September 17, 1988

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

before the

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al. (Seabrook Station, Units 1 and 2)	Docket Nos. 50-443-OL 50-444-OL (On-Site Emergency Planning and Safety Issues)

AFFIDAVIT OF GARY J. CATAPANO

I, Gary J. Catapano, being on oath, depose and say as follows:

1. I am the President of AllComm, Inc. which is contracted by the joint owners of Seabrook Station to evaluate and design communications systems and to specify communications equipment for emergency planning purposes in connection with Seabrook Station. A statement of my professional qualifications is attached hereto and marked "A".

2. The purpose of this affidavit is to address allegations in Contention Bases A.5 and A.14. The allegations I address are: (1) the time required for dispatch, setup, and activation of many VANS vehicles will

exceed 15 minutes (citing the time required to notify VANS drivers as a factor contributing to this inadequacy) [Basis A.5]; (2) the equipment to be used for remote activation of the VANS sirens has not been identified [Basis A.14]; (3) no equipment has been identified and therefore no conclusion can be reached regarding the reliability of the equipment [Basis A.14]; and (4) there is no indication whether the siren signals will be pre-recorded or broadcast to remote locations [Basis A.14].

Basis A.5: Notification

3. VANS staging areas receive notification from the EOC for all emergency classification levels. For an emergency condition classified as an Alert or higher the VANS vehicles will be dispatched and the following events will occur.

4. The Emergency Operations Center (EOC) Guard Station will be staffed continuously and is the point of receipt for the initial notification of an emergency at Seabrook Station for the New Hampshire Yankee Offsite Response Organization.

5. The EOC Contact will be notified of the emergency classification level by the Seabrook Station Control Room Communicator via the Nuclear Alert System (NAS). The NAS is located at the EOC Guard Station.

6. For an Alert or higher level emergency, the EOC Contact will immediately activate the Vehicular Alert

Communications System (VACS), co-located with the NAS at the Guard Station, to achieve VANS deployment.

7. To notify the drivers located at the VANS staging areas, the EOC Contact will enter a numeric code into the CSI-14 Remote Display Unit touchpad located on his desk at the Guard Station where he received the call. Codes are available to activate all six staging areas ("ALL-CALL" function), or to activate individual staging areas. There are also specific commands to activate a particular function at a specific staging area.

8. The EOC Contact will utilize the "ALL-CALL" function to activate the staging areas and turn on or activate all remotely controlled functions. The equipment at the EOC electronically polls each staging area and verifies that the "ALL-CALL" command has been received and decoded.

9. When the "ALL-CALL" command has been successfully received and decoded at the staging areas, the VACS console printer at each of the two locations within the EOC prints out a message for each staging area, which reads "STAGING AREA "XX" ACTIVATED." If a staging area fails to respond electronically to the activation command, the system automatically attempts to retry the activation. If the retry fails, a message will be printed out which reads "STAGING AREA "X" FAILED TO ACTIVATE." At this point, the EOC Contact can activate that staging area via radio or telephone voice contact.

10. The equipment package located at each staging area consists of the necessary radio frequency and control equipment to automatically carry out the following actions when activated.

- Activation of audible alarm devices designed for audible alerting purposes.
- Activation of visual alarm devices.
- Activation of public address system cross-patch allowing the EOC Contact to transmit an audible message to each staging area. This message could be used to provide additional information to the staging area.
- Opening of garage doors at staging area.
- Activation of an all building lights-on command.

11. The equipment located at the satellite staging area will electronically decode the group call command and activate both audible and visual alarms. A portamobile radio on the overflow channel will provide for voice communications to the EOC Contact as a means of verification of activation. The commercial telephone will service as a backup communication and notification mechanism.

12. This entire process is automatic and is initiated by the EOC Contact Point via the single action of entering the valid activation command. The entire process for activation and electronic polling of the staging areas should occur in less than 10 seconds.

13. When the EOC communicates (voice and non-voice) with the VANS staging areas using the VACS, all communications are relayed by a remotely located automatic relay station. The same repeater station is utilized for both the activation of the VANS sirens and VACS activation of the staging areas (non-voice communications). This repeater station is located within close geographical proximity to the VANS acoustical locations and the staging areas. A separate repeater station provides the primary voice communications on the "overflow" channel.

