THOMPSON COBURN LLP

Suite 600
1909 K Street, N.W.
Washington, D.C. 20006-1167
202-585-6900
FAX 202-585-6969
www.thompsoncoburn.com

February 26, 2010

J. Jeffrey Craven
202-585-6958
FAX 202-508-1018
jcraven@thompsoncoburn.com

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: WT Docket No. 09-176; ET Docket No. 05-345; WT Docket No. 08-166; WT Docket No. 08-167; and ET Docket No. 10-24
Notice of Ex Parte Communication

Dear Ms. Dortch:

In accordance with Sections 1.1206 of the Commission's Rules, 47 C.F.R. §§ 1.1206, at the invitation of Scot Stone, Deputy Director of the Wireless Telecommunication Bureau ("WTB") Mobility Division, the undersigned, along with Ellen C. Ginsberg, Vice President & General Counsel of the Nuclear Energy Institute ("NEI"), Brett Kilbourne, Associate Counsel of the Utilities Telecom Council ("UTC"), Jeffrey L. Sheldon (Counsel to Southern Company Service, Inc. (Plant Vogtle, Plant Hatch, and Plant Farley), Donald L. Herman, Jr., Counsel to Arizona Power Service Company (Palo Verde Nuclear Facility), Raymond A. Kowalski, Counsel to Dominion Resources Services, Inc., and Ameren Services Company, met yesterday with Mr. Stone, Monica Desai, of the WTB, Bruce Romano of the Office of Engineering and Technology ("OET"), Ira Keltz of the OET, Rodney Conway, of the WTB Mobility Division, and Paul d'Ari, of the WTB Spectrum & Competition Policy Division.

During the discussion, the undersigned presented to the FCC representatives the attached power point and the parties discussed the challenges associated with transitioning from using spectrum at 698 MHz-806 MHz by the June 12, 2010 deadline set in the January 15, 2010 Report and Order in WT Docket No. 08-167 , as well as the merits of the pending Petition for Waiver filed by NEI and UTC in WT Docket No. 09-176 through which NEI and UTC seek the right, on behalf of the 65 nuclear plant licensees that are their members, to obtain licenses under Part 90 in order to continue to use two-way wireless headset equipment for indoor communications requirements.

In addition, during the meeting, the representatives of the nuclear plants were asked to provide a time frame that would allow the nuclear plants to effect an orderly transition away from use of the 698 MHz- 868 MHz band. The representatives of the nuclear plants have determined that they can likely manage such a transition within 3 years of the final order on the grant of the NEI/UTC Petition for Waiver, or other granting mechanism, provided that the Part 90 licensing authority provided thereby addresses all of the issues presented in the Petition for Waiver as well as the power point. Such a period would allow the plants to manage issues such as (i) existing outage schedules (which can be 18-24 months away), (ii) equipment inventory/availability, (iii) planning and budget cycles, (iv) installation as well as testing, and (v) training on the new equipment, to the extent necessary. NEI, UTC and the other representatives of the nuclear plants are prepared to commence discussions immediately toward this end.

NEI, on behalf of the non-FCC parties listed above, is electronically filing this notice using the Commission's Electronic Filing System for inclusion in the dockets listed above.

Very truly yours,

Thompson Coburn LLP

By

J. Jeffrey Craven
Counsel to Nuclear Energy Institute

JJC/jjj

cc: Ellen C. Ginsberg
Brett Kilbourne
Jonathan L. Weiner
Jeffrey L. Sheldon
Donald L. Herman, Jr.
Raymond A. Kowalski
FCC Participants

BACKGROUND, CURRENT DATA & JUSTIFICATION FOR WAIVER OF FCC'S RULES TO ALLOW CONTINUED USE OF TELEX EQUIPMENT AT U.S. NUCLEAR POWER PLANTS

February, 2010

Overview

- Telex Equipment
- Regulatory Background
- Survey
  - Data
  - Alternatives Tested
  - Operational Conclusions
- Waiver of FCC Rules Requested for Indoor Only Use
- Requested Relief Meets FCC's Waiver Standard
- Limiting Plants to Telex Equipment that Operates Only Below 698 MHz Won't Work
- Part 15 Waiver Option, Provided in 700 MHz R&O, Does Not Go Far Enough
- Grant of NEI/UTC Waiver is Necessary

