Exhibit B

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)
	)
NUCLEAR ENERGY INSTITUTE	)
and	)
UTILITIES TELECOM COUNCIL	)
	)
Request for Waiver to Permit	)
The Use of Two-Way Wireless Headsets and	)
Intercom Devices Inside Nuclear Power Plants –	)
Expedited Action Requested	)

To: Acting Chief, Wireless Telecommunications Bureau

PETITION FOR WAIVER
(Expedited Action Requested)

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Dated: September 23, 2009

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SUMMARY

The Nuclear Energy Institute ("NEI") and the Utilities Telecom Council ("UTC), on behalf of the nuclear energy industry, seek a waiver of Parts 2 and 90 of the FCC's Rules in order to permit commercial nuclear power plants to obtain licenses under Part 90 in order to continue to use certain intercom and headset equipment, certified for use under Subpart H of Part 74, for indoor communications (the "Two-Way Wireless Headsets"). This request is based upon the unique physical structure of nuclear plants, decades of experience regarding the communications needs within those structures, and the strict safety standards and regulatory requirements imposed on nuclear power plants by the Nuclear Regulatory Commission ("NRC").

Grant of the Waiver is in the public interest because, as detailed herein, the Two-Way Wireless Headsets continue to be the only communications equipment that possess all of the requisite performance features upon which the plants have come to rely to protect nuclear workers, consistent with Nuclear Regulatory Commission ("NRC") regulation limiting worker exposure to radiation, and to promote safe plant operations. Further, there has been no evidence that the plants' use of the Two-Way Wireless Headsets has caused *any* interference to other licensees during the past five (5) years, thus demonstrating that the underlying purpose of the rules would not be compromised by a grant of the relief requested. Further, a recent study confirmed that Two-Way Wireless Headsets, operating indoors at 50 to 100mW, will have no effective signal beyond 500 feet to 1,000 feet outside of the plant building. These facts dramatically reduce the potential for any interference to any other licensed users. Accordingly, strict application of the Commission's rules would indeed be inequitable, unduly burdensome and contrary to public interest.

None of these facts were "of record" when, in 2003, Telex Communications, Inc. ("Telex") sought a waiver that would allow its equipment to be used by the plants, which generally are Part 90

Business/Industrial eligible entities. As detailed herein, following five (5) years of industry surveys, manufacturer evaluations, and reports to the FCC, the record is clear: there is neither an equipment alternative nor a frequency choice that can as efficiently enable plant personnel to successfully fulfill their mission of protecting nuclear workers, thereby complying with the NRC rules, and also promoting safe plant operations.

Furthermore, because of the unique operational requirements associated with use of the Two-Way Wireless Headsets at nuclear power plants, waiver relief can be narrowly tailored such that it applies only to Power Licensees (defined pursuant to Section 90.7 of the FCC's Rules), operating on the frequencies currently used by the plants under their FCC experimental licenses, on specific plant property, and *inside plant buildings only*. Petitioners believe that these conditions, discussed in greater detail herein, will effectively limit the relief requested herein only to nuclear power plants, and will thereby ensure that the Two-Way Wireless Headsets are used in a manner that will pose no threat of interference to other licensed users.

Finally, grant of the requested relief also will remove the growing concern surrounding the plants' ongoing right to use the Two-Way Wireless Headsets, and will enable operators to plan their outage communications functions in advance, with regulatory certainty. Ample Commission precedent exists to support the grant of this waiver of the FCC Rules. Accordingly, as set forth more fully herein, good cause exists for grant of a waiver, in order to allow the nuclear plants to continue to use the Two-Way Wireless Headsets indoors for critical operations.

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To: Acting Chief, Wireless Telecommunications Bureau

PETITION FOR WAIVER

In accordance with the Commission's Rules,[1] the Nuclear Energy Institute ("NEI") and Utilities Telecom Council ("UTC") (collectively, the "Petitioners"), on behalf of Nuclear Regulatory Commission ("NRC")-licensed operators ("NRC licensees") of commercial nuclear power plants in the United States (the "plants"), hereby request expedited treatment of the waiver of Parts 2 and 90 of the FCC's Rules in order to be authorized to continue to use certain intercom and headset equipment, certified for use under Subpart H of Part 74, for indoor communications (the "Two-Way Wireless Headsets") (the "Waiver").[2]

Petitioners submit that good cause exists to grant the instant Waiver because the underlying purpose of the relevant rules would not be served by application to this situation and because there

[1] 47 C.F.R. §§ 1.3 and 1.925(b)(3).

[2] 47 C.F.R. Parts 2 and 90, and § 1.925(b)(4). Given the fact that the plants' current experimental licenses expire on February 19, 2010, Petitioners respectfully request that the Wireless Telecommunications Bureau accord this matter expedited treatment. Specifically, in order that the necessary plant outage and worker protection planning may be undertaken, Petitioners ask that the Bureau grant this Waiver no later than October 1, 2009.

are unique and unusual factual circumstances presented herein that demonstrate that Petitioners have no reasonable alternative to the Two-Way Wireless Headsets. Specifically, five (5) years of extensive research, equipment industry surveys and reports to the FCC have made it clear that there is neither an equipment nor frequency alternative currently available that would provide the level of communications capabilities delivered by the Two-Way Wireless Headsets. Also, as more fully described herein, the Two-Way Wireless Headsets contribute substantially to the reduction in plant workers' exposure to radiation, consistent with NRC regulations, and to safe plant operation.

Moreover, there have been no reported incidents of interference during the entire five (5) year period the plants have used the Two-Way Wireless Headsets, both indoors and outdoors. Finally, unique factors associated with the NRC licensees' use of the Two-Way Wireless Headsets allow for very narrowly tailored regulatory relief. Collectively, these unique and unusual factual circumstances fully justify Petitioners' request that the FCC grant the NRC licensees a waiver of Parts 2 and 90 of the FCC's Rules to enable continued use of the Two-Way Wireless Headsets.

I. Background on Petitioners

A. NEI is a not-for-profit 501(c)(6) corporation which is responsible for representing the commercial nuclear energy industry. NEI's members include all entities licensed by the NRC to operate the Nation's 104 nuclear plants, nuclear plant designers, major architectural and engineering firms, fuel fabrication facilities and other entities involved in various aspects of the nuclear energy industry. NEI is responsible for establishing broad, unified nuclear industry policy on generic matters affecting nuclear energy, including the regulatory aspects of operational and technical issues. NEI promotes the beneficial uses of nuclear energy and technologies in the United States and around the world, develops policy on key legislative and regulatory issues, and serves as a unified

industry voice before the U.S. Congress, Executive Branch agencies, federal regulators, and the courts.

B. UTC, also a non-profit corporation operating under Section 501(c)(6) has been the national representative on communications and information technology matters for the nation's electric, gas, water and steam utilities, and natural gas pipelines, since its formation in 1948. UTC's members provide public service and public safety-related services throughout the United States and its territories, as well as in Europe and elsewhere. UTC's approximately 600 core members range in size from large combination electric-gas-water utilities that serve millions of customers, to smaller, rural electric cooperatives and water districts that serve only a few thousand customers each. Among UTC's member companies are most of the owners and operators of the nuclear power generating facilities on whose behalf this Petition for Waiver is submitted.

II. Nuclear Power Is Critical To The Nation's Energy Supply

The supply of power in the United States is under strain. At times, supply in some areas can barely meet demand. The problem is likely to get worse before it gets better. Over the next ten years, the utility industry expects peak demand to increase by over 17%, while committed generating capacity is expected to increase by only 8.4%.[3] In a number of regions, capacity margins are expected to drop well below target levels.[4]

Against this backdrop, nuclear power plants are an exceedingly important source of power. There are currently 104 operating units at more than 60 nuclear sites in the United States. These

[3] See NERC, 2007 Long Term Reliability Assessment: The Reliability of Bulk Power Systems in North America 10 (Oct. 2007) (2007 NERC Assessment), available at http://www.nerc.com/~filez/rasre ports.html.

[4] Id. at 24.

plants generate approximately 20% of the nation's electricity[5] and therefore are included in the FCC's definition of the nation's critical infrastructure industries.[6] Along with coal and natural gas, nuclear energy is a foundational part of the nation's power supply.

Nuclear power is a particularly important source of generation because of its cost stability and output reliability. The supply and cost of nuclear power do not fluctuate significantly based on weather or climate conditions, fuel cost variability, or the vagaries of foreign suppliers. Nuclear plants are able to operate without interruption for extended periods, up to 24 months at a time. Because nuclear power can be so reliably generated, it helps supply the "baseload" of electricity that is required for the national electric power grid to function. Indeed, the stability of the grid depends on nuclear power.