Basis A.14: Siren Activation

14. As discussed in the following paragraphs, the Seabrook Station Public Alert and Notification System FEMA-REP-10 Design Report, dated April 30, 1988, clearly describes how the Seabrook Station Public Alert and Notification System including the Whelen siren systems function.

15. The dual sirens employed on the VANS vehicles is described in Chapter 2, Section E.6.2.1.a of this Design Report. The remote control of sirens is discussed in Chapter 2, Section E.6.2.1.b of this Design Report. [A copy of Sections E.6.2.1.a and E.6.2.1.b is attached and marked "B."]

16. This Design Report in Sections E.6.2.1.a at p. 2-15 states "The siren is composed of . . . electrical cabinets housing the . . . tone generators." Also in this section at p. 2-15, the Design Report states "In

the siren [tone] mode, the output of a tone generator is amplified and broadcast over the siren speakers." It is also clear from Sections E.6.2.1.a and E.6.2.1.b that the sirens will be activated after the activation signal has been transmitted from the NHY Offsite Response Organization (ORO) Emergency Operations Center (EOC).

17. Therefore, the siren tone used to initially notify the public is neither "pre-recorded" nor "broadcasted to the remote locations." Rather, the siren tone is generated by a tone generator internal to the siren system. The activation signal from the NHY EOC causes the control circuitry in the VANS siren cabinets to activate the siren tone mode of operation.

18. As provided in the "Affidavit of Edward W. Desmarais," the message mode or public address mode capability of the VANS sirens is not being used.

19. The above referenced Design Report, in Section E.6.2.1.b at p. 2-17, briefly describes the means used for remote activation of the VANS sirens. The following paragraphs describe in more detail the equipment used to generate and broadcast the siren activation signals and the equipment used to receive and activate the sirens.

20. The siren activation signals originate from equipment located at the EOC. The radio activation signals transmitted from the EOC are received at an automatic relay station located within the Massachusetts portion of the EPZ.

These signals are amplified and retransmitted to the VANS sirens. The transmitted siren activation signals are received and processed by equipment employed on the VANS vehicles.

21. The equipment at the EOC consists of encoding and decoding equipment, a radio transceiver (i.e., transmitter/receiver), and an antenna system and other equipment for proper integrated operation of this equipment.

22. The transceiver assembly is a , full duplex station manufactured by . The transceiver operates in a full duplex mode transmitting and receiving simultaneously on 2 different UHF frequencies with 90 watts power output, continuous duty rated with channel guard. The transceiver is located in the Radio Equipment Room across from the Communications Room in the EOC and is remotely controlled from the Communications Room via internal building cabling connected to a . The Controller has been modified to allow the Whelen siren activation encoder to automatically activate the transmitter portion of the transceiver when the "send" function is selected and activated on the encoder.

23. The antenna system operates with a duplexer which allows simultaneous transmission and reception through a common antenna. The antenna consists of a directional, high-

gain, yagi-type antenna orientated towards the Massachusetts repeater station.

24. The Siren Activation Encoder utilizes a high-speed signaling protocol which is capable of controlling up to 16 functions at each siren site or VANS unit. The encoder transmits user-selectable codes which activate a specific siren function and are capable of addressing all VANS, groups of VANS units, or individual VANS units.

25. The equipment at the automatic relay station consists of a repeater station and an antenna system.

26. The repeater station is a , full duplex station with channel guard manufactured by .

27. The repeater operates in a full duplex mode, transmitting and receiving simultaneously on 2 different UHF frequencies. The antenna system operates with a duplexer which allows simultaneous transmission and reception through a common antenna. The antenna consists of an omnidirectional high-gain type antenna.

28. The Radio Control/Decoder equipment to be employed on the VANS vehicle consists of a radio receiver or equivalent, a Control Logic System and decoder and a roof mounted antenna. The equipment utilized for this purpose has demonstrated reliability and has been utilized in siren activation applications and in

other similar applications for over 3 years. As with all equipment utilized as part of the Prompt Notification System, this equipment will be subjected to an extensive startup test and acceptance program, followed by scheduled preventative maintenance and surveillance. Taken collectively, these measures will ensure reliable siren system activation.

