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August 22, 2007

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**SUBJECT:     **Response to FEMA Request for Information Regarding  
                  Indian Point Energy Center Alert and Notification System****

- References:
1. FEMA letter; R. David Paulison to Michael Kansler (Entergy) dated, August 15, 2007; regarding request for documents and data.
  2. Entergy letter; O. Limpias to John Gibb, dated January 5, 2007; regarding Updated design report for IPEC ANS.
  3. Entergy letter; M. Balduzzi to A. Feeney, dated June 29, 2007; regarding additional information requested via June 11, 2007 conference call.
  4. Entergy letter; M. Slobodien to A. Feeney dated, August 14, 2007; regarding response to July 20, 2007 FEMA technical review.

Dear Mr. Feeney;

The Reference 1 letter identifies the remaining documents and data that FEMA stated it must review prior to formal approval of the new Indian Point Energy Center (IPEC) Alert and Notification System (ANS). These items were further discussed in a joint stakeholder meeting at IPEC on August 20, 2007. This letter provides the information as agreed at that meeting and we request that you transmit this information to FEMA.

The design of the new ANS for IPEC is described in the design report submitted to FEMA with Reference 2, as supplemented by information provided in References 3 and 4 in response to questions from FEMA which addressed the results of the preoperational startup test program conducted by ENO.

**FEMA Information Request Item 1:**

An updated sound coverage map using actual test data as inputs, including the impact of the five new sirens recently installed. The map must provide evidence of adequate sound coverage including 10dB above background where required, based on demographics and topography. Information about the modeling that was used to produce the sound propagation study should also be provided, along with the specific data that was entered into the model. The model run must include the five new sirens that were recently added to the system in order to be deemed a credible data source.

**ENO Response Item 1:**

Attachment I is the updated sound coverage map using the ATI acoustic model and actual acoustic test data gathered in July and August as inputs for the originally planned 150 sirens plus the 5 new recently installed sirens. Latitude / longitude reference markings are included on this map as discussed at the joint stakeholder meeting of August 20, 2007.

A description of the ATI acoustic model used to produce the sound coverage map was provided in the Reference 2 Design Report and is also included in Attachment II for your convenience. The actual sound pressure values used in the ATI model as input for the 155 sirens were obtained by individual full volume four-minute duration siren soundings. This data collection effort is described in Appendix D of the Blue Ridge Research and Consulting (BRRC) report provided in Attachment III. The BRRC report also contains the results of acoustic testing during full system soundings on August 11 and 14, 2007 and the results of a three-day long ambient sound study conducted from August 15-18, 2007. As previously discussed in Reference 4, most of the sirens were not accessible for bucket truck measurements of 'at-elevation' sound pressure levels. Therefore, ground elevation measurements were also obtained and a correlation was developed to determine the at-elevation sound pressure level needed for input to the acoustic model. The correlation description, previously provided in Reference 4, is also provided here as Attachment IV. A tabulation of siren characteristics, including latitude / longitude coordinates and the sound pressure level used as input to the model for all 155 sirens is provided as Attachment V.

In addition, as requested by FEMA, ENO has conducted testing to address FEMA's position that sound pressure levels should exceed 10 dB over ambient noise levels in high population (high noise) areas.

BRRC collected 630 Hz one-third octave sound pressure levels in connection with the two full system soundings performed on August 11 and 14, 2007 and conducted a three-day ambient sound study on August 16-18, 2007 to evaluate whether the sirens generally exceed 10dB over background in high population (high noise) areas. Detailed information regarding these data and study are described in the BRRC Report which is Attachment III. The 630 Hz one-third octave sound pressure level data collected and ambient study results demonstrated that at each of the measurement sites the 630 Hz one-third octave siren sound pressure levels are between 17dB and 40 dB over background noise levels. Based on this information, ENO believes there is adequate sound coverage in the high population (high noise) areas of the EPZ.

**FEMA Information Request Item 2:**

Proof that the siren signal is steady for 3 to 5 minutes and is capable of repetition.

**ENO Response Item 2:**

As stated in the response to Item 1, sound pressure level readings were taken during acoustic tests conducted by BRRC in July and August 2007 at each of the 155 sirens. An evaluation of the data collected is provided in the Attachment III BRRC report. This information demonstrates that the siren signal is steady for 3 to 5 minutes and is capable of repetition.

