GE Nuclear Energy

Nuclear Energy Business Operations
175 Curtner Avenue, San Jose, CA 95125

April 8, 1993

Docket No. STN 52-001

Chet Poslusny, Senior Project Manager
Standardization Project Directorate
Associate Directorate for Advanced Reactors
and License Renewal
Office of the Nuclear Reactor Regulation

Subject: Submittal Supporting Accelerated ABWR Review Schedule - **DFSER Open Item 7.7.1.15-1**

Dear Chet:

Enclosed is a SSAR markup addressing DFSER Open Item 7.7.1.15-1.

Please provide a copy of this transmittal to Jim Stewart.

Sincerely,

Jack Fox

Jack Fox
Advanced Reactor Programs

cc: Norman Fletcher (DOE)
Manny Patel (GE)
Bob Strong (GE)

JP93-85

9.5.2 Communication Systems

The ABWR Standard Plant design provides a telephonic communication system consisting of a power actuated paging facility and a separate network of cables and jacks to facilitate use of sound-powered telephones for maintenance and repair.

See Subsection 9.5.13.11 for COL applicant information pertaining to criteria for the design of plant security system.

9.5.2.1 Design Bases

9.5.2.1.1 Power-Actuated Paging System

The paging system is designed to provide facilities for mutual communication and simultaneous broadcasting in the related buildings of the plant.

9.5.2.1.2 Sound-Powered Telephone System

The design basis for the sound powered telephone system is to provide communication primarily for fuel transfer, testing, calibration, ~~and~~ maintenance, and emergency conditions.

9.5.2.2 Description

9.5.2.2.1 Paging Facilities

This system provides communication means such as ringing, mutual telephonic communication and simultaneous broadcasting in various select buildings and areas including outdoor locations of a nuclear power plant unit. The system also permits merging with and separation from other units of the nuclear power station. The system is primarily used for intraplant communications and a fixed-type (as opposed to wireless communication) emergency communication during plant operations, testing, calibration, start-up and limited emergencies.

The paging facilities system is a non safety system and, therefore, does not have seismic mounting requirements. Mounting of system components is not on or above seismic class equipment, and is in accordance with sound design engineering practices.

The paging facilities consist of handsets, speakers, branch boxes, main distribution boards, a control board, amplifiers, amplifier boards, 48V battery, battery chargers, dc distribution board, cables wiring materials, junction boxes and jacks. The system is a 3 channel, 3 system split type design with a separate set of amplifiers and a distribution board for each branch. A general outline of the system is shown in Figure 9.5-2.

Handsets and speakers are installed in places which are important for plant operation and necessary for personnel safety, and where communication is frequent including the rooms described below:

(1) Main Control Room

(2) Electrical Equipment room

(3) Fuel replacement area

(4) Turbine operation area

(5) Periphery of control rods hydraulic units

(6) Feedwater Pump Room

(7) Elevators

(8) Exteriors of plant buildings

Each handset station can be used to communicate with any other handset station or the central station of an another unit at the same nuclear station.

One circuit of the handset station is connected to a telephone line, thereby, permitting a simultaneous broadcasting from a security telephone unit. In addition to the basic paging function the equipment can be used for an automatic surveillance of main amplifier output, alarm indication in the event of failure of main equipment and manual switching to spare amplifier as necessary.

The system is operated from a 48V battery source with a normal and a spare battery chargers. The chargers are fed from 3ø, 440VAC station power supply and a separate 1ø, 120VAC power source is used for panel lights and receptacles.

Due to its importance to plant operation and safety the paging equipment will have an exclusive DC power supply with a dedicated battery. The battery has capacity for 10 hours of operation following the loss of AC power. The charger is sized to recharge the battery form a fully discharged condition in 10 hours while supplying the normal DC loads.

A handset is located at the same relative position on each floor, at a conspicuous location in the patrol route, at uniform intervals in corridors and large rooms, close to panels where possible and at a location least affected by radioactivity within one area.

Paging equipment for outdoor facilities is designed to automatically limit the sound volume at night to a level manually set from the operator's desk. The manual volume settings can be 10, 20, 30 or 40 dB.

The paging equipment produces an emergency signal (siren sound) upon actuation of an emergency signal pushbutton.

Box-type speakers are installed in small rooms where reverberations make hearing difficult.

Speakers and handsets are installed at the best practical distance from noise sources. However, in rooms where noise level increases during equipment operation, (such as feed water pump room ,diesel generator room etc.), handsets are enclosed within a sound-proof booth.

The speakers are of two different types as described below. Their sound to noise (S/N) ratio is approximately 3 to 6 dB.

S: Output sound pressure of speaker.

N: Noise level at a place where the speaker is installed.

(1) Horn shaped (Trumpet shaped): Output of 5 to 15W

(2) Cone shaped (box Type): Output of 3W

(3) Junction Box

Junction boxes installed outdoors are made of stainless plate in accordance with the outdoor specifications. Junction boxes installed within building are constructed to prevent water damage from above.

The interconnecting cables consist of a standard pair of conductors with cross-linked polyethylene insulation, a static electricity shield and an overall sheath of flame and heat resistant PVC (colored yellow).

The circuits from the main paging equipment to each junction box are wired by separate routes. Wiring is routed in existing cable trays for control cables. Containment penetrations X-102 A and B are used for communication cables which are routed to the communication circuits within containment.