29. The radio receiver/control system of the VANS units will be equivalent to the radio receiver and decoder utilized in the New Hampshire fixed sirens. The VANS equipment will consist of a UHF radio receiver to monitor the output of the repeater station. The radio receivers will be connected to omnidirectional receiver antenna mounted on the VANS units.

30. The audio output of the receiver is coupled to a decoder which decodes or interprets the received code, checking it against the decoder programming for validity. If the received signal has the correct address and requests a valid function, the decoder commands the siren to carry out the requested function.

31. The hardware located at the EOC and described above is the same as the hardware installed at the

. The hardware at the does use different radio frequencies and predesignated code sequences than the hardware located at the EOC.

32. The equipment at the is utilized to control the siren system located in the

. This equipment has operated continuously since being placed into service in . Further, this equipment has successfully completed in excess of several thousand test activations.

33. The Massachusetts repeater station, described in paragraphs 26 and 27 above, had been installed to relay activation signals to the pole mounted siren system previously installed in the Massachusetts portion of the Seabrook Station EPZ. While the repeater station was used in this role, the system successfully performed in approximately 2000 test activations of the siren system. This equipment has operated without failure since its installation in early 1986. In addition, repeater system performance to original manufacturers specifications is verified quarterly as part of the routine preventative maintenance and surveillance program.

34. In order to assure system function even in the event of a commercial power problem, emergency standby dual-electric power is available at both the EOC and the repeater station.

35. Based on the foregoing paragraphs I have concluded that:

a. The siren tone used to initially notify the public is neither "prerecorded" nor "broadcast to remote locations." The siren tone is generated by a tone generator internal to the Whelen siren system.

b. The siren activation equipment located at the EOC has demonstrated reliability.

c. The equipment located at the repeater station has demonstrated reliability.

d. The radio control decoder equipment located in the VANS units has demonstrated reliability.

e. Taken collectively these measures will ensure reliable siren activation.

f. The notification and dispatch of the VANS units will be electronically facilitated by the VACS system reducing to a minimum the time needed to notify VANS drivers and verify notification has occured.

Gary J. Catapano

September __, 1988

The above-subscribed Gary J. Catapano appeared before me and made oath that he had read the foregoing affidavit and that the statements set forth therein are true to the best of his knowledge.

Before me,

Notary Public
My Commission Expires:

JANE D. WISEMAN
NOTARY PUBLIC
My Commission Expires January 8, 1993

Professional Qualifications
of
Gary J. Catapano
President, AllComm, Inc.

My name is Gary J. Catapano and my business address is AllComm, Inc., 165 Martell Court, Keene, NH 03431. I am the President of AllComm, Inc., a company specializing in design of emergency communications systems founded by me in July of 1984.

I am certified by the National Association of Radio and Telecommunications Engineers (NARTE) as Communications Engineer with special skills endorsements in three areas: Land Mobile Systems, Land Mobile Interference and Analysis and Suppression and Inside Plant Telephone Engineering. I am also a senior member of NARTE.

I hold a "Lifetime" FCC General Class Radiotelephone Engineering license and I am certified as an R.F. Engineering Technician by the National Association of Business and Educational Radio (NABER). I am also a member of NABERS Professional Mobile Radio Service Section.

I have studied electrical engineering at Suffolk Community College and other curriculum at Keene State College and Nathaniel Hawthorne College. I am a 1970 graduate of L.A. Wilson Tech where I studied Radio and Television Electronic Communications.

I have additional special education in the following areas: microwave radio system design, telephone systems, telephone systems traffic theory and network design. I have participated in 14 special training seminars covering all aspects of the land mobile communications field. I have developed engineering programs to aid in the prediction and elimination of the harmful interference caused by undesired radio transmissions.

Since July of 1985, my company has been employed by New Hampshire Yankee to conduct an evaluation of the communications networks utilized by governmental entities, public safety agencies and other concerns involved with the Seabrook Station Radiological Emergency Response Plan for both New Hampshire and Massachusetts. I assumed the lead responsibility for this project which consisted of four phases. The objectives of Phase 1 were to study and identify the types of systems currently in place and identify existing problem areas. The first phase involved extensive field work and interviews with public safety officials of the states, counties, and local municipalities. Phase 2 involved the analysis of this information in order to determine the effect that the additional RERP communications would have on the existing systems and to formulate the engineering changes. Subsequent meetings were held again with public safety officials to review the recommendations. Phase 3 involved the installation test and debug of all the equipment. Phase

4 involves further refinement of these systems, documentation and training, and drill and exercise support.