Telex Equipment

- Wireless intercom systems offer reliable, high-performance, fully duplex, hands-free communications
- Belt-packs come in sturdy (shock resistant die cast magnesium) casings and feature 12-14 hour battery life
- Roughly 1/3 of plants also use BTR 200, 300 operating at 150-174, 174-216 MHz
- Roughly 2/3 of plants use BTR 700, 800 operating at 470-608 MHz, 518-608 MHz, 614-740 MHz, 796-868 MHz
- Preliminary estimates are that 1/3 of the Telex units include channel groups with frequencies above 698 MHz
- Transmitter power: all programmed to operate at 50 mW, except the BTR 800 which can be controlled to keep it under 50 mW.
- Receiver distortion: <1% at full deviation.
- Telex Radio's signal travels, line-of sight, dissipates rapidly. Plant building wall is thick enough to keep radiation inside; also thick enough to keep Telex signal inside, and potentially interfering signals outside.
- More data available at www.telexradiocom.com

Regulatory Background

- April 2003 –April 2005: FCC approves use of Telex equipment at nuclear plants via Special Temporary Authorization ("STA") and FCC issues STA to Nuclear Energy Institute ("NEI") for use of Telex equipment at the nuclear plants.

- April 2007 -- NAB, MSTV, SBE, NEI and Utilities Telecom Council ("UTC") file an agreement (the "Consensus Plan") with FCC to allow nuclear plants to continue to use Telex equipment pursuant to FCC-granted experimental licenses.

- Summer 2007 – February 2008: FCC and NTIA approve experimental licenses for nuclear plants to continue to use Telex equipment; and Nuclear plants, NEI and UTC file reports with FCC confirming no alternative equipment is available to meet nuclear plants' communications and safety requirements presently served by Telex equipment

- Summer 2008 -- Nuclear plants, NEI and UTC sponsor survey of industry use of Telex equipment and alternative equipment, as well as engineering studies of certain alternative equipment, and submit as engineering studies of certain alternative equipment, and submit data to FCC's office of Engineering & Technology.

- Winter 2008/January 2009 – Nuclear plants apply for and receive 12 month renewals (until 2/17/2010) of their experimental licenses.

- Fall 2009 – NEI and UTC seek Waiver of Parts 2 and 90 of FCC Rules to permit plants to be licensed under Part 90, using Telex equipment, certified under Subpart H, Part 74, for indoor use.

- Winter 2009 – Plants file applications seeking renewal of their experimental licenses.

Survey Data

- Nuclear plants continue to rely on Telex equipment to carry on critical, operational and outage-related activities while effectively limiting worker occupational exposure to radiation
- 50% of the nuclear plants use Telex equipment only during refueling operations ("outages")
- 25% use it two to three times per month for maintenance; 10% use it weekly
- Most nuclear plants are using Telex BTR 200, 300, 700 and/or 800
- 2/3 of plants' Telex equipment inventory is BTR 700, 800 Series
- 1/3 of plants use both 200, 300 BTR Series and 700, 800 BTR Series
- Roughly 1/3 of plants Telex units (and in some cases over 50%) operates on frequencies above 698 MHz
- Telex advises that it has not sold units using frequencies over 698 MHz in the past 2 years and will no longer sell such units in the U.S.

Alternatives Tested

- Nuclear plant licensees have tested 29 different alternatives to the Telex equipment since 2003, including Kenwood Walkie Talkies; Cisco Wireless Phones; Vertex 600; Ascom Cell Phones; Ascom Wireless Phone Systems, Motorola MTS 200/2000, Panasonic, HME; Avaya Spectra-Link and SpectraLink PCS Phone System. A complete list of the 24 potential alternatives tested from 2003-2007 is attached as Exhibit A to this power point. Exhibit B provides a record of quotes from plant representatives regarding the short-comings and deficiencies of these "potential alternatives."

- Eleven nuclear plants have tested five (5) additional types of potential alternative equipment within the past two years:
  - Cobalt;
  - HME DX200;
  - Spectralink;
  - Eartec Communications Systems; and
  - ClearCom Communications' CellCom 10 Digital Wireless System.

- The alternatives tested each suffered from one or more of the following deficiencies:
  - Triggered unacceptable interference with other wireless devices essential to Nuclear plant operations (e.g., dosimeters) and wireless networks;
  - "Multi-path" interference resulting from a "reflected signal" from the containment building's domed ceiling subtracts signal strength rendering it too low/weak to receive.
  - Inadequate coverage/footprint;
  - Unacceptable voice quality; and
  - Insufficient capacity for multiple headsets in simultaneous use.