Nuclear energy is also comparatively inexpensive. Nuclear plants are currently estimated to be the lowest-cost producers of baseload electricity.[7] The consistent availability of nuclear power at predictable prices also has a stabilizing effect on the electricity market as a whole.

Finally, nuclear power is increasingly cited as an important part of efforts to minimize adverse environmental impacts. The world faces serious threats from global climate change.[8] Many believe that climate change is caused in significant part by the emission of greenhouse gases, including carbon dioxide. Nuclear plants emit no such gases. For that reason, the United Nations Intergovernmental Panel on Climate Change, which recently shared the Nobel Peace Prize for its

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[5] See Comments of the Nuclear Energy Institute, Comment ID 316bEFR.020.002, at 407. The comments cited in this brief are available at http://www.epa.gov/waterseienee/316b/phase2/ comments/author-ph2.pdf. The page citations provided are to this compilation of the comments.

[6] See 47 C.F.R.§ 90.7, "*Critical Infrastructure Industries.*"

[7] See *Status and Outlook for Nuclear Energy in the United States* 3-4 (Aug. 2006), *available at* http://www.nei.org/resourcesandstats/documentlibrary/reliableandaffordableenergy/reports/statusreportoutlook/

[8] See Massachusetts v. EPA, 127 S. Ct. 1438,1455 (2007).

work on global warming, listed "nuclear energy" as a "key" technology for mitigating greenhouse gas emissions—a technology, importantly, that is "currently commercially available."[9]

Accordingly, because the nuclear energy industry contributes to meeting the Nation's power supply requirements, and also to mitigating greenhouse gas emissions, it is in the public interest to provide the necessary regulatory basis to enable safe and efficient operations.

III. Nuclear Plant Configuration and Radiation Management

Nuclear power plants are large industrial facilities located on sites ranging in size from approximately 400 to 1,400 acres. Many are located in remote areas, far from population centers, broadcast facilities, studios or television towers. The nuclear reactor containment buildings and other plant buildings are clustered inside a secure area which is itself encircled by a perimeter security fence. There may be as much as several thousand feet between the two fences, though the distances vary.[10]

Within each plant, the reactor containment area is constructed with four-foot to six-foot thick concrete walls, reinforced with steel. The connected buildings (e.g., turbine building, fuel handling building, emergency diesel generator building, auxiliary building) are structurally fortified and their interiors filled with large pipes, assorted water and other storage tanks, various large scale

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[9] See *Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report* 17 (Nov. 16, 2007 draft), *available at* http://www.ipcc.ch/; see *also Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 269 (Cambridge Univ. Press 2007), *available at* http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html ("Total life-cycle [greenhouse gas] emissions per unit of electricity produced from nuclear power are . . . similar to those for renewable energy sources. Nuclear power is therefore an effective [greenhouse gas] mitigation option, especially through license extensions of existing plants enabling investments in retro-fitting and upgrading." (citations omitted)).

[10] This is an important consideration, given the fact that the Two-Way Wireless Headsets, operating indoors at 50 mW, will produce no effective signal beyond 500 feet – 1000 feet outside the plant building. See March 3, 2005 letter from Special System Services (SSS) to the FCC regarding a test SSS conducted on behalf of Exelon Generation Company at the Limerick Nuclear Plant, in Limerick, PA, attached as Attachment A hereto. While acknowledging that attenuation data will vary plant-to-plant, this test is representative of the likely average attenuation of the Two-Way Wireless Headsets signal at an average plant. See also September 9, 2005 Declaration by T. Fred Short, Electrical Engineer, Consultant to Exelon confirming his March 3, 2005 letter and stating that "the signal strength of Telex Equipment, operated at 50 mW of output power inside a training center (e.g. a building with walls less thick than the plants' containment vessel) would be reduced to one-quarter of its non-obstructed path strength as it passes through the building wall, to the outdoors...no further than 500 feet outside of the building," included as part of Attachment A hereto.

pumps and heaters, hydraulic systems, generators, metal bridges, cranes and other heavy equipment necessary for electricity generation.

In order to appreciate the importance of the Two-Way Wireless Headsets to the nuclear energy industry, it is helpful to understand the unique role they play in limiting worker exposure and contributing to the plants' operational safety. The nuclear fission process inside a nuclear reactor creates radioactive material. Small amounts of this material leave the reactor and circulate through the plants' piping systems in the primary coolant. As a result, small metal particles in the primary coolant—from normal operation and wear of pumps, valves and pipes—also become radioactive. These particals are carried through piping systems and are deposited in, for example, pipes and valves, where they become possible sources of radiation exposure for plant workers.

Workers perform various maintenance and other tasks in "radiation areas," the definition of which is an area of the plant where an individual could receive a dose equivalent in excess of 0.005 rem (0.05 mSv) in one hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.[11] NRC regulations require that access to such areas be strictly controlled, and that workers be protected against ionizing radiation when in a radiation area.

One way the NRC and reactor licensees enhance worker safety is by ensuring doses are "as low as reasonably achievable," which is known by its acronym "ALARA." Specifically, the NRC's ALARA standard requires that plants make:

> "every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the benefits to the public health and safety, and other

[11] See 10 C.F.R. § 20.1003.

> societal and socioeconomic considerations, in relation to the utilization of nuclear energy and licensed materials in the public interest."[12]

Although NRC regulations limit nuclear worker radiation doses to no more than five (5) rem in any year,[13] ALARA drives NRC licensees to limit that exposure even further. During the 1990s, under the ALARA standards and associated practices, workers on average received less than 10% of the maximum annual radiation dose allowed by the NRC.[14] Most occupational doses are received during outages, when workers are engaged in refueling activities and performing maintenance work on equipment such as primary coolant system pipes, pumps and valves.

Through training, adoption of best practices, use of protective clothing and equipment (e.g., electronic personal dosimeters ("EPD") which are more fully described below), guidance by expert health physics personnel, and internal and external exposure testing, the ALARA principle is embodied in every aspect of each plant's radiation protection program and has resulted in lower worker dose.[15] As described in greater detail in Section III, the Two-Way Wireless Headsets have been a critical component of the carefully assembled suite of equipment (along with video cameras, local area network ("LAN") access points and EPDs) employed to enable health physics personnel to remotely monitor and communicate with workers in radiation areas throughout the plants, so that critical plant operations can be completed as quickly and efficiently as possible, thereby achieving the ALARA objectives.

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[12] 10 CFR § 20.1003 et seq.

[13] A rem is a measure of the amount of radiation dose that takes into account the potential effects on the human body.

[14] See http://www.nei.org.

[15] *Radiation Protection for Nuclear Power Plant Workers*, July 2000 at http://www.nei.org.

The simultaneous use by plant workers of both EPDs and the Two-Way Wireless Headsets is an excellent example of how specific equipment contributes to protecting workers' health and safety as well as promoting safe plant operations in the challenging environment of a nuclear plant. EPDs are wireless communications devices (worn on the chest between the shoulders and waist), usually operating on 2.4 GHz unlicensed frequencies, providing real-time radiation exposure data from plant workers via transmitters that send data to a central command center. EPDs do not interfere with other plant equipment because of the limited power of their transmitters and their operating frequencies, which are generally higher than those of other wireless devices operating within the plants. Since Two-Way Wireless Headsets operate on much lower frequencies (and thus with substantial separation from those of the EPDs), both pieces of equipment can operate simultaneously and in close proximity. This enables plant command centers to monitor EPD readings and to instruct workers instantly and clearly to reposition their bodies away from "hot" areas to the extent possible, thereby minimizing worker dose, consistent with the NRC's ALARA objective.

IV. Plants' Limited Use of Two-Way Wireless Headsets

A. Surveys Confirm Need for Two-Way Wireless Headsets.

In order to fully understand the extent to which the Two-Way Wireless Headsets contribute to the plants' ability to meet the NRC's ALARA standard, Petitioners undertook a comprehensive survey of their members to confirm the nature and context of the use of the Two-Way Wireless Headsets at the plants. Staff at virtually every plant surveyed noted the unique combination of performance features of the Two-Way Wireless Headsets as being extremely valuable to ensuring greater worker protection from exposure to radiation and safe plant operation. These features included: wireless operation; hands-free use; full-duplex communications among multiple users;

reliable signals, generally with no call drop; no background noise; no inadvertent actuation; uninterrupted voice transmission; ease of use; and durability ("Requisite Performance Features"). Also, numerous responses stressed the absolute necessity for wireless equipment, so that workers do not trip and equipment does not become tangled.

The Requisite Performance Features are most essential during an outage, which occurs every 18-24 months and generally lasts 37-40 days, during which one or more of the reactors at a given site are shut down. One of the main activities during an outage is the refueling of the nuclear reactor, accomplished by removing irradiated fuel ("used fuel"), replacing it with "fresh" or un-irradiated fuel and moving the used fuel to a fuel pool.