**FEMA Information Request Item 3:**

The graphical trace of the sounding for all 150 sirens that was conducted.

**ENO Response Item 3:**

The sound pressure level readings discussed in item 2 included recording of the time-dependent sound pressure level graphical traces at each of the 150 plus 5 new sirens. The graphical traces are provided in Attachment VI.

**FEMA Information Request Item 4:**

Technical Specifications, including acoustical information of the five new sirens.

**ENO Response Item 4:**

The technical specifications of the five new omni-directional sirens are identical to the omni-directional sirens described in the Reference 2 Design Report. The five new sirens were added as a result of a reanalysis of sound coverage performed after acoustic test results indicated that the initially assumed value of 122 dBC in the Reference 2 design report was not supported. Two of the five sirens were placed in Westchester County (Ossining and Croton-on-Hudson) and three sirens were placed in Rockland County (New City and Clarkstown). The technical specifications of these five new sirens are included in the Attachment V tabulation mentioned in the response to Item 1. The acoustical information for these five new sirens is set forth in the Attachment III BRRC report and in the graphical traces in Attachment VI.

**FEMA Information Request Item 5:**

A strategy for how a failure of all sirens in a county will be addressed since, even if the 90% threshold required by guidance is met, failure of an entire counties' sirens is deemed unacceptable performance by this Agency.

**ENO Response Item 5:**

ENO has implemented a strategy to address the failure of all sirens in a county.

ENO conducted system reliability testing during the period August 1-14, 2007, including two full system soundings on August 11 and 14, 2007. A discussion of the statistical basis for the portion of this reliability testing program that used the microwave radio communication pathway is

described in Attachment VII. The results of the August 1 – 14, 2007 reliability testing are tabulated in Attachment VIII. The data table shows the date of the test, the locations from which the testing took place, and the communication pathway(s) that were used for the testing. Test results are provided on a county by county basis and on an overall system basis. There were three instances during the reliability testing in which a significant fraction of the sirens failed to activate in an individual county. The causes of these events, corrective actions, and actions to prevent recurrence are described below.

#### History of Significant Activation Failures

During the new system reliability testing conducted August 1–August 14, 2007, there was one instance when an entire county's sirens failed. This event occurred on Tuesday, August 14 when Westchester County's 71 sirens failed to activate during a TCP/IP only signal test from the county EOC. A review of this condition concluded that the performance was an artificiality of the siren system configuration that was required in order to test one of the three activation communication pathways. The normal siren system configuration keeps all three communication pathways active. In order to test one particular communication path, the other two must be placed into a shutdown condition. Investigation of the event on August 14, 2007 in Westchester County revealed that the Westchester County Control Station had been shutdown at the completion of the last test. Since the unit was inactive for a period of time, the cellular modem went into the sleep mode and therefore was unresponsive for the first test. The modem was reset, the scheduled second test was performed and all but one Westchester County siren activated. This condition would not occur during a normal configuration. In an actual event the CCU at the county's other activation location could have been used to activate the sirens immediately as described above.

There were two other instances that occurred in Orange County during testing where a significant number of the county's sirens failed to activate. These tests occurred on August 1 and August 8, 2007. Both tests used only the radio/microwave communication signal. The August 1<sup>st</sup> test resulted in 19 of the 22 sirens not receiving an activation signal. The August 8<sup>th</sup> test resulted in 10 sirens not receiving the activation signal. These events were caused by a failure to reboot a computer at the CCU following software updating. The software was not activated until the reboot occurred. This is attributed to technician error. In an actual event the CCU at the county's other activation location could have been used to activate the sirens immediately as described above.

ENO has identified the cause for each of these failures and has taken corrective action to address them. In addition, our preventative maintenance plan which will be in place when the sirens are placed into service is designed to prevent such occurrences.

#### Strategy and System Performance

There was no instance in which a hardware failure caused a system-wide inability to activate sirens. One of the significant advantages of the new system is that is designed to address the potential for individual hardware failures. The system incorporates the physical separation of redundant components to enable activation from other locations within the affected county and from locations outside of the county. Furthermore, the failures observed all occurred when the system was placed in an off-normal configuration to test a single activation pathway. In normal use the configuration utilizes all three independent activation pathways. A failure of a large fraction of individual county sirens to sound on the first activation demand or even all of the sirens in a single county in an actual emergency condition can be addressed in the following ways:

- 1) The affected county should utilize its other CCU to activate sirens. If that were to fail then
- 2) The affected county should request one of the other counties to activate the sirens in the failed county jurisdiction. If that proved to be unsuccessful, then,
- 3) The affected county should ask Indian Point to activate the sirens from one of its three CCUs.
- 4) Additionally, the affected county should utilize the back-up alert and notification system as described in the siren system design report. For all counties that is a high speed telephone notification system.