Unique Circumstances and Protection of Worker Health & Safety Merit an <u>Exception to 700 MHz Access</u>

- There are some 104 Nuclear Power Plants at 65 separate locations nationally, generating 20% of U.S. electricity. Attached as Exhibit C is a map showing the locations of all of the plants in the U.S.
- Nuclear plants, which emit zero greenhouse gas, are part of the Nation's Critical Infrastructure (47 CFR 90.7). Nuclear energy is increasingly recognized as a key part of the U.S. plan for energy independence.
- Nuclear industry workers continue to need fully functional communications equipment to perform indoor activities in "hot" areas during outages; for moving spent fuel indoors; and for indoor maintenance functions, including handling radioactive waste.
- Given their unique operating environment (e.g., four foot thick outer walls, containment building's domed ceiling; dosimeters, as well as numerous other wireless devices and equipment/systems, that must operate simultaneously, reliably and in very close proximity), nuclear plants present an ultra-challenging wireless communications environment.
- None of the alternative equipment tested demonstrated anything close to the same functional capability and plant worker health and safety protection, consistent with NRC's ALARA (as low as reasonably achievable) standard, as does the Telex equipment.
- For coverage, clarity, capacity and reliability, Telex equipment remains the best option for the nuclear industry's functional communications requirements, and for limiting worker exposure to radiation, as well as the promotion of safe plant operations.

Waiver of FCC Rules Requested

- NEI and UTC, on behalf of the commercial nuclear industry:
  - Seek a blanket waiver of the applicable FCC Rules in order to enable the nuclear plants to continue to use the Telex equipment in the VHF and the UHF band, (which includes 700 MHz spectrum bands) for **indoor operations only**.
  - Eligibility limited to those primarily engaged in the generation, transmission, or distribution of electrical energy for use by the general public, and use restricted to indoor locations at nuclear power plants.
- Nuclear plants' use of the Telex equipment meets both sets of FCC criteria for granting waivers as:
  - (i) the underlying purpose of the rule(s) would not be served by application to the instant case, and the grant of the waiver would be **in the public interest**; or
  - (ii) in view of the **unique factual circumstances**, application of the rule(s) would be inequitable, unduly burdensome and contrary to the public interest and the applicant has no reasonable alternative.

Requested Relief Meets FCC's Waiver Standard

- Underlying purpose of the Rules would not be served by its application in this limited instance, and grant is in the public interest:
  - This secondary, limited use won't interfere with other FCC licensees.
    - Indoor only use, at just 50 mW, on an intermittent basis, together with fortress-like construction of the plants and large fenced-in sites, make **virtually impossible interference with other FCC licensees**
    - **7 years of *indoor and outdoor use* with ZERO reports of interference demonstrates that the nuclear plants' use of Telex equipment does not interfere with any FCC licensees**
  - Safety and health of nuclear plant workers is advanced materially by use of the Telex equipment because it reduces the number of workers that must be exposed to radiation, as well as the duration of those exposures, consistent with NRC's ALARA requirements.
  - Use of the Telex equipment advances safe plant operations, by helping to avoid actuations.
- Unique factual circumstances compel grant of Waiver:
  - Protection of worker public health and safety requires use of communications equipment produced only by Telex
  - Plants have tested 29 potential alternatives; none compare with Telex equipment in mastering the challenging environment of nuclear buildings, and the promotion of safe plant operations as well as worker protection from radiation

Limiting Plants to Telex Equipment that Operates Only <u>Below 698 MHz Won't Work</u>

- Denying the plants the opportunity to use existing Telex equipment, all of which has been configured inside the plants and fully tested, would be an unnecessary hardship without corresponding benefit, especially given the 7 year record of non-interference (with both indoor and outdoor use).

- Preliminary estimates suggest that fully 1/3 (and in some case over 50%) of the plants' equipment would be lost if a "cap" of 698 MHz were applied.

- There is insufficient existing inventory at the plants to support outage and maintenance/repair functions, and meet NRC's ALARA requirements, without use of equipment operating above 698 MHz.

- Re-banding of the equipment (to cap at 698 MHz) is not possible due to radiation/contamination and there is not adequate time and likely inadequate inventory to allow timely replacement of equipment.