In addition, there are numerous other, critically important operations performed during outages with the assistance of the Two-Way Wireless Headsets, including turbine maintenance; overhauling various pumps, motors and valves; installing modifications; performing testing and inspections; cleaning and maintaining steam generators; and calibrating and repairing equipment (e.g., high pressure injection safety equipment) that cannot be accomplished while the plant is operating. In each of these major maintenance activities, remote communication among multiple workers is essential. Workers must work in confined spaces, often involving mobile equipment such as cranes, refueling bridges, and elevators. As noted in Section II, each of these tasks exposes plant workers to radiation. The goal, whether undertaken in the context of moving used fuel to storage facilities, or performing maintenance work on pipes, pumps and valves exposed to radiation, is to have the fewest workers involved in the efforts, for the shortest possible time. As more fully described below, the Requisite Performance Features, found uniquely in the Two-Way Wireless Headsets, contribute significantly to these objectives, and thus to plant compliance with the NRC's regulatory requirements.

Specifically, in the 2005 survey plant personnel reported that[16]:

- We need continuous communication between the workers and the control room and the Two-Way Wireless Headsets provide excellent hands-free operation, enables multi-user platforms, provides uninterrupted voice transmission and minimizes background noise;

- Radiological safety is enhanced with the ability to communicate with workers in the field while being able to view remote dose and dose rate information from a central monitoring station. The ability to communicate with the worker to reposition their body or to move to a different location saves personnel radiation exposure;

- The Two-Way Wireless Headsets employ design functionality and utilizes frequency spectrum that uniquely meets the essential performance criteria for plants by providing communications that are continuous, instantaneous, predictable and reliable; and

- Operator's Radiation Protection Unit has struggled with ineffective outage communications for many years and has investigated numerous systems and the Two-Way Wireless Headsets are superb in their ease of use, durability, coverage area, quality of communication and ease of set-up. No other system on the market can duplicate each of these assets of the Two-Way Wireless Headsets at this time.

(See Attachment B: a Summary of 2005 Survey Responses on Use of Two-Way Wireless Headsets and Deficiencies of Potential "Alternatives").

In 2008, after operating under the Commission's Special Temporary Authority and experimental licenses, Petitioners undertook a new study of the plants to evaluate any changes in communications technology practices, hoping to determine that one or more of the plants had found a suitable alternative to the Two-Way Wireless Headsets. Once again, the survey data was clear: although eleven (11) plants had tested five (5) new types of equipment (in addition to the 24 tested in 2005), none provided all of the Requisite Performance Features. Among the most consistent objections to the potential alternatives they tested were unacceptable voice quality,

[16] NEI obtained the responses from the plants with the understanding that the information would be treated confidentially. Accordingly, these quotes are not attributed to any specific plant.

coverage and capacity shortcomings, and interference with other wireless devices and networks which must operate simultaneously with the plants' communications equipment. Thus, the 2008 survey demonstrated that the plants continue to need the Two-Way Wireless Headsets for the most critical communications functions, especially those inside the plant buildings, in order to limit worker exposure to radiation and to maintain safe plant operations. (See Attachment C: a Summary of the 2008 Survey Responses on Use of the Two-Way Wireless Headsets and Deficiencies of Potential "Alternatives.").

B. The Two-Way Wireless Headsets Help Maintain Safe Plant Operation.

So much sensitive equipment must operate in such close quarters inside a nuclear plant that it is especially critical that NRC licensees have communications equipment that does not jeopardize safe and predictable plant operation. Indeed, a key objective for plant managers is to make sure that plant equipment does not trigger actuation of operating equipment. This can occur when critical equipment malfunctions due to spurious radio frequency interference ("RFI"), which can jeopardize safe plant operation. To further illustrate how important this is, and the extent to which NRC licensees go in order to avoid actuations, every plant has established a series of "radio-free zones" around the most sensitive equipment to prevent any radios from actuating that equipment.

In the two surveys, plant staff identified specific incidents of plant equipment actuating and clearly articulated the importance of having all of the Requisite Performance Features available in order to avoid such actuations. Specifically[17]:

- The "push-to-talk" function of a hand held radio (1 watt, walkie-talkie type), employed next to a diesel driven pump, caused the pump to over-speed and shut down.

[17] Id.

- Use of a trunked radio system "tripped" the central air compressor in the Service Air System, rendering it non-operational.

- Use of a 450 MHz radio caused the shutdown of several of a plant's critical monitoring systems.

- RFI adversely affected electrical switch gear and relays, including an incident where an emergency diesel generator was actuated by RFI, jeopardizing plant operations.

- Use of an 800 MHz handheld radio triggered a shutdown of a plant's chlorine transfer system.

C. Plants Use the Two-Way Wireless Headsets in Limited Contexts.

The survey responses, taken together, suggest that one-half of the plants use their Two-Way Wireless Headsets only during outages. However, during outages (which, as noted in Section III.A, occur every 18 to 24 months and last 37 to 40 days), use is generally 24/7. Those NRC licensees that also use their Two-Way Wireless Headsets for non-outage purposes report that they do so an average of five or six times per month, usually for limited periods of the day. The vast majority of plants use the Two-Way Wireless Headsets extensively within the reactor buildings. Only about one-quarter of the plants currently use the Two-Way Wireless Headsets outside. Petitioners emphasize that the relief requested herein is limited to indoor use only, and that plants seeking to use Two-Way Wireless Headsets outside will need to independently request an additional waiver based on their unique situations.

Thus, the plants rely on the Requisite Performance Features found in the Two-Way Wireless Headsets for numerous critical communications functions during several procedures, from moving used fuel to testing, calibrating, maintaining, repairing or replacing equipment during an outage. While use is heaviest during the outage periods, some ongoing operations and maintenance work on "hot spots" also require Two-Way Wireless Headsets to minimize worker radiation exposure and thus comply with the ALARA standards. However, even during the periods of maximum use, as

noted herein, the industry now has a five- (5) year record of no interference by plant users of the Two-Way Wireless Headsets (including both indoor and outdoor use) to other licensees' transmissions.

V. Petitioners' Efforts to Identify Equipment Available for Licensing Pursuant to FCC Regulations

Since 2003, the FCC has authorized use of Two-Way Wireless Headsets at nuclear plants, first via Special Temporary Authorizations ("STAs")[18] and currently under experimental licenses.[19] In this context, in addition to the two (2) industry surveys and numerous solicitations of equipment manufacturers noted above, NEI undertook a series of meetings with representatives of the FCC's Office of Engineering and Technology, the Mass Media and Wireless Telecommunications Bureaus, the Chairman's Office, and the Public Safety and Homeland Security Bureau. These discussions examined the unique circumstances associated with the nuclear plants' communications requirements and the mitigating factors associated with their use of the Two-Way Wireless Headsets. The mitigating factors include: (i) use in steel fortified, thick-walled concrete buildings, operating on large, often remote sites; (ii) transmitting at extremely low power – almost always 50-100 mW; (iii) signals attenuating to -110 to -114dBm as they pass through the walls of the plant buildings, resulting in no effective signal beyond 500 feet to 1,000 feet outside the plant building;[20] and (iv) a record of not causing any interference with other licensee's transmissions over the past five (5) years, during which the Two-Way Wireless Headsets were used for both indoor and outdoor operations.

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[18] See 0135-EX-ST-2003, granted April 7, 2003; see also, 0169-EX-ST-2004, granted April 7, 2004; see also, 0547-EX-ST-2004, granted October 7, 2004.

[19] See 0127-EX-ST-2005, granted April 7, 2005; attached as Exhibit B. See also 0254-EX-RR-2008, 0249-EX-RR-2008, 0251-EX-RR-2008, 0262-EX-RR-2008, 0250-EX-RR-2008, 0261-EX-RR-2008, 0219-EX-RR-2008, 0215-EX-RR-2008, 0495-EX-PL-2008, 0499-EX-PL-2008, 0239-EX-RR-2008, 0238-EX-RR-2008, 0252-EX-RR-2008, 0253-EX-RR-2008, 0218-EX-RR-2008, 0257-EX-RR-2008, 0258-EX-RR-2008, 0259-EX-RR-2008, 0260-EX-RR-2008, 0246-EX-RR-2008, 0494-EX-PL-2008, 0216-EX-RR-2008, 0248-EX-RR-2008, 0226-EX-RR-2008, 0241-EX-RR-2008, 0221-EX-RR-2008, 0221-EX-RR-2008, 0227-EX-RR-2008, 0244-EX-RR-2008, 0222-EX-RR-2008, 0223-EX-RR-2008, 0224-EX-RR-2008, 0217-EX-RR-2008, and 0242-EX-RR-2008.