During the second half of 1985 and into late 1986, an extensive part of the project effort was focused on the six Massachusetts municipalities within the plume exposure pathway, the two "Host" communities, Massachusetts State Police and other entities involved at the time in the "draft" Massachusetts radiological emergency response plans for Seabrook Station.

Also, as part of this project, I have assisted the utility and the State of New Hampshire with design and installation of the communications networks for the NHY Emergency Operations Facility and the NH state EOC and Incident Field Office.

With the creation of the New Hampshire Yankee Offsite Response Organization, I have the responsibility for the design and installation of the ORO communications networks in support of the Seabrook Plan for Massachusetts Communities. I am also a volunteer for the NHY ORO and hold the position of Red Team Communications Coordinator. I have participated in all of the drills leading up to the graded exercise and participated on both days of the graded exercise as the communications coordinator at the NHY ORO EOC.

Prior to my founding AllComm, Inc., I was employed as the General Manager of HEW Communications, Inc. As part of my duties while at HEW I was the project manager and engineer for the design and installation of the emergency communications systems that form the backbone of the public notification system and emergency communications networks for 34 municipalities and 3 state civil defense agencies involved with the Vermont Yankee Nuclear Power Plant and Yankee Atomic Electric Company, Rowe, MA Nuclear Power Plant. This project involved an assessment of the existing communications capabilities, extensive interviews with local public safety officials, the design of new communications systems and integration with existing systems.

I had the lead responsibility for the entire project including the training and documentation which included two comprehensive technical manuals which provide the foundation for the utilities FEMA-43 submittals. During the initial phase of this project, much of the existing guidance for the design of public notification systems and emergency communications systems did not exist. I provided technical support to Yankee Atomic Electric Company in drafting comments to FEMA's proposed guidance for the alert and notification systems.

As part of the above project, I also designed a special system in cooperation with NOAA (National Weather Service) which links vital information from the National Weather Service offices in Burlington, Vermont to over 8,000 Alert receivers located approximately 100 miles away in some of the residance within the Emergancy Planning Zones of both plants. This system operates 24 hours, 365 days a year, and has done so since November of 1981.

Prior to my beginning the New Hampshire Yankee project, my firm assisted Vermont Yankee in the relocation of their Emergency Operations Facility to its new location. My main responsibility was for the design and installation of the radio communications systems for this facility and to minimize and eliminate any interference that resulted from the co-location of communications facilities. We also performed this same function for Yankee Atomic Electric Company's emergency operations facility for the Rowe, MA Nuclear Power Plant.

My firm currently has the responsibility for the surveillance and maintenance programs for the prompt notification systems for both Vermont Yankee and Yankee plants. Since early 1982, these systems have been in operation and functioning with a very high percentage of operability (over 99%).

I have also participated in thirteen full scale federally witnessed emergency exercises and many numerous full scale drills providing communications support (troubleshooting, diagnosis and emergency repair) to the utilities and state agencies. My firm currently provides these emergency communications support services to three nuclear power facilities in New England.

Prior to the Seabrook project, while at AllComm, and HEW, I have been called in as an expert to "debug" many types of communications systems that were not functioning as intended. I have designed and installed many types of electronic communications systems. This work includes projects for state agencies, public safety dispatch centers, and regional fire mutual aid compacts, ski areas, broadcast stations, business and industrial concerns. With divestiture of the Bell System, this work has grown to include the design and installation and interfacing of telephone networks and increasing liaison work with the Bell Operating Company (New England Telephone). I currently hold technical certifications for four different manufacturers of telephone systems including two sophisticated PABX systems. I have supervised the installation of over several hundred telephone systems, including many in public safety applications.

From 1977 to 1979 while at HEW, I was the senior communications technician with the lead responsibility for the maintenance and preventive maintenance and system debug for a public safety communications network that spanned portions of three states and encompassed three counties and included 52 municipalities.

All of my prior employment dating back to 1965 include positions of increasing responsibility in the electronics field. The study of electronic communications has been a lifelong pursuit for me dating back to early childhood.