The above strategy would successfully address each of the three siren failures noted above.

#### Reliability Testing and Performance Requirements

Our recent reliability testing data demonstrate not only that overall system reliability is greater than 97% but that siren reliability for each individual county exceeds 90%, despite the failures noted above.

Also, after declaring the ANS operable in accordance with the NRC Order EA-05-190 dated January 31, 2006, ENO is required to demonstrate on three consecutive reliability tests using the microwave synchronized radio communication and control pathway that overall reliability is greater than or equal to 97% with no individual county experiencing a failure rate greater than 10%.

During the joint stakeholder meeting of August 20, 2007 a question was raised regarding the need to conduct a separate test of activating all 155 sirens from Rockland County. The response to this question is provided in Attachment IX.

#### **FEMA Information Request No. 6:**

The NRC report on backup power, along with copies of all battery test information submitted to the NRC must be received and reviewed by FEMA prior to approving the system for primary use.

#### **ENO Response No 6:**

The NRC report on backup power was issued to FEMA by letter dated August 15, 2007. A copy of that letter along with copies of battery test information is provided in Attachment X. Also included in Attachment X is information regarding testing of the indicators for loss of AC power at one or more sirens, as requested in Reference 1.

The Reference 1 letter also describes FEMA concerns regarding "inconsistency of the mechanism for feedback information" should be "addressed immediately and the resolution and test data indicating improved results must be provided to FEMA for review." This situation appears to occur as a result of radio interference or when one county polling has completed and sirens in the adjacent county are polling and return results that some border sirens have not activated. The first county data will not update automatically if the adjacent county upon repolling returns a satisfactory result. With regard to radio interference, additional radio frequency filters have been installed to improve radio signal quality. With regard to polling issues in adjacent counties, there are two actions – an immediate short term action and a long term action. The immediate action in the instance in which there is apparent inconsistency in data indication on the CCU computer screen is

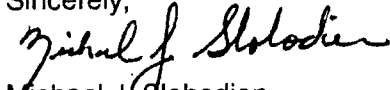
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to activate the back up notification system (high speed telephone dialing) for those individual sirens where activation status is not clear. The longer term action is to provide the ability to interrogate the siren system computer for current status of the individual sirens in adjacent counties. This action requires a software modification that has already been ordered.

During the joint stakeholder meeting of August 20, 2007 FEMA representatives also requested a copy of the pre-operational system assessment conducted by radio communications consultants from SAIC. That assessment was performed to diagnose and correct inconsistent performance of the radio communications and control network. The assessment report, which describes the corrective actions implemented, is provided in Attachment XI. Diagnostic testing performed after completion of the corrective actions supported our decision to initiate the reliability testing program on August 1, 2007 as described in the reply to Item 5

We look forward to working with you to promptly resolve any remaining issues needed for your approval of the new ANS so that it can be placed in service as soon as possible.

Sincerely,

  
Michael J. Slobodien  
Director, Emergency Planning

cc: next page

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cc: R. Thomson, FEMA (w/ Attachments)  
V. Quinn, FEMA  
S. Collins, NRC  
J. Boska, NRC

Summary of Attachments:

Attachment I: Updated Sound Coverage Map Using Actual Acoustic Test Data for 155 Sirens

Attachment II: Description of ATI Acoustic Analysis Model

Attachment III: Blue Ridge Research and Consulting Report of Acoustic Measurements

Attachment IV: Correlation Methodology for Ground-Level and Elevated Acoustic Data

Attachment V: Siren Characteristics

Attachment VI: Graphical Acoustic Traces for 155 Sirens (refer to separate binder)

Attachment VII: Statistically Based Sample Size Using the Student T Test

Attachment VIII: Summary of Test Results for August 1 – 14, 2007 Reliability Testing

Attachment IX: ENO Response to August 20, 2007 Question Regarding an  
All Siren Test from Rockland County

Attachment X: NRC Letter and ENO Documents Regarding Backup Power Testing  
(refer to separate binder)

Attachment XI: SAIC Assessment Report