[20] See n 10, supra.

As noted herein, since 2004, Petitioners and the plants have actively sought equipment options and have tested 29 potential alternatives. Every one has one or more material shortcomings, including multi-path interference; insufficient voice quality; inadequate capacity for multiple headsets in simultaneous use; and interference with the other wireless equipment (e.g., EPDs that measure worker radiation exposure); and inadequate coverage. None offered all of the Requisite Performance Features upon which the plants have come to rely.

All of this data has been submitted to the FCC during the course of the STA filings, the experimental license applications, and the reporting requirements associated with the experimental licenses under the Consensus Plan entered into with the Broadcast Industry (NAB, MSTV and SBE) in April 2007 (See ET Docket No. 05-345). Summaries of the 2005 and 2008 surveys of the plants' use of the Two-Way Wireless Headsets and their experience in testing 29 potential alternatives have been presented to various FCC Bureaus and are attached hereto as Attachment B and Attachment C, respectively.

Further, UTC has reached out to numerous equipment manufacturer members, large and small, some of whom initially thought that they could fairly easily adapt other equipment to the plants' needs. Ultimately these manufacturers determined that they did not have a ready solution and that they could not justify the research and development investment necessary to develop a solution. Petitioners do not expect this situation to change in the foreseeable future, further necessitating this Petition for Waiver.

Although in 2004 the FCC rejected the Telex waiver request, which sought similar relief to that requested herein, Telex failed to provided any proof that (i) there were no Part 90 frequencies, or Part 90 equipment, available that could provide the Requisite Performance Features; and (ii) Telex could not adapt the Part 74 equipment, or develop new equipment, to provide the required

communications over Part 90 frequencies.[21] The Commission's Order also stated that for several reasons, any such FCC regulatory relief should be granted directly to the NRC licensees, not to the equipment manufacturer.

Over the past five (5) years, Petitioners have developed a record that demonstrates that there is no currently available equipment from either Telex or any other manufacturer that is designed to operate on Part 90 frequencies and that offers all of the Requisite Performance Functions. [22]Further, as recommended in the FCC's 2004 Order, Petitioners ask that the waivers requested herein, as well as licenses under Part 90, be issued directly to the plants, consistent with the manner in which the FCC has issued the experimental licenses. A listing of the nuclear plants in the U.S. is attached as Attachment D.

Now, having demonstrated beyond any doubt the plants' continued need for the Two-Way Wireless Headsets, and that there are neither equipment nor frequency alternatives, Petitioners urge that it is both a practical and appropriate regulatory solution for the FCC to grant waivers to these NRC licensees so that they, as Part 90 eligibles, may continue to use the Two-Way Wireless Headsets for indoor operations.

VI. The FCC's Waiver Standards

The FCC may grant a Waiver if one of two standards is met: "1) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a

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[21] See Telex Communications, Inc., Order, 19 FCC Rcd 23169, 23171 (WTB PSCID 2004) ("Order").

[22] Telex has advised Petitioners that two models of its headsets were certificated by the FCC to operate on Part 90 frequencies as well as Part 74 frequencies. The BTR-200/TR-200 could operate on Part 90 and Part 74 frequencies but this model was discontinued and was replaced by the BTR-300/TR-300. Both of those models could operate on only a few Part 90 frequencies, thereby limiting operation on Part 90 frequencies to a maximum of 2 base stations and 8 belt packs at a given site. Moreover, because of a recent reallocation of Part 90 frequencies to Part 95, the BTR-300/TR-300 can now support only 1 base station and 4 belt packs if operated exclusively on Part 90 frequencies. Because the typical plant requires about 10 base stations and 50 belt packs during a refueling operation, these models generally would not meet the plants' Requisite Performance Functions if operated only on Part 90 frequencies.

grant of the requested Waiver would be in the public interest; or 2) in view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome or contrary to the public interest, or the applicant has no reasonable alternative."[23] The FCC may also use the general waiver "good cause" analysis.[24] For the reasons set out below, Petitioners maintain that a waiver is fully justified and that use of the Two-Way Wireless Headsets by plant personnel meets both of the Commission's waiver standards.

A. Granting Petitioners' Waiver is in the Public Interest Because the Underlying Purpose of FCC Parts 2 and 90 Would Not Be Served and Would Otherwise Be Frustrated By Application to the Nuclear Energy Industry.

Although nuclear power plants are eligible licensees under Part 90 of the FCC Rules, continued use by the plants of the Two-Way Wireless Headsets will require waivers of Parts 2 and 90. The underlying purpose of the Rules would not be served by limiting plants to use of frequencies normally available for licensing under Part 90. As demonstrated herein, use of the Two-Way Wireless Headsets serves an overriding public interest in reducing nuclear worker exposure and maintaining safe plant operations, and is the only acceptable communications choice for these purposes.

Neither the Petitioners nor any of the plants have received, or are aware of, any claims by other licensees that the plants' use of the Two-Way Wireless Headsets is causing, or has ever caused, any interference.[25] Since other licensees have not experienced interference, and since the minimal

[23] 47 C.F.R. § 1.925(b)(3)(i)-(ii).

[24] 47 C.F.R. § 1.3.

[25] It should be noted that, under the Consensus Plan entered into with the Broadcast Industry in 2007, the plants have been subject to a duty of frequency coordination. However, the Consensus Plan only required such coordination for ***outdoor*** use of the Two-Way Wireless Headsets, recognizing that indoor use at nuclear plants presents essentially no threat of interference. Because only indoor use is addressed herein, consistent with the Consensus Plan, such a coordination condition is not specified. If and to the extent plants may seek individual waivers for outdoor use, the Petitioners recognize that, if permitted, coordination conditions comparable to those specified in the Consensus Plan might be required. Petitioners note that, to the best of their knowledge, no threat of interference, even as with respect to outdoor use, arose in the coordination of such operations. In any event, to the best of Petitioners' knowledge, there have not been any reported incidents of interference from these operations, whether indoor or outdoor.

potential for any future interference can be addressed by limiting use to indoor locations at the plants and by capping power levels, the underlying purpose of the frequency allocation rules is not served by strict enforcement in this case.

B. Unique Circumstances Compel a Grant of the Waiver.

There are numerous unique circumstances associated with Petitioners' request for a Waiver, each of which favors a grant of the requested relief; all of which fully justify such a result. First, as noted above, many plants operate in rural areas away from population centers, on sites of approximately 400-1,400 acres. Second, under a waiver, all future use of the Two-Way Wireless Headsets would occur within a building, typically within the containment comprised of four-foot to six-foot thick concrete and steel-reinforced walls designed to withstand earthquakes, tornadoes and other disasters. Third, most plants operate the Two-Way Wireless Headsets at 50 to 100 mW, meaning that there is no effective signal beyond 500 feet – 1000 feet outside the plant building.[26] Fourth, according to all of the information Petitioners have gathered, including discussions with FCC staff, there has never been a report that use of the Two-Way Wireless Headsets by a plant caused any interference to another licensed user. Petitioners contend that these unique circumstances make replication in another context extremely unlikely, further justifying grant of the requested relief.

C. Good Cause For Grant Exists; Strict Application of the Parts 2 and 90 Rules in this Limited Case Would be Contrary to the Public Interest.

Good cause exists for the grant of the Waiver. By using the Two-Way Wireless Headsets, plant operators reduce workers' exposure to radiation during outage operations, as well as during routine maintenance operations that must be conducted while the plant is on-line. If the plants were

[26] See n 10, supra.

required to discontinue use of the Two-Way Wireless Headsets as of February 19, 2010 (when the current experimental licenses expire), reducing radiation exposure to workers will be more challenging and the potential for incidents adversely affecting plant safety will be increased. It is easy to envision, for example, that if plants were forced to replace the Two-Way Wireless Headsets with a device that did not allow for a sufficient quantity of reliable, hands-free, full-duplex communications capabilities, vital communications in and around the plant would take longer, and require more workers to perform tasks involving radiation exposure. If the plants were forced to turn to a technology that caused results as significant as spurious actuation, interference or equipment desensitization, these communication breakdowns could result in more safety-significant operational events and even unscheduled partial (or complete) plant shut-downs. Accordingly, strict application of the Parts 2 and 90 Rules would be counter to the regulatory scheme for workers and plant safety established by the NRC, the federal agency responsible for protecting public health and safety through oversight of nuclear power plants.

D. The Nuclear Power Industry's Communications Needs Are Not Met By Any Other Available Communications Equipment.

As noted above on several occasions, Petitioners also sought input from plant operators regarding other available communication technologies that could serve as an alternative to the Two-Way Wireless Headsets. Based on the responses from the plants, and based on UTC's knowledge of the plants' communications needs and the equipment available on the market today, Petitioners have concluded that there is no alternative equipment available that would provide all of the Requisite Performance Features needed by the NRC licensees.

