SNC Answer Opposing BREDL Petition to
Intervene and Request for Hearing

Docket Nos. 52-025-LA-2; 52-026-LA-2

Exhibit No. 2

AP1000 DCD, Tier 2, Tables 6.2.4-6 and 6.2.4-7

Table 6.2.4-6 (Sheet 1 of 3)

IGNITER LOCATION

Criteria

- A sufficient number of igniters are placed in the major transport paths (including dominant natural circulation pathways) of hydrogen so that hydrogen can be burned continuously close to the release point. This prevents hydrogen from preferentially accumulating in a certain region of the containment.
- Igniters (minimum of 2) are located in major regions or compartments where hydrogen may be released, through which it may flow, or where it may accumulate.
- It is preferable to ignite a hydrogen-air mixture at the bottom so that upward flame propagation can be promoted at lean hydrogen concentrations. Igniters within each subcompartment are located in the vicinity of, and above, the highest potential release location within the subcompartment.
- In compartments with relatively small openings in the ceiling, the potential may exist for the hydrogen-air mixture to rise and to collect near the ceiling. Therefore, one or more igniters are placed near the ceiling of such compartments. Igniter coverage is provided within the upper 10 percent of the vertical height subcompartments or 10 feet from the ceiling whichever is less. In cases where the highest potential release point is low in the compartment, both this and the previous criteria are considered.
- To the extent possible, igniters are placed away from walls and other large surfaces so that a flame front created by ignition at the bottom of a compartment can travel unimpeded up to the top.
- A sufficient number of igniters are installed in long, narrow compartments (corridors) so that the flame fronts created by the igniters need to travel only a limited distance before they merge. This limits the potential for significant flame acceleration.
- Igniter coverage is provided to control combustion in areas where oxygen rich air may enter into an inerted region with combustible hydrogen levels during an accident scenario.
- Igniters are located above the flood level, if possible. Those which may be flooded have redundant fuses to protect the power supply.
- In locations where the potential hydrogen release location can be defined, i.e. above the IRWST spargers, at IRWST vents, etc igniter coverage is provided as close to the source as feasible.
- Provisions for installation, maintenance, and testing are to be considered.

Table 6.2.4-6 (Sheet 2 of 3)

IGNITER LOCATION

Implementation

- **Reactor Cavity –** Hydrogen releases within the reactor cavity will flow either through the vertical access tunnel, through the opening around the RCS hot and cold legs into the loop compartments or if the refueling cavity seal ring fails then potentially through the refueling cavity. The potential flow paths have at least four igniters with at least two powered by each of two power groups. No igniters have been located within the reactor cavity since this region would always be flooded, adequate igniter coverage is available in hydrogen pathways from the reactor cavity and any maintenance or inspection would result in elevated personnel exposure.

- **Loop Compartments –** Hydrogen releases from the hot or cold legs or from the reactor cavity would flow up through the loop compartment to the dome region. Igniter coverage provided within the loop compartment consists of a total of four igniters at two different elevations covering the perimeter of the compartment and with two igniters powered by one power group and two by the second power group. Additional coverage is provided above the loop compartments at elevation 166′ with four igniters above each loop compartment and powered by different power groups.

- **Pressurizer Compartment –** Hydrogen releases within the pressurizer compartment would flow up through the compartment toward the dome region. Igniter coverage provided within the compartment consists of a total of four igniters at two different elevations covering the perimeter of the compartment with two igniters powered by one power group and two by the second power group. Additional coverage is provided above the pressurizer compartment at elevation 166′ with two igniters above powered by different power groups.

- **Tunnel Connection Loop Compartments –** The tunnel between the loop compartments and extending downward into the reactor coolant drain tank cavity is provided with four igniters for hydrogen control. Releases within the reactor cavity or from the loop compartment may flow through this vertical access tunnel. Igniter coverage is provided over the width of the tunnel at three separate elevations and is powered by different power groups.

- **Refueling Cavity –** Hydrogen releases from the reactor cavity or potentially from the reactor coolant loops may flow up past the refueling cavity seal ring and through the refueling cavity to the dome region. Igniter coverage provided within the refueling cavity consists of a total of four igniters at two different elevations covering the perimeter of the compartment with two igniters powered by one power group and two by the second power group. Additional coverage is provided above the refueling cavity at elevation 166′ with four igniters powered by different power groups.

- **Southeast Valve and Accumulator Rooms –** Hydrogen releases within the southeast valve or accumulator rooms will rise with the mass and energy releases to near the ceiling and exit either through the stairwell on the west wall or through piping penetration holes in the ceiling. The hydrogen control protection is provided by two igniters, one located near the ceiling of each of the adjoining rooms. The igniters are powered by different power groups and provide backup control for each other.