Part 15 Waiver in R&O Does <u>Not Go Far Enough</u>

- The Waiver of Part 15 granted in the R&O is only temporary pending final rules; this leaves uncertainty as to the plants' continued ability to operate the Telex headsets.
- Plants need operational certainty in their outage and radiation-related maintenance operations, requiring regulatory certainty.
- Part 15 Waiver option, or adoption of the Part 15 rules proposed in <u>FNPRM,</u> would effectively require plants to comply with the co-channel distance limitations of current Section 74.802 (b), which were intended to protect TV reception within a station's "Grade B" contour from highly mobile wireless microphones. (63 FCC 2d 535 (1977).
- No other broadcast or non-preapproved communications devices are allowed to operate inside plants.
- "Grade B" television signal countours range from about -62dBm to -45dBm depending on channel.

Part 15 Waiver in R&O Does Not Go Far Enough (cont.)

- Data we provided in this proceeding demonstrates that the signal levels of Telex headset, operating at 50 mW, and through free-space, would be far below the broadcast signal levels, (e.g. roughly -80 to -90 dBm) at only a few hundred feet from the headsets, and would be much lower with indoor only operations; thus there is no danger of interference to TV reception for households, even at the fringe of a TV station's Grade B service area.
- Section 74.802(b) allows operation of wireless microphones at closer distances to co-channel TV broadcast status "if authorized by FCC."
- Through this waiver request, NEI and UTC effectively seek such "closer distance" authorization due to the very low operating power of the Telex headsets (50mW), intermittent use of the equipment indoors only, and use that is confined to buildings on the property of a nuclear power plant that averages 400-1,400 acres, with double rings of security fence, generally separated by several thousand feet.
- Grant of the Waiver will allow the plants to use the Telex equipment to protect worker health and safety and advance safe plant operations, without any risk of interference to TV reception.

Exhibit A: Potential Alternatives Tested 2003-2007

- Comotronic Wireless Headsets (radio built-in)
- Kenwood Walkie-talkie (hand-held radio)
- Cisco Wireless Phone Model 7920
- Vertex 600
- Ascom Cell Phone
- Ascom Wireless Phone System w/Kenwood radios
- Vega
- Ericson
- Earmark
- Motorola MTS 200/2000
- Panasonic
- HME
- Peltor
- D. Clark
- Areeva
- Sound Powered Head Phones
- Avaya Specta-Link VoIP Phone System 802.11
- Site Telephone System
- Ascom Mini Cell Private Cell Systems
- Cattron Theimeg Portable Remote Control System 460 MHz
- Motorola 9250 900 MHz Trunked
- Nortel Companion Phones
- Corelar Wireless Phones
- SpectraLink PCS Phone System with 451 Motorola 2-Way Radios

EXHIBIT B

PLANTS REPORT PROBLEMS WITH POTENTIAL "EQUIPMENT ALTERNATIVES"

In surveys conducted during 2003-2007, plants report that they had tested 24 different types of communications equipment in US nuclear facilities for outage and maintenance work in areas where worker exposure to radiation is an issue. These potential equipment "alternatives" can be classified in six categories:

1. VoIP Systems, based on a 802.11 platform (2.4 GHz, non-spread spectrum);
2. Part 90 UHF/walkie-talkies (two-way radios);
3. Private Cell Phone Systems;
4. Wired Telephone Service;
5. 2.4 GHz spread spectrum products;
6. Wireless headsets.

Comments from nuclear plant operators and managers demonstrate that none of these "alternatives" can fully replace Telex as a means of achieving reliable, wireless, fully duplex communications necessary for key operating functions in the plants. Below are the quotes (minus the brand names which have been redacted in order to avoid any business tort exposure) from nuclear plant operators and managers in the responses to the surveys.

VoIP/2.4 GHz (non-spread spectrum):

- "Due to the RF propagation characteristics of the 2.4 GHz frequency spectrum, it is very difficult to achieve nearly ubiquitous RF coverage within containment that is required for predictable and reliable communications using VoIP equipment."

- "To achieve a coverage footprint within containment similar to Telex, a higher density of VoIP transceiver equipment would be required in high radiation areas, such as inside the bio-shield wall. This **would result in additional radiological dose exposure to employees** responsible for implementing the engineering design change for a new wireless communications system, installing the transceiver equipment at the beginning of each outage, and performing maintenance on cabling and/or transceivers in the event of a malfunction during the outage."

