

ARPANSA Regulatory Assessment of the Replacement Reactor Construction Application

9 July 2001 - Reactive Review Comments, Questions and Issues

PSAR Chapter 9 – Electric Power

Question reference	Section number and name	Topic	ARPANSA Comment, Issue or Question and ANSTO's Response
9.1.	9.2 Design Requirements	Equipment that is required to function even when the normal power is interrupted, and can not tolerate a brief interruption.	Which is it that cannot tolerate the brief interruption: the equipment or, the function of the equipment?
			Response: The function of the equipment
9.2.	9.2.3 Design Basis Conditions	System Fault Level - 250 MVA (3-phase)	Please provide Fault Level Calculations.
			Response: The design fault level of 250 MVA is the maximum permissible fault level guaranteed by Energy Australia. The actual fault level is a function of the Energy Australia network, and will be dependant on the characteristics of the replacement 33/11 kV transformers that will be installed by Energy Australia, which is planned to occur in the next 12 months.
9.3.	9.2.3 Design Basis Conditions	Sags / Swells - 6 monthly	What are "Sags/Swells"?
			Response: Sag: decrease in rms amplitude below the supply tolerance. Swell: increase in rms voltage above the supply tolerance.
9.4.	9.3 Description of Systems	A schematic single-line diagram of the electric power systems is shown in Figures 9.3/1 and 9.3/2.	What are RPS 1/2/3? How many feeders does the CERS have?
			Response: RPS 1/2/3 are reactor protection system UPS units (see the key at the bottom of Figure 9.3/1). Each of the two CERS units have one feeder (as shown in Figure 9.3/1).

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9.5.	9.3 Description of Systems	The two High Voltage and two pairs of main Low Voltage switchboards have bus-ties that can be used for interconnection of the two trains, so that they can be supplied from a single incoming line if required. The transformer ratings are sufficient to meet this demand.	This increases the availability of power – but what is the reduction of independence of the two trains? Single line diagrams indicate automatic transfer switches between the redundant standby trains. Please explain how this affects the independence of the two trains.
			<p>Response: This circuit arrangement (using bus-ties) provides an increase in availability of Normal Power. The independence of the two standby trains is not affected by this arrangement. The Normal Power System is not important to the safety of the facility (Category 3).</p> <p>The four automatic transfer switches (two per train) are required to allow automatic disconnection of the test load (in the event testing is being carried out) and automatic connection of the diesel generator to the Standby Power Distribution Boards. These operations are separate for the two trains, so there is no affect on the independence of the two trains</p>
9.6.	9.3 Description of Systems	A 240 V AC supply from several Uninterruptible Power Supply units that are part of the SPS.	Where are these UPS units shown in Figure 9.3/1?
			Response: The UPS units that form part of the SPS are RPS 1, RPS 2 and RPS 3. They are located on SD-A, SD-B and SD-C respectively.
9.7.	9.3.1 Equipment Categories	Diesel Generators, UPS units and batteries, are all housed in separate rooms with fire-rated walls between them (See Figure 9.3/3).	There is no Key provided for Figure 9.3/3 to indicate the meaning of ESD, RPS, RSD. What are these?

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			Response: RSD is not used, RPS 1/2/3 are the RPS UPS units, RCM is the RCMS UPS, ESD are incorrectly labelled: ESD-A1 is SD-A, SD stands for Standby Distribution ESD-A2 is SDA-A, SDA stands for Standby Distribution Auxiliary ESD-B1 is SD-B, ESD-B2 is SDA-B, ESD-C1 is SD-C.
9.8.	9.3.3 Standby Power Supply	The Diesel Generators are designed to start and attain the required voltage and frequency to be able to accept a load within 15 seconds.	Can a diesel system actually come on line that quickly?
			Response: Yes, this is part of the acceptance criteria of these units
9.9.	9.3.3 Standby Power Supply	These and other protective functions of the engine or the generator circuit breaker, and other abnormal conditions, are annunciated in the control room and locally.	Are these functions registered in both control rooms or only the MCR?
			Response: Both Control Rooms
9.10.	9.3.3 Standby Power Supply	The Standby Electric Power equipment with the exception of load banks and some electrical monitoring equipment is classified as a Seismic Category 1.	Please provide a list of the equipment that will not be Seismic Category 1. Where will the Load Banks be located? Can their positioning compromise the Category 1 Systems?

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			<p>Response: The seismic classification of the electrical monitoring equipment of the Standby Power Supply System will be finalised during detailed engineering. Information will be provided in the FSAR.</p> <p>The location of the load banks will be determined during detailed engineering. The positioning of the load banks will not compromise the Category 1 systems</p>
9.11.	9.3.8.1 Facility Earthing	To keep touch and step voltages within the vicinity of the facility maintained at less than the hazardous potential differences prescribed by IEEE Std 80 for a line-to-earth fault on the of the 415V, 11kV and 33kV supply networks.	How is there a hazard introduced into the facility by the 33kV system?
			Response: The earthing systems are all connected, so an earth fault from any of the power supply systems will cause current to flow in the earthing system
9.12.	9.3.8.1 Facility Earthing	The high-voltage supply cables will have a continuous cable sheath bonded to the earthing system at the facility and at Energy Australia's Lucas Heights Zone substation.	<p>Is it standard practice to earth cables at both ends?</p> <p>Is Energy Australia's Lucas Heights Zone Substation the same as the ANSTO Main Substation?</p>
			<p>Response: The cable sheath forms part of the earthing system and acts as a conductor. This function requires it to be connected at both ends.</p> <p>The Energy Australia Lucas Heights Zone Substation and the ANSTO Main Substation share the same fenced area, but contain different equipment.</p>
9.13.	9.3.9.3 Low Voltage Switchboards and Motor Control centres	All switchboards and motor control centres are 'dead front' sheet steel...	What is meant by the term "dead front"?

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			Response: Distribution boards that prevent access to live parts when the controls are accessed are termed “dead front”. This arrangement reduces the risk to personnel operating the circuit breakers or switches
9.14.	9.4.3.3 Evacuation Lights	In addition to the other emergency lighting, permanently energised evacuation lighting is located along evacuation routes and in part of the control room.	The Evacuation Lights are permanently energised from what source?
			Response: The emergency lights are connected to the normal power supply and contain internal batteries. In the event of failure of the normal supply the emergency lights are supplied from their internal batteries until they are powered by the diesel generators.
9.15.	9.5.1.1 Requirement a)	The provision of power from two Energy Australia zone substations to the ANSTO Main Substation.	Where are the two zone substations? Do the supply feeders follow different routes?
			Response: The two substations that feed the Lucas Heights Zone Substation are part of the Energy Australia supply network and are located in Engadine and Jannali
9.16.	9.5.1.1 Requirement a)	Fire Protection of cable systems incorporated into the design and installation by use of fire resistant and non-propagating cables	Are the HV cables fire resistant?
			Response: No. The incoming HV cables are buried along most of their route. The cables will be standard industrial high voltage cable
9.17.	9.6.3 Normal Power Supply Failure	The Uninterruptible Loads are fed from the UPS units without interruption or supply transient.	Is it possible to have no supply transient?
			Response: Yes, these UPS units are all on-line type units

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9.18.	9.7.2 Standby Power System Train A	The Train A Standby Diesel Generator (DG-A) rating is anticipated to be:	Are all the unlabelled feeders from the Distribution Board spare feeders (Figure 9.3/1)?
			Response: No. Not all loads are shown in this figure (for clarity).

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