As noted in Section III hereof, there are material shortcomings to each of the potential alternatives, including the interference with other wireless devices caused by unlicensed 2.4 GHz equipment; the poor voice quality and unreliability of Part 90 UHF equipment; and the lack of

multi-user functionality of commercial cell phone systems. Respondents also noted that wired solutions can result in additional dosages of radiation during wired cable installation and removal. Thus, none of the tested alternatives have all of the Requisite Performance Features.

The Two-Way Wireless Headsets are uniquely capable of overcoming the deficiencies found in the other equipment, principally because they operate on frequencies far from the spectrum employed for numerous other wireless devices that must be used in the plant, often simultaneously and in close proximity. Obviously, however, the same fact triggers the need for this Petition, given that the Two-Way Wireless Headsets are not designed to operate on Part 90 frequencies for which the plants are eligible. Petitioners believe that the best solution is to make this limited use, under restricted conditions, under the plants' general Part 90 eligibility, as requested herein.

In addition, the planning and implementation of nuclear fuel outages is complicated enough without the ongoing regulatory uncertainty of whether plants will have access to the Two-Way Wireless Headsets when needed. The plants seek regulatory stability through this Petition, which will enable them to plan outages and ensure appropriate radiation protection for workers carrying out maintenance operations.

E. Case Precedent Supports Petitioners' Waiver.

Recent Commission decisions support Petitioners' request for a Waiver. In Dominion Virginia Power,[27] the Wireless Telecommunications Bureau granted Dominion's request for a Waiver of the Commission's rules to allow Dominion to use frequencies allocated to the Part 90 Public Safety Pool, for which Dominion was not eligible to be licensed.[28] The Commission found Dominion's waiver request compelling, noting that the utility "will use the proposed frequencies at

[27] Dominion Virginia Power, Order, 19 FCC Rcd 12254 (2004).

[28] Id. at 12255.

two of its nuclear power plants to provide critical infrastructure communications."[29] The Commission also concluded that Dominion had demonstrated that "there are no reasonable alternatives within the existing rules to accommodate the described needs,"[30] by showing that "alternative communications are not feasible . . . particularly given the sensitive nature of the nuclear facilities it operates."[31] Like Dominion, the nuclear power plants have demonstrated that they have no reasonable alternative to achieve the critical infrastructure communication that is not only desirable, but required, by the NRC's regulatory regime.

In 2004, the Bureau granted a similar request from a nuclear facility, Entergy Nuclear Indian Point,[32] to access the Public Safety Pool for a land mobile system, finding that Entergy's use of requested frequencies would not interfere with incumbent users because of limited signal propagation, low (10 watts) Effective Radiated Power (ERP) and height of no more than 12 meters above ground. A key factor that led to the Commission's grant of Entergy's waiver request was that it "will not frustrate the underlying purpose" of the relevant Rule Section, which is to "ensure adequate spectrum for public safety activities, and to avoid interference to such communications from incompatible users."[33] This is precisely the case with the instant Petition: even lower ERP and resulting signal propagation, a demonstrated history of no interference to other users, as well as confined use to ensure continued non-interference.

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[29] Id.

[30] Id. at 12256.

[31] Id.

[32] See Entergy Nuclear Indian Point 2, LLC, at 21259.

[33] Id. at 3. See also, New York Stock Exchange Inc., Order, 19 FCC Rcd 2602, 2604 (2004), (Commission waived the eligibility criteria "in light of the absence of any interference to any other user from NYSE's proposed use of the public safety frequencies . . . ").

In addition, the FCC has previously recognized the extent to which the nuclear power plants' unique and critical communications needs affect the "safety of life; health and property" by including the plants in the definition of entities that are included within the "public safety radio services" definition and therefore, exempt from having to obtain spectrum via FCC auction.[34]

Moreover, and in support of this Petition, Petitioners note that, in 1995, the Commission conditionally waived the Part 2 and 90 rules to allow New York City area public safety agencies to use television Channel 16 for a minimum of five years, after determining that such arrangement "could be concluded without affecting the existing television operations . . . .[35] Nearly ten years later, in 2004, the Commission acknowledged that "Channel 16 has successfully coexisted with television operations"[36] and that "the public interest would be served by changing the temporary authorization to a permanent allocation."[37]

Petitioners seek neither a temporary authorization of frequency nor a permanent frequency reallocation; rather, Petitioners seek only a waiver of the Part 90 licensing rules so that the Two-Way Wireless Headsets may be used by operators of nuclear power plants, eligible for licensing under Part 90. Petitioners believe that this modest accommodation is well within the bounds of recent Commission action to address eligibility challenges in the context of demonstrable public interest. The fact that nuclear power plants are among the Nation's most critical infrastructure entities, for

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[34] See Implementation of Sections 309(j) of the Communications Act of 1934, as Amended, Report and Order and Further Notice of Proposed Rulemaking, 15 FCC Rcd 22709 (2000) (interpreting Section 309(j)(2) of the Telecommunications Act).

[35] See Waiver of Parts 2 and 90 of the Commission's Rules to Permit New York Metropolitan Area Public Safety Agencies to Use Frequencies at 482-488 MHz on a Conditional Basis, 10 FCC Rcd 4466 (1995).

[36] Amendment of Parts 2, 73, 74 and 90 of the Commission's Rules to Permit New York City Metropolitan Area Public Safety Agencies to Use Frequencies at 482-488 MHz, Report and Order, 19 FCC Rcd 6719, 6728 (2004).

[37] Id.

which the FCC is tasked with ensuring access to effective and efficient communications technologies and services, makes this request even more compelling.

F. Waiver Relief Can Be Narrowly Tailored.

Because of the unique operational requirements associated with use of the Two-Way Wireless Headsets at nuclear power plants, waiver relief can be narrowly tailored. Specifically, Petitioners request that the allocation and licensing provisions of Parts 2 and 90 of the FCC's Rules be waived to permit "Power Licensees," as defined in Section 90.7 of the FCC's Rules,[38] to obtain licenses under Part 90 for Two-Way Wireless Headsets operating in the frequency bands 174.00-216.00MHz; 470.00-608.00MHz; and 614.00-806.00MHz,, subject to the following conditions:

1. Licensing under this blanket waiver will be limited to Power Licensees that own or operate nuclear power plants, or that provide a supporting service to a nuclear plant owned or operated by the licensee's parent corporation, another subsidiary of the same parent, or the licensee's own subsidiary.[39]
2. The use of the Two-Way Wireless Headsets will be restricted to indoor locations at the nuclear power plants.
3. A license for mobile operation may specify use within a radius of a set of geographic coordinates on the plant property.

[38] "Power Licensees" include persons primarily engaged in "(1) the generation, transmission, or distribution of electrical energy for use by the general public or by the members of a cooperative organization," as well as persons engaged in "(4) The providing of a supporting service by a corporation directly related to activities of its parent corporation, or another subsidiary of the same parent, or of its own subsidiary, where the party served is regularly engaged in any of the activities set forth in this definition."

[39] The Petitioners suggest that upon grant of the blanket waiver requested herein, each Power Licensee would submit its own application for licensing, under Part 90, of the Two-Way Wireless Headsets used at the relevant nuclear power plant(s). Each application will include all relevant technical information, including the specific frequencies to be used at each plant so that other licensees in these bands will be able to identify specific frequencies in operation at the plants through a routine search of the FCC's Universal Licensing System (ULS). Although each application would indicate that a waiver was being requested, the waiver request could simply make reference to the FCC's grant of a blanket waiver for such licensing, thereby allowing routine processing by the FCC's licensing staff. Although Petitioners are requesting a general waiver of Part 90, they note that certain provisions of Part 90 should be deemed inapplicable in any event; for example, Section 90.35(b) on the frequencies normally available to Industrial/Business licensees; Section 90.175 on frequency coordination in the Part 90 radio services; Section 90.203 on certification of transmitters to be used under Part 90; and Section 90.425 on station identification.

4. The Two-Way Wireless Headset transmitting equipment must be of a type which has been certificated for operation as a low power auxiliary station under Subpart H of FCC Rule Part 74.[40]

Petitioners believe that these conditions will effectively limit the relief requested herein to the nuclear power plants, and will thereby ensure that this equipment is used in a manner that will pose no threat of interference to other licensed users.

[40] 47 C.F.R. § 74.801 *et seq.*

For the foregoing reasons, Petitioners request a Waiver of Parts 2 and 90 of the Commission's Rules to permit Power Licensees to continue to operate the Two-Way Wireless Headsets on nuclear plant sites for indoor operations as proposed herein.