E.6.2.1.a Siren Descriptions

Three types of sirens are employed in the Public Alert and Notification System for the Seabrook Station EPZ:

1. Whelen Model WS-3000: oscillating very-high-power electronic sirens, (rated at 122 dBC at 550 Hz):
2. Whelen Model WS-4000: oscillating ultra-high-power electronic sirens, (rated at 129 dBC at 550 Hz):
3. Dual Whelen Model WS-4000: oscillating ultra-high-power electronic siren system (rated at 134 dBC at 550 Hz).

Table 2-1 presents a list of all siren and VANS acoustic locations and contains for each siren: unique identifier, siren type, sound output, and mounting height.

Each siren type is described in detail below.

1. Whelen Model WS-3000 Electronic Siren

Eighty (80) of the sirens installed for the Seabrook Station Public Alert and Notification System are very-high-power electronic sirens, Model WS-3000, manufactured by Whelen Engineering Company, Inc. Figure A-1 is a picture of the WS-3000 and Figure A-2 shows a typical installation.

Each WS-3000 siren is capable of functioning either as a siren or as a powerful public address device. In the public-address mode, voice messages received over radio are amplified and broadcast over the siren speakers. In the siren mode, the output of a tone-generator is amplified and broadcast over the siren speakers. A steady tone of 550 Hz is the alerting sound to be used by the WS-3000 in the event of an emergency at the Seabrook Station. Other signals can be used by

Power to operate the Dual WS-4000 siren system is provided by a 24-volt battery/battery charger system. The battery charger is powered by a gasoline-engine driven generator. At the staging areas, the batteries are kept fully charged by a trickle-charger powered by a 120-volt, single phase utility power source.

The entire Dual WS-4000 siren design is modular. The power amplifiers, tone-generator, radio receiver and decoder, silent test module and batteries, as well as the individual loudspeaker radial horns/drivers, are housed in easily replaceable modules to facilitate maintenance of the siren.

To ensure full 360 coverage by the siren, the speaker assembly is oscillated back and forth through an angle of about 360°. The siren rotates 360° in one direction, stops, rotates back to the same position, stops, and then rotates 360° in the other direction. This cycle is repeated 2-4 times per minute.

To ensure intelligibility of a voice message when the sirens are used in the public-address mode, the sirens are held stationary while the message is broadcast. The sirens are then rotated 45°, held stationary again, and the message is rebroadcast. Thus, the message is repeated eight times as the sirens are swept through 360°.

The control system for the Dual WS-4000 is discussed in Section E.6.2.1.b.

E.6.2.1.b <u>Remote Control of Sirens</u>

The fixed sirens for the State of New hamponire will be activated by radio from the Rockingham County Dispatch Center in Brentwood, NH.

The VANS for Massachusetts will be dispatched from their staging areas by the NHY Offsite Response EOC Contact at an ALERT or higher emergency classification. The VANS will be driven to their predetermined acoustic locations and the sirens will be placed in an operable position. Operable position will require leveling and stabilizing the vehicle with the outriggers and raising the siren to a deployed position.

The VANS sirens will be capable of receiving an actuation signal for remote tone operation while the vehicle is in transit. This signal will be stored in the siren control circuitry until the "siren raised" interlock is cleared. Conversely, if a VANS vehicle is deployed at its acoustic location and the "siren raised" interlock is cleared; then the siren is capable of remote actuation from the NHY Offsite Response EOC. This "siren raised" interlock prevents the siren from sounding until the siren is in a deployed position. The VANS operator can also manually activate the VANS siren when it is in the deployed position.

Once the VANS vehicles are operable at their acoustic locations, siren operation and actuation is equivalent to a pole-mounted siren.

The remote control system employed for the sirens in the New Hampshire section of the EPZ and the sirens on the VANS for Massachusetts uses a coded sequence of tones broadcast over separate radio frequencies. A dual-tone, multi-frequency (DTMF) encoding scheme is used. Each remote control system contains the encoder and radio transmitter used to generate and broadcast the DTMF codes. The electrical cabinet at each siren contains a radio receiver and decoding equipment. The control circuitry in each siren cabinet constantly "listens" for the DTMF codes, and activates the siren after it has determined that the siren has been properly addressed and a proper control code has been received. The internal control circuitry will automatically turn the siren off three minutes after activation.