2007 and meet the steadiness and repeatability requirements described in FEMA's report of September 12, 2007. We also expect that the tests will aid in development of an field testing protocol that will take into consideration any near field effects that were not considered with the ANSI S12.14 standard was promulgated. Based on the results of the testing in the anechoic chamber, in-situ field testing may be conducted at selected siren sites within the Indian Point emergency planning zone.