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Dated: September 23, 2009

ATTACHMENT A

SPECIAL
SYSTEM
SERVICES

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Lower Gwynedd, PA
19002

Office (215) 699-4427
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March 3, 2005

Federal Communications Commission
Wireless Telecommunications Bureau
1270 Fairfield Road
Gettysburg, PA 17325

To Whom It May Concern:

On March 02, 2005 the Exelon Generation Company conducted tests on the Telex model BTR-700 (Base unit) and the TR-700 (Head set unit) at the Limerick Nuclear plant in Limerick, PA. The purpose of the testing was to identify the range of the units and to verify the proximity of the plant parimeter to any possible entity that may be subject to interference.

The units operate at a maximum of 50 mw of output power. The base unit was set up outside on a table, free of obstructions, on the Limerick Nuclear plant property. A Hewlett Packerd Spectrum analyzer was set up in a van with a magnetic mount antenna on the roof (about 6 feet above the ground). We first tested the base unit at intervals of 0.1 miles until signal was lost. We then repeated the test with the headset. This time the Spectrum analyzer was placed on the table with the base and the headset signal strength was measured as we drove away. The head set antennas were placed on the outside of the van window, toward the test location. There were no obstructions between the base and the van during the testing.

Test results:

Distance		Frequency 522.3 MHz Base Signal strength		Frequency 632.7 MHz Headset Signal strength	
(ft.)	(meters)	(dBm)	(uv/m)	(dBm)	(uv/m)
10	3.048	-40	2236.067	-50	707.106
528	160.9	-80	22.36	-90	7.071
1056	321.9	-100	2.236	-100	2.236
1584	482.8	-105	1.2571	-108	0.89
2112	643.7	-110	0.707	-114	0.446

Conclusion :

The signal strength from the base and headset decreases to the noise level of between -110 and –114 dBm where communications is lost between units. This occurs at a distance of about 2000 feet. No homes or businesses are located within a 2000 foot parimeter of the plant property boundry. Any communications within the plant or even within the plant boundry would not produce a signal strength which could be heard outside the plant property. Tests within the plant were cancelled because every building would further attenuate the signal by between 10 and 20 dBm and we loose signal from the parimeter test position before we reach the plant buildings.

The full duplex headsets are essential to the safety and support of the plant activities and none of the operations has been the subject of interference complaints.

Respectfully,

T. Fred Short, Electrical Engineer and Consultant for Exelon

DECLARATION

I, T. Fred Short, am an Electrical Engineer at Special System Services ("SSS"), 1 Wayne Circle, Lower Gwynedd, PA 19002. SSS serves as a Consultant for Exelon, a nuclear plant owner that utilizes Telex equipment for certain communications needs. I hereby declare the following to be true under the penalty of perjury.

1. I am the author of the SSS letter dated March 3, 2005 (the "Letter") which the Nuclear Energy Institute submitted to the FCC as part of its request for waiver, in which I described the real-world testing of Telex equipment's signal strength when operated at and around nuclear plant buildings.

2. As a consequence of the testing described in the Letter, I am familiar with both the signal strength and the attenuation characteristics of the Telex equipment, in the context of a nuclear plant.

3. I am also familiar with the types of buildings that generally house training centers used by nuclear plants. Inside these training centers are the simulators that are used to train plant staff on the use of equipment, including the Telex equipment.

4. Based upon my knowledge and expertise, including the information obtained during the testing described in the Letter, the signal strength of Telex equipment, operated at 50 mw of output power inside a plant training center, would be reduced to one-quarter of its non-obstructed path strength as it passes through the building wall, to the outdoors. Accordingly, the signal from the base station and headset operated inside a training center would travel no further than 500 feet outside of the building, from the point nearest the Telex equipment operation.

Respectfully submitted,

T. Fred Short 09/09/05

T. Fred Short
Electrical Engineer
Consultant for Exelon

ATTACHMENT B

"EQUIPMENT ALTERNATIVES" - BY CATEGORY

Based on our research, we see six (6) different categories of communications equipment used widely, in one way or another, throughout the Nuclear Energy Industry ("Industry") facilities in the U.S. for outage and maintenance work in areas where worker exposure to radiation is an issue:

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 Industry 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. While Telex is used in the plants, in many different ways, it is most essential in the context of communicating during outage and maintenance situations, when cranes and bridges are moving radiated fuel and spent fuel rods from one part of the plant to another.

Below are all of 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 NEI questionnaire, which solicited information about the various communications equipment they use, in addition to Telex, or have tested.

1. <u>VoIP/2.4 GHz (non-spread spectrum)</u>:

- "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 offgas building due to the lack of slotted coax for RF propagation in these areas."

2. <u>Part 90 UHF/Walkie-Talkies</u>:

- 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 (RFI)."

- Uses hand held radios but states that they are "hard to hear in noisy areas. Have to use noise-canceling headsets, provide by manufacturer to attach to radios. These headsets do not eliminate all background noise, still hard to hear in some areas."

- "Hand held radio has an output of 1 watt, which is enough to actuate sensitive instruments if radio is keyed close to instruments."

- "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 12 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 Trunking Radio were ranked fairly high, but noted negatives of "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."

- "There is a slight setup delay before communication can commence due to trunking channel assignment. This type of issue can be problematic for crane operations due to delay."

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

- "Extremely expensive ($3K per unit) and does not operate full duplex (a must for many maintenance activities)."

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

- "Not powerful enough to transmit through the secondary containment wall but works well outside."

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

- Uses trunked radio system but does not like it because "it is not duplex."

- The walkie-talkie equipment is "not good for safety situations."

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

3. **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." (Operator no longer uses this equipment.)

- "These require noise-canceling headsets to be effective in some parts of the Plant."

- "Will not interact with Matrix. Affective range determined by antenna placement. Background noise problems resolved by modification. Not highly effective due to structures and configuration."

- "The mini cell system is designed and intended to augment the existing telephone system by adding the features of mobility. Users can still get busy signals when attempting to contact other users. Coverage is subject to installed antennas through the plants. This

system functions the same way a normal cell system does and is subject to the same limitations."

- "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 or the hands free use."

- "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."

4. <u>Wired Telephone Service:</u>

- 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."

5. <u>2.4 GHz Spread Spectrum:</u>

- "We use Telex because multiple channels are necessary to allow more work crews to communicate with each other in high noise/high radiation areas at the same time. 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 2.4Ghz range where the other equipment operates. This prevents interference between the systems."

- "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)."

- "Radiological safety is enhanced with the ability to communicate with workers in the field while being able to view remote dose and dose rate information from a central monitoring station. The ability to communicate with the worker to reposition their body or to move to a different location saves personnel radiation exposure."

- "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."

- Also tested 2.4 GHz spread spectrum phones; graded it highly but stated: "A system was presented with no applications at this time."

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

6. <u>Wireless Headsets</u>:

- Problems noted include "tethered 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."

ATTACHMENT C

Summary of 2008 Survey of Nuclear Plant Telex Headset Use

Below are the results of the plant survey undertaken by NEI, in cooperation with the UTC during the spring/summer of 2008.

Roughly half of the plants have responded to the survey and approximately 10 plants have tested non-Telex equipment. As was the case with the 2005 survey, the plants report a myriad of shortcomings in the equipment they tested as potential alternatives to the Telex Equipment. Among the most common complaints about the non-Telex equipment were (i) interference caused to certain other plant equipment and systems; the coverage area is smaller (and thus not as useful); and the small number of headsets can be used at the same time (and thus not as useful).

A summary of the results is below including a separate section listing the plants' comments regarding their use of non-Telex equipment:

Results Summary

- 47 of 108 plants responded to the survey.
- No plants are using BTR 600 radios.
- Most plants are using BTR 800, 700 or 200 series equipment.
  a) 36 plants are using BTR 800 radios; 10 plants are using 1 to 4 radios, 12 plants are using 5 to 10 radios, and 12 plants are using more than 10 radios
  b) 26 plants are using BTR 700 radios; 10 plants are using 1 to 4 radios, 4 plants are using 5 to 10 radios, and 12 plants are using more than 10 radios
  c) 20 plants are using Telex BTR 200 equipment; 12 plants are using 1 to 4 radios, 4 plants are using 5 to 10 radios, and 7 plants are using more than 10 radios
  d) 16 plants are using BTR 300 radios; 7 plants are using 1 to 4 radios, 6 plants are using 5 to 10 radios, and 3 plants are using more than 10 radios
- In the last two years, 26 plants bought more Telex equipment and 10 plants purchased and tested non-Telex equipment.
- The plants reported that they tested five additional potential equipment alternatives (all wireless). For the purposes of this report which will be submitted to the FCC, so as to avoid any issue of commercial disparagement, we shall replace the names of the equipment tested with numbers, 1-5. As each type of equipment is referenced herein, once again numbers, rather than names, shall be utilized.
- Generally, the plants noted that the equipment provided unacceptable voice quality and coverage; caused unacceptable interference to other wireless devices and networks; and does not permit the use of enough headsets at the same time.
- 32 plants use Telex equipment indoors only and 10 plants use Telex equipment indoors and outdoors.