9.5.2.2.2 Sound-Powered Telephone System for Plant Maintenance and Repair

A separate ~~telephone~~ communication system using portable sound-powered telephone units will be provided. and emergency condition such as operation from RSS

The communication facilities for use during plant maintenance consists of local terminal jacks and boxes and a system ~~main~~ communication boards with storage for patch cords. The portable sound-powered telephones themselves are out of the ABWR Standard Plant scope.

The system provides communication capability between boards in the main control room, between the main control room and field station(s) ~~or from field stations~~, or from field station to field station, ~~during testing and periodic inspection of the plant.~~

An outline of the system is shown in Figure 9.5-2.

The communication between stations ~~of the maintenance communication facility~~ is by means of portable telephone units and patch cords at the ~~maintenance~~ communication system board.

Terminal jacks are attached to the central control boards and to local panels and racks where communication links are frequently required for testing, calibration, maintenance, and for operation from RSS.

The cable for the maintenance communication facility is unshielded with a flame and heat resistance PVC sheath and cross-linked polyethylene insulation. The cables are routed in existing control voltage level cable trays where available. The wiring used for this system is color coded and the color of the sheath is black.

9.5.2.3 System Operation

The telephonic communication systems are designed to assist the plant personnel during preoperational, start-up, testing, maintenance and ~~limited~~ emergency conditions. The system provides easily accessible means of communications between various intraplant locations and simultaneous broadcasting in those locations.

The various equipment involved in system operation is designed to function in the environment where is located. The power supply for the system is derived from the dedicated batteries, thus providing a reliable source of power and the communication system for up to 10 hours in the event of a loss of plant power supply. The sound-powered telephone system does not require any electrical power source to operate the system.

paging

9.5.2.4 Safety Evaluation

The communication system has no safety-related function as discussed in Section 3.2. However, see Subsection 9.5.13.2 for COL license information pertaining to use of the system in emergencies.

9.5.2.5 Inspection and testing Requirements

The communication systems are conventional and have a history of successful operation. Routine use of parts of the system during normal operation ensures availability. Measurements or tests required to guard against long-term deterioration shall be performed on a periodic basis. See Subsection 9.5.13.3 for COL license information pertaining to communication equipment maintenance and testing procedures.

9.5.2.6 Portable and Fixed Emergency Communication Systems

The portable radio communication system, and the fixed emergency communication system (independent of the normal plant communication system) are out of ABWR standard plant design scope. The COL applicants design shall comply with the BTP CMEB 9.5-1, position C.5.g(3) and (4). The COL applicant will supplement this subsection accordingly as applicable. See Subsection 9.5.13.14 for COL license information.

The portions of the flooder pipe that extend from the steel liner in the lower drywell meet the requirements of ASME Class 2 piping components.

An ANSI B16.5 stainless steel weld-neck flange (or equivalent) is used at the interface between the flooder pipe and the fusible plug valve. The flooder pipe is made of the same material as the blowdown vent pipe or of a stainless steel material that is compatible for welding to the blowdown vent pipe.

The fusible plug is required to open fully when the outer metal temperature of the valve reaches 260°C during a severe accident and to pass a minimum of 10.5 l/sec with 375 mm of water above the valve inlet.

A plastic cover on the valve outlet seals the valve from the intrusion of moisture that could cause corrosion of the fusible metal material. The plastic cover has a melting point below 130°C and greater than 70°C and is required to melt completely or offer minimal resistance to valve opening when the opening temperature is reached.

9.5.12.4 Testing and Inspection Requirements

The ability of the LDF to mitigate severe accidents by passing sufficient water to cover and quench the postulated corium in the drywell is confirmed by PRA analysis (Appendix 19D).

No testing of the LDF system will be required during normal operation. During refueling outages, the following surveillance would be required:

(1) During each refueling outage, verify that there is no leakage from the fusible plug valve flange or outlet when the suppression pool is at its maximum level.

(2) Once every four refueling outages, lower suppression pool water level or plug the flooder pipe inlet and replace two fusible plug valves. Test the valves that were removed to confirm their function. This practice follows the precedent set for in-service testing of standby liquid control system (SLCS) explosive valves in earlier boiling water reactors.

9.5.12.5 Instrumentation Requirements

The LDF operates automatically in a passive manner during a severe accident scenario that involves a core melt and vessel failure. No operator action is required; therefore, no instrumentation is placed upon the system. An inadvertent opening or leak would be detected by the lower drywell leak detection system and the suppression pool water level instrumentation which would result in plant shutdown.

During severe accidents, operation of the LDF is confirmed by other instrument readings in the containment. These instruments include those which would record the drywell temperature reduction and the lowering of suppression pool water level.

9.5.13 COL License Information

9.5.13.1 Contamination of the DG Combustion Air Intake

The COL applicant will take measures to restrict contaminating substances from the plant site which may be available to the diesel generator air intakes. (See Subsection 9.5.8.1).

9.5.13.2 Use of Communication System in Emergencies

Procedures for use of the communication system in emergencies shall be provided by the COL applicant. (See Subsection 9.5.2.4).

9.5.13.3 Maintenance and Testing Procedure for Communication Equipment

Maintenance and testing procedures for the plant communication shall be provided by the COL applicant. (See Subsection 9.5.2.5)

9.5.13.4 Use of Portable Hand Light in Emergency

The portable sealed beam battery powered hand light (used by the fire brigade and other personnel during an emergency to achieve a plant shutdown) is out of ABWR standard design scope. The COL applicant's design will comply with the BTP CMEB 9.5-1, position C.5.g(1) and (2). The COL applicant will supplement this subsection accordingly as applicable.