Table 6.2.4-6 (Sheet 3 of 3)

IGNITER LOCATION

- **East Valve, Northeast Accumulator, and Northeast Valve Room –** Hydrogen releases within the east valve, northeast accumulator or valve rooms will rise with the mass and energy releases to near the ceiling and exit either through the enlarged vent area surrounding the discharge piping from the core makeup tank located at the 107′ 2″ elevation and through other piping penetration holes in the ceiling. The hydrogen control protection is provided by three igniters, one located near the ceiling of each of the adjoining rooms. The igniters are powered by different power groups and provide backup control for each other.

- **North CVS Equipment Room –** Hydrogen releases within the CVS equipment room will rise from the piping or equipment located on the CVS module to near the ceiling, pass over the outer barrier wall and flow up through the stairwell or ceiling grating. Hydrogen control is provided by two igniters located near the ceiling of the equipment room between the equipment module and the major relief paths from the compartment. The igniters are powered by different power groups.

- **IRWST –** Hydrogen releases into the IRWST are controlled by the distribution of igniters internal to the IRWST and within the vents from and into the IRWST. Two igniters on different power groups are located within the IRWST just below the tank roof of the IRWST and near the spargers. In the event of hydrogen releases via the spargers, the igniters near the release points will provide the most immediate point of recombination. Should the environment within the IRWST be inerted or otherwise not be ignited by the assemblies near the sparger, the hydrogen will be ignited as it exhausts from the IRWST at any of four of the vents fitted with igniter assemblies. Two of the four igniters are powered by one power group and two by the second power group. Finally, in the event that the IRWST is hydrogen rich and air is drawn into the IRWST the mixture will become flammable. In order to provide this recombination, the two inlet vents on the other side of the IRWST from the sparger and primary exhaust vents are each fitted with an igniter.

- **Lower Compartment Area –** Hydrogen releases within the lower compartment will rise with the mass and energy releases to near the ceiling and exit either through the north stairwell or along the circumferential gap between the operating deck and the containment shell. The hydrogen control protection is provided by eleven igniters spread over the potential release areas and located either just above the mezzanine deck elevation or near the ceiling. This approach provides wide coverage over the entire compartment area at two separate elevations. The igniters are split between the two separate power groups.

- **Upper Compartment –** Hydrogen control is provided at three separate levels within the upper compartment. At the 162-166 foot elevations, 10 igniters are distributed over the area primarily above the major release flow paths including the loop compartments, refueling cavity, pressurizer compartment and above the stairwell from the lower compartment area. The igniters are split between the two power groups. At 233 foot elevation, an igniter is provided in each quadrant at the mid region of the upper compartment with two igniters on each of the two power groups. At the upper region elevation of 258 feet, four additional igniters are located to initiate recombination of hydrogen not ignited at either the source or along its flow path. The four igniters are split between the two power groups.

Table 6.2.4-7

SUBCOMPARTMENT/AREA IGNITER COVERAGE

	Igniter Coverage (Elevation)[1]	
Subcompartment	**Power Group 1**	**Power Group 2**
Reactor Cavity	1(El 91′) 3 (El 95′) 13, 5, 55 (El 120′) 58 (El 132′) 8, 12 (El 139′)	4 (El 95′) 2 (El 99′) 11, 7, 56 (El 120′) 57 (El 132′) 6, 14 (El 139′)
Loop Compartment 01	13 (El 120′) 12 (El 139′)	11 (El 120′) 14 (El 139′)
Loop Compartment 02	5 (El 120′) 8 (El 139′)	7 (El 120′) 6 (El 139′)
Pressurizer Compartment	49 (El 154′) 60 (El 135′)	50 (El 154′) 59 (El 135′)
Tunnel connecting Loop Compartments	1 (El 91′) 3 (El 95′) 31 (El 120′)	4 (El 95′) 2 (El 99′) 30 (El 120′)
Southeast Valve Room	21 (El 105′)	20 (El 105′)
Southeast Accumulator Room	21 (El 105′)	20 (El 105′)
East Valve Room	18 (El 105′)	19 (El 105′)
Northeast Accumulator Room	18 (El 105′)	17, 19 (El 105′)
Northeast Valve Room	18 (El 105′)	17 (El 105′)
North CVS Equipment Room	34 (El 105′)	33 (El 105′)
Lower Compartment Area (CMT and Valve area)	22 (El 133′) 27, 28, 29, 31, 32 (El 120′)	23, 24, 25 (El 133′) 26, 30 (El 120′)
IRWST Outlets	35, 37 (El 137′)	36, 38 (El 137′)
IRWST Interior	9 (El 133′)	10 (El 133′)
IRWST Inlet	16 (El 133′)	15 (El 133′)
Refueling Cavity	55 (El 120′) 58 (El 132′)	56 (El 120′) 57 (El 132′)
Upper Compartment		
Lower Region	39, 42, 44, 43, 47 (El 166′)	40, 41, 45, 46, 48 (El 162′-166′)
Mid Region	51, 54 (El 233′)	52, 53 (El 233′)
Upper Region	61, 63 (El 258′)	62, 64 (El 258′)

Note:
1. Elevations are approximate.