- Telex equipment is used during outages only by 23 plants, 2-3 times per month by 13 plants, 1-2 times per week by 4 plants, and daily by 1 plant.
- 18 plants reported contacting SBE regarding frequency coordination, 12 successfully completed frequency coordination and 6 received no response from SBE.
- Dosimeter interference was reported by 7 plants that tested Alternative #2 and #4 equipment but 16 plants reported no interference.

Specific Comments Regarding Problems/Challenges of Using Non-Telex Equipment

As detailed below in the comments received from the plants, the two primary problems with non-Telex equipment are limited range of use and interference to plant operations.

Capacity and Coverage Problems

a) Plant Vogtle, Farley and Hatch, Southern Company; Georgia Power and Alabama Power: Refueling activities require full duplex, immediate response communications that cannot be achieved with push to talk equipment. Other full duplex equipment that has been investigated has capacity limitations with associated access points. Equipment operating at frequencies above 700 MHz do not provide the coverage necessary.

b) Palo Verde Nuclear Generating Station, Arizona Public Service: The durability and flexibility does not match the TELEX. Also, the non-TELEX units cannot operate enough units at one time.

c) Davis Besse Nuclear Power Station, First Energy; Fermi 2, DTE Energy / Detroit Edison; River Bend Station, Entergy; and Salem/Hope Creek, PSEG: Lack of range, sound quality, and multipath issues due to 2.4 GHz.

d) Waterford 3, Entergy: Alternative #1 headsets do not have noise reduction microphones.

e) Surry, Virginia Electric and Power Company: Alternative #4 equipment provided 80% coverage in containment and Alternative #2 provided 95% coverage in containment. While Alternative #2 provided the best coverage at Surry, the operating frequency of 2.4 GHz is used by other plant devices so this may not be a viable replacement for the Telex equipment. Also, Alternative #2 is limited to 4 belt packs for full duplex operation.

f) Millstone, Dominion Nuclear Connecticut, Inc.: Alternative #4 equipment provided less than 40% coverage in containment and Alternative #2 provided approximately 60% coverage in containment. Test results indicated that Alternative #4 and Alternative #2 did not provide adequate coverage for refueling operations.

g) Sequoyah Nuclear Plant, Tennessee Valley Authority: We have not been able to obtain the coverage areas that we currently have with the Telex equipment.

h) Perry Nuclear Power Station, FENOC: The most significant draw back for non-Telex equipment is the inability to deploy an antenna system to provide adequate reception coverage to support various work groups on independent channels.

i) Kewaunee, Dominion Energy Kewaunee, Inc.: Alternative #4 provided less than 10% coverage in containment and Alternative #2 provided approximately 40% coverage in

containment. Test results indicated that Alternative #4 and Alternative #2 did not provide adequate coverage for refueling operations.

- **Interference Issues**

  a) Kewaunee Power Station, Dominion: Alternative #4 has signal issues (e.g. interference) in buildings with round ceilings.

  b) Callaway Nuclear Plant, Ameren UE: Non-Telex equipment is not compatible with a digital audio matrix and causes interference to other 1.9 or 2.4 GHz equipment.

  c) Exelon: With Alternative #2 (2.4 GHz system) and operating in 802.11, we had interference with other technologies which using this standard 802.11, such as wireless data network and other systems used during refuel outages, and did no formal testing. We did test Alternative #4's 10 Digital Wireless Intercom 1.92 GHZ to 1.93 GHZ frequency bands in November of 2007. The system appeared to be very flexible, but there was a critical failure in the containment dome at the station tested. Given the structure of the dome, we found 100% packet loss for the digital signal. A frequency engineer from Alternative #4 was called upon to support the testing, but could not address the issue. We are not optimistic that we will be successful in finding an alternative for a wireless intercom solution which can be effectively used in the plant environment at our stations. A long-term alternative would be to move to an in-plant communications system, which leverages voice over IP. Moving in this direction will take time and is expensive, as well as may not be technically feasible in some areas of the plant environment.

  d) Prairie Island Nuclear Generating Plant, Xcel Energy: Interference with sensitive instrumentation, unable to cope with high-noise environment, are all issues with non-Telex equipment

  e) Wolf Creek Generating Station, Wolf Creek Nuclear Operating Corporation: Non-Telex equipment will not work on refueling floor or in reactor head area due to multipath distortion from reflections from containment dome.

  f) Harris Nuclear Station, Progress Energy: Frequency of non-Telex equipment does not work well in containment.

  g) Naesco: Non-Telex equipment limited on number of users and unacceptable interference.

ATTACHMENT D

ATTACHMENT D

List of Power Nuclear Reactors
http://www.nrc.gov/reactors/operating/list-power-reactor-units.html

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
Arkansas Nuclear 1 05000313	PWR	6 MI WNW of Russellville, AR	Entergy Nuclear Operations, Inc.	4
Arkansas Nuclear 2 05000368	PWR	6 MI WNW of Russellville, AR	Entergy Nuclear Operations, Inc.	4
Beaver Valley 1 05000334	PWR	17 MI W of McCandless, PA	FirstEnergy Nuclear Operating Co.	1
Beaver Valley 2 05000412	PWR	17 MI W of McCandless, PA	FirstEnergy Nuclear Operating Co.	1
Braidwood 1 05000456	PWR	24 MI SSW of Joilet, IL	Exelon Generation Co., LLC	3
Braidwood 2 05000457	PWR	24 MI SSW of Joilet, IL	Exelon Generation Co., LLC	3
Browns Ferry 1 05000259	BWR	10 MI NW of Decatur, AL	Tennessee Valley Authority	2
Browns Ferry 2 05000260	BWR	10 MI NW of Decatur, AL	Tennessee Valley Authority	2
Browns Ferry 3 05000296	BWR	10 MI NW of Decatur, AL	Tennessee Valley Authority	2
Brunswick 1 05000325	BWR	2 MI N of Southport, NC	Progress Energy	2
Brunswick 2 05000324	BWR	2 MI N of Southport, NC	Progress Energy	2
Byron 1 05000454	PWR	17 MI SW of Rockford, IL	Exelon Generation Co., LLC	3
Byron 2 05000455	PWR	17 MI SW of Rockford, IL	Exelon Generation Co., LLC	3
Callaway 05000483	PWR	10 MI SE of Fulton, MO	Ameren UE	4
Calvert Cliffs 1 05000317	PWR	40 MI S of Annapolis, MD	Constellation Energy	1
Calvert Cliffs 2	PWR	40 MI S of Annapolis, MD	Constellation Energy	1

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
05000318				
Catawba 1 05000413	PWR	6 MI NW of Rock Hill, SC	Duke Energy Power Company, LLC	2
Catawba 2 05000414	PWR	6 MI NW of Rock Hill, SC	Duke Energy Power Company, LLC	2
Clinton 05000461	BWR	6 MI E of Clinton, IL	Exelon Generation Co., LLC	3
Columbia Generating Station 05000397	BWR	12 MI NW of Richland, WA	Energy Northwest	4
Comanche Peak 1 05000445	PWR	4 MI N of Glen Rose, TX	TXU Generating Company LP	4
Comanche Peak 2 05000446	PWR	4 MI N of Glen Rose, TX	TXU Generating Company LP	4
Cooper 05000298	BWR	23 MI S of Nebraska City, NE	Nebraska Public Power District	4
Crystal River 3 05000302	PWR	7 MI NW of Crystal River, FL	Progress Energy	2
D.C. Cook 1 05000315	PWR	11 MI S of Benton Harbor, MI	Indiana/Michigan Power Co.	3
D.C. Cook 2 05000316	PWR	11 MI S of Benton Harbor, MI	IndianaMichigan Power Co.	3
Davis-Besse 05000346	PWR	21 MI ESE of Toledo, OH	FirstEnergy Nuclear Operating Co.	3
Diablo Canyon 1 05000275	PWR	12 MI WSW of San Luis Obispo, CA	Pacific Gas & Electric Co.	4
Diablo Canyon 2 05000323	PWR	12 MI WSW of San Luis Obispo, CA	Pacific Gas & Electric Co.	4
Dresden 2 05000237	BWR	9 MI E of Morris, IL	Exelon Generation Co., LLC	3
Dresden 3 05000249	BWR	9 MI E of Morris, IL	Exelon Generation Co., LLC	3
Duane Arnold 05000331	BWR	8 MI NW of Cedar Rapids, IA	Florida Power & Light Co.	3
Farley 1	PWR	18 MI SE of Dothan, AL	Southern Nuclear	2