- "The VOIP wireless phone system, unlike Telex equipment, **is unable to automatically re-establish full-duplex communications** without any user action if a user were to momentarily leave and then subsequently re-enter the coverage area. If personnel using the VOIP wireless phone system lose communications due to a momentary loss of coverage, they must take manual actions to initiate a call and re-establish communications. This auto-reconnect functionality is vital for the safety of personnel working in high radiation area and other high risk work evolutions where they could be encumbered by protective clothing or equipment they must carry into and out of the work area. The inability to auto-reconnect in a high radiation area could result in additional and unanticipated radiological dose exposure."

- Problems with VoIP phones included the fact that "the equipment operates at 2.4 GHz and has **problems with multi-path. Requires the user to hold the phone while in operation**. Displays are hard to read in dim light. Noise canceling microphones were not used and background noise and interference was a problem. Battery time limited to about 4 hours of continuous talk time."

- "The VoIP phone was good but **would not stay on frequency**; antenna's broke very easily; not intended for construction use; no longer supported."

- "The number of VoIP phones usable in containment at one time in a given area may be somewhat limited."

- "Main problem is that these **phones drop calls** when losing signal or swapping between repeater antennas."

- Problems include: "possible **denial of access if cell is full** (each cell handles 8 calls at one time); possible call drop due to weak coverage; both denial of access and dropped calls require human intervention in-order to reestablish communications;

limited range in the turbine buildings, the diesel building, and the off gas building due to the lack of slotted coax for RF propagation in these areas."

Part 90 UHF/Walkie-Talkies:

- Negatives noted included "Push to Talk (PTT) radios require user to use one hand to initiate conversations; **Poor fidelity in noisy areas**; No bridging capability; 4 watt transmitter is a potential source of Radio Frequency Interference (RFT)."
- "Radios are hard to hear in noisy areas".
- "Hand held radios have output of **1 watt this output is strong enough to actuate sensitive equipment**. Example: Diesel driven cooling water pumps, when radio was keyed next to diesel it **caused overspeed of the diesel**."
- "Two-way radios can be used in restricted area but it has **dead spots inside the plant** and excessive background noise. This equipment essentially does not meet many of the Telex performance criteria."
- "This equipment could **cause workers to spend longer periods in high radiation areas** due to not being full-duplex. No central management of the frequencies or intercom groups. No way to patch auxiliary inputs into groups."
- 450 MHz UHF Trunkey Radio were ranked fairly high, but noted negatives include "**calls getting dropped** and lack of background noise rejection. The radio system is half duplex only."
- Problems include: "**there is no hands-free operation feature**, which requires the user to key microphone whenever they need to talk. It is a half-duplex system only and the base station only allows **one channel operation, which restricts interconnect of multiple systems**. High background noise reduces the clarity of communications. Sub-optimal coverage characteristics. The equipment is less durable than Telex headsets and were easily broken if dropped. Breakage of the antennas was common. **Size, weight and design of equipment prevented the use of personnel safety equipment** (hardhats could not be worn with the units)."
- "The two-way radio system is half-duplex only with a limit of only one person being able to talk at a time, which causes one talker to blank out all others. There is limited coverage within containment when communicating point-to-point using portable radios. The limited background noise rejection of the radio equipment reduces the clarity of communications in high noise areas."
- "Problem is multi-channel cross talk"

- "**Two-way radios are not full duplex**, therefore they can't integrate with vendor systems that are normally full duplex Telex type systems."

- **A trip (actuation) was attributed to activation of a 450 MHz radio many years ago, prior to the creation of radio exclusion zones.**"

- 450, 800,900 radio systems installed for site operations. Negatives noted: "not hands free; not duplex; poor audio quality; not easy to use, etc."

- "Equipment (walkie-talkies) is not dedicated and therefore any other radio operator can join the channel and disrupt communications."

Private Cell Phone Systems:

- Problems identified included: "Multi-user capability required - each user had a separate phone number assigned. Cell sites had **limited coverage capabilities** due to the design of the system, the operating system frequency and the design characteristics of the containment structure. Cell site loading resulted in dropped calls or in the inability to make calls. Multiple cell sites had to be installed to achieve minimal coverage resulting in increased radiological exposure to the workers installing the system in high radiation areas."

- "Restricted to use outside of high noise areas due to limited **background noise rejection capability**. Easily broken. Not simple to use since each phone had an assigned number and dynamic lists had to be maintained to track who was assigned a particular phone."

- "Could only talk to one user at a time. Phone was difficult to use while wearing protective clothing."

- "Equipment was packaged poorly and **did not stand up to the physical abuse** it was subjected to in the Containment environment. RF design was poor and channel frequency drift was common resulting in poor communications. Units were difficult to adjust because RF adjustments needed to be performed in a RF screen room which was not available on site. Frequent shipments of equipment were made to the vendor for simple RF adjustments. This system was abandoned and replaced by Telex."

- Problems with system: "**difficult to setup, balance and maintain** in Rx. Bldg due to placement of antennae system and to get the communication outside of the Rx Bldg. The durability of the headsets, antennas, etc is not as good as the TELEX

belt packs. The system does not integrate with our Audio Matrix. The system cannot be used where you depend on good, constant communications."

- "In high use areas, users may be denied access due to the limited number of concurrent users allowed to access a single antenna. The handsets **do not adapt to high noise conditions nor are they hands free**."
- "Limited range, static problems, **very complicated set up**. The system was used during a refueling outage in the 1990's and abandoned during the outage due to lack of functionality."
- Negative comments for "lack of high fidelity/clarity; multi-user; uninterrupted voice transmissions; moisture resistant and durability." Additional problems noted on these systems were "few frequencies available," and "**not programmable**."
- "There is some drop associated with our cell phones, and re-establishing communications is difficult when the phone is under protective clothing for bagged.
- The **time it takes to re-establish communications had a dose cost in High Radiation Areas**."

Wired Telephone Service:

- Uses hard-wired communications equipment, for which "the only drawback is it is not wireless."
- "Problem is a **hardwire system adversely impacts ALARA**. A hardwire system requires installation of approximately 1000 ft of cable for a typical routine outage to support eddy current and reactor coolant pump job coverage. Technicians incur dose during cable installation and un-installation."
- "A hard wire system **adversely impacts industrial safety**. Personnel must climb over and around equipment to install (and uninstall) the cable. Also, the cable creates a trip hazard when in use."

2.4 GHz Spread Spectrum:

- "The problem noted with the 2.4 GHz spread spectrum equipment is that it uses same frequency band as the wireless dosimetry, LAN and video equipment already in use at the plant. There are **concerns over interference between the different equipment in places where all of it must be operational (e.g. Refuel Floor)**."

- "**Telex's communication equipment does not interfere with existing wireless dosimetry equipment**, wireless LAN access points or wireless video used for refueling cameras. Telex actually allows for several channels to be in use simultaneously. Telex operates in a spectrum outside of the 2.4 GHz range where the other equipment operates. This prevents interference between the systems."

- "Due to construction of Nuclear power plant containment buildings (limited space with stainless steel liner), **signals tend to bounce and cause multi-path interference. Higher frequencies seem to be more susceptible**."

- "The radios are untested in an outage environment."