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
05000348			Operating Co.	
Farley 2 05000364	PWR	18 MI SE of Dothan, AL	Southern Nuclear Operating Co.	2
Fermi 2 05000341	BWR	25 MI NE of Toledo, OH	Detroit Edison Co.	3
FitzPatrick 05000333	BWR	8 MI NE of Oswego, NY	Entergy Nuclear Operations, Inc.	1
Fort Calhoun 05000285	PWR	19 MI N of Omaha, NE	Omaha Public Power District	4
Ginna 05000244	PWR	20 MI NE of Rochester, NY	Constellation Energy	1
Grand Gulf 1 05000416	BWR	25 MI S of Vicksburg, MS	Entergy Nuclear Operations, Inc.	4
Hatch 1 05000321	BWR	11 MI N of Baxley, GA	Southern Nuclear Operating Co., Inc.	2
Hatch 2 05000366	BWR	11 MI N of Baxley, GA	Southern Nuclear Operating Co., Inc.	2
Hope Creek 1 05000354	BWR	18 MI SE of Wilmington, DE	PSE&G Nuclear	1
Indian Point 2 05000247	PWR	24 MI N of New York City, NY	Entergy Nuclear Operations, Inc.	1
Indian Point 3 05000286	PWR	24 MI N of New York City, NY	Entergy Nuclear Operations, Inc.	1
Kewaunee 05000305	PWR	27 MI E of Green Bay, WI	Dominion Generation	3
La Salle 1 05000373	BWR	11 MI SE of Ottawa, IL	Exelon Generation Co., LLC	3
La Salle 2 05000374	BWR	11 MI SE of Ottawa, IL	Exelon Generation Co., LLC	3
Limerick 1 05000352	BWR	21 MI NW of Philadelphia, PA	Exelon Generation Co., LLC	1
Limerick 2 05000353	BWR	21 MI NW of Philadelphia, PA	Exelon Generation Co., LLC	1
McGuire 1 05000369	PWR	17 MI N of Charlotte, NC	Duke Energy Power Company, LLC	2

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
McGuire 2 05000370	PWR	17 MI N of Charlotte, NC	Duke Energy Power Company, LLC	2
Millstone 2 05000336	PWR	3.2 MI WSW of New London, CT	Dominion Generation	1
Millstone 3 05000423	PWR	3.2 MI WSW of New London, CT	Dominion Generation	1
Monticello 05000263	BWR	30 MI NW of Minneapolis, MN	Nuclear Management Co.	3
Nine Mile Point 1 05000220	BWR	6 MI NE of Oswego, NY	Constellation Energy	1
Nine Mile Point 2 05000410	BWR	6 MI NE of Oswego, NY	Constellation Energy	1
North Anna 1 05000338	PWR	40 MI NW of Richmond, VA	Dominion Generation	2
North Anna 2 05000339	PWR	40 MI NW of Richmond, VA	Dominion Generation	2
Oconee 1 05000269	PWR	30 MI W of Greenville, SC	Duke Energy Power Company, LLC	2
Oconee 2 05000270	PWR	30 MI W of Greenville, SC	Duke Energy Power Company, LLC	2
Oconee 3 05000287	PWR	30 MI W of Greenville, SC	Duke Energy Power Company, LLC	2
Oyster Creek 05000219	BWR	9 MI S of Toms River, NJ	Exelon Generation Co., LLC	1
Palisades 05000255	PWR	5 MI S of South Haven, MI	Entergy Nuclear Operations, Inc.	3
Palo Verde 1 05000528	PWR	36 MI W of Phoenix, AZ	Arizona Public Service Co.	4
Palo Verde 2 05000529	PWR	36 MI W of Phoenix, AZ	Arizona Public Service Co.	4
Palo Verde 3 05000530	PWR	36 MI W of Phoenix, AZ	Arizona Public Service Co.	4
Peach Bottom 2 05000277	BWR	17.9 MI S of Lancaster, PA	Exelon Generation Co., LLC	1
Peach Bottom 3	BWR	17.9 MI S of Lancaster, PA	Exelon Generation Co.,	1

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
05000278			LLC	
Perry 1 05000440	BWR	7 MI NE of Painesville, OH	FirstEnergy Nuclear Operating Co.	3
Pilgrim 1 05000293	BWR	4 MI SE of Plymouth, MA	Entergy Nuclear Operations, Inc.	1
Point Beach 1 05000266	PWR	13 MI NNW of Manitowoc, WI	FPL Energy Point Beach, LLC	3
Point Beach 2 05000301	PWR	13 MI NNW of Manitowoc, WI	FPL Energy Point Beach, LLC	3
Prairie Island 1 05000282	PWR	28 MI SE of Minneapolis, MN	Nuclear Management Co.	3
Prairie Island 2 05000306	PWR	28 MI SE of Minneapolis, MN	Nuclear Management Co.	3
Quad Cities 1 05000254	BWR	20 MI NE of Moline, IL	Exelon Generation Co., LLC	3
Quad Cities 2 05000265	BWR	20 MI NE of Moline, IL	Exelon Generation Co., LLC	3
River Bend 1 05000458	BWR	24 MI NNW of Baton Rouge, LA	Entergy Nuclear Operations, Inc.	4
Robinson 2 05000261	PWR	26 MI from Florence, SC	Progress Energy	2
Saint Lucie 1 05000335	PWR	12 MI SE of Ft. Pierce, FL	Florida Power & Light Co.	2
Saint Lucie 2 05000389	PWR	12 MI SE of Ft. Pierce, FL	Florida Power & Light Co.	2
Salem 1 05000272	PWR	18 MI S of Wilmington, DE	PSE&G Nuclear	1
Salem 2 05000311	PWR	18 MI S of Wilmington, DE	PSE&G Nuclear	1
San Onofre 2 05000361	PWR	4 MI SE of San Clemente, CA	Southern California Edison Co.	4
San Onofre 3 05000362	PWR	4 MI SE of San Clemente, CA	Southern California Edison Co.	4
Seabrook 1 05000443	PWR	13 MI S of Portsmouth, NH	Florida Power & Light Co.	1

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
Sequoyah 1 05000327	PWR	9.5 MI NE of Chattanooga, TN	Tennessee Valley Authority	2
Sequoyah 2 05000328	PWR	9.5 MI NE of Chattanooga, TN	Tennessee Valley Authority	2
Shearon Harris 1 05000400	PWR	20 MI SW of Raleigh, NC	Progress Energy	2
South Texas 1 05000498	PWR	12 MI SSW of Bay City, TX	STP Nuclear Operating Co.	4
South Texas 2 05000499	PWR	12 MI SSW of Bay City, TX	STP Nuclear Operating Co.	4
Summer 05000395	PWR	26 MI NW of Columbia, SC	South Carolina Electric & Gas Co.	2
Surry 1 05000280	PWR	17 MI NW of Newport News, VA	Dominion Generation	2
Surry 2 05000281	PWR	17 MI NW of Newport News, VA	Dominion Generation	2
Susquehanna 1 05000387	BWR	7 MI NE of Berwick, PA	PPL Susquehanna, LLC	1
Susquehanna 2 05000388	BWR	7 MI NE of Berwick, PA	PPL Susquehanna, LLC	1
Three Mile Island 1 05000289	PWR	10 MI SE of Harrisburg, PA	Exelon Generation Co., LLC	1
Turkey Point 3 05000250	PWR	25 MI S of Miami, FL	Florida Power & Light Co.	2
Turkey Point 4 05000251	PWR	25 MI S of Miami, FL	Florida Power & Light Co.	2
Vermont Yankee 05000271	BWR	5 MI S of Brattleboro, VT	Entergy Nuclear Operations, Inc.	1
Vogtle 1 05000424	PWR	26 MI SE of Augusta, GA	Southern Nuclear Operating Co.	2
Vogtle 2 05000425	PWR	26 MI SE of Augusta, GA	Southern Nuclear Operating Co.	2
Waterford 3 05000382	PWR	20 MI W of New Orleans, LA	Entergy Nuclear Operations, Inc.	4
Watts Bar 1	PWR	10 MI S of Spring City, TN	Tennessee Valley	2

Plant Name Docket Number	Reactor Type	Location	Owner/Operator	NRC Region
05000390			Authority	
Wolf Creek 1 05000482	PWR	3.5 MI NE of Burlington, KS	Wolf Creek Nuclear Operating Corp.	4