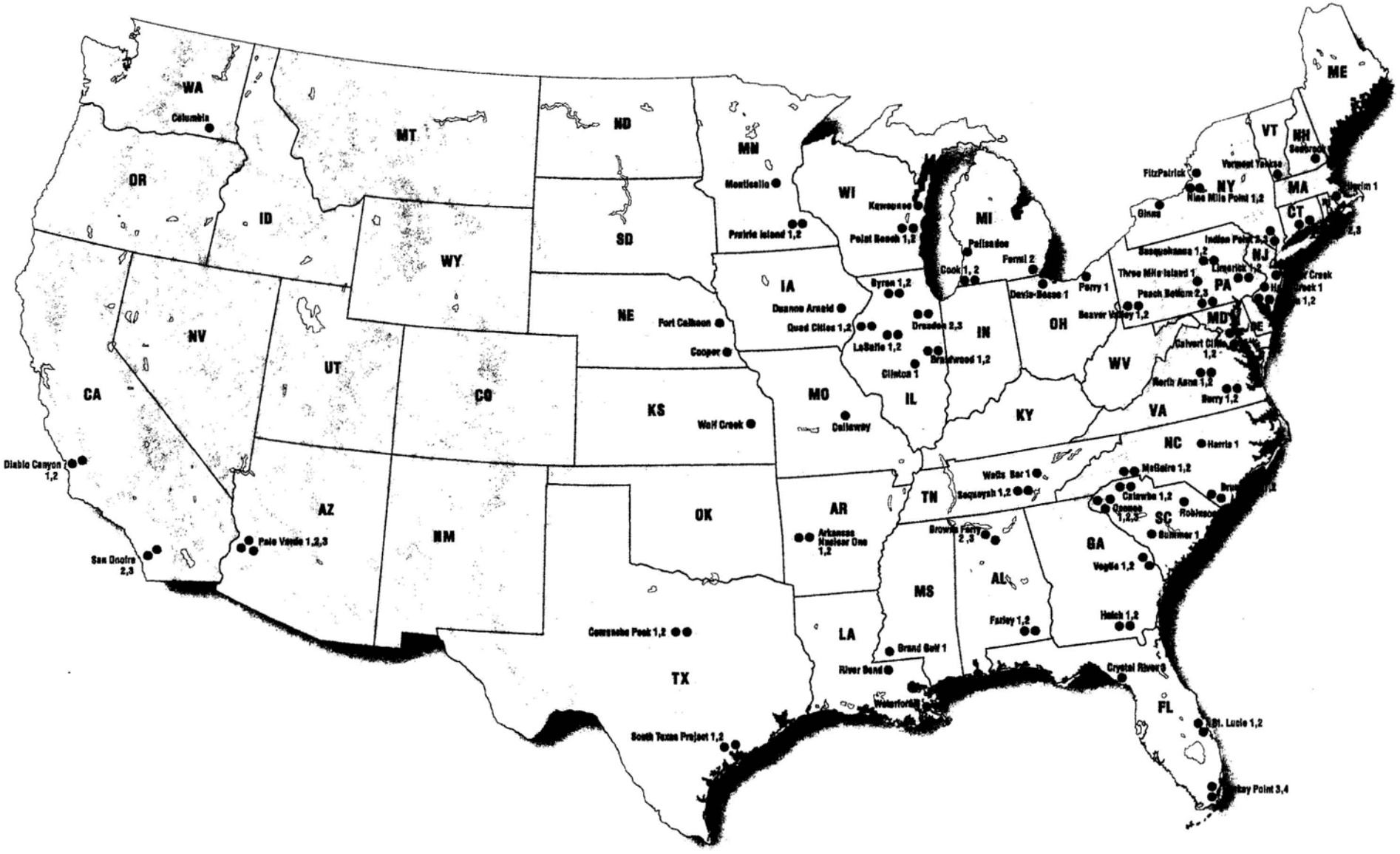
Wireless Headsets:

- Problems noted include "headset **limits mobility**; low audio volume - no volume adjustment; susceptible to background noise."

- Tested wireless headsets and found that "they were not durable. Also, **equipment was used for crane operations until the voice drop out (due to lack of full duplex) caused problems for the crane operator."**

Exhibit C: Map of Locations of U.S. Nuclear Plants

- (attached)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Point Beach 1,2
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Palisades
Fermi 2
Cook 1, 2
IA
Duanne Arnold
Quad Cities 1,2
Byron 1,2
Dresden 2,3
LaSalle 1,2
Braidwood 1,2
Clinton 1
IL
IN
OH
Perry 1
Davis-Besse 1
Beaver Valley 1,2
WV
KY
VA
NC
Harris 1
McGuire 1,2
Catawba 1,2
Oconee 1,2,3
SC
Robinson
Summer 1
GA
Vogtle 1,2
Hatch 1,2
Crystal River 3
FL
St. Lucie 1,2
Turkey Point 3,4
TN
Watts Bar 1
Sequoyah 1,2
AL
Farley 1,2
MS
Grand Gulf 1
LA
River Bend
Waterford
AR
Arkansas Nuclear One 1,2
MO
Callaway
KS
Wolf Creek
OK
TX
Comanche Peak 1,2
South Texas Project 1,2
NM
CO
UT
NV
CA
Diablo Canyon 1,2
San Onofre 2,3
AZ
Palo Verde 1,2,3
NY
Nine Mile Point 1,2
FitzPatrick
Ginna
Vermont Yankee
VT
NH
Seabrook
MA
Pilgrim 1
CT
Indian Point 2,3
NJ
Susquehanna 1,2
Limerick 1,2
Three Mile Island 1
PA
Peach Bottom 2,3
MD
Calvert Cliffs 1,2
North Anna 1,2
Surry 1,2
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ME