Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.105.	10.4.1.1. System Categorisation	The Systems noted in the table under System Categorisation	These systems do not correspond to the systems specified in table 2.5/2-13 titled "Reactor Ventilation System". Please explain.
			Response: We acknowledge that there is inconsistency in the terminology used in Section 10.4 and that used in Chapter 2, Table 2.5/2. This will be corrected in the next revision of the PSAR. However, the systems covered are the same.
10.106.	10.4.2.2 System Description	In the event of an emergency, the ECC is provided with filtered supply air. There are two independent systems to provide full redundancy of operation.	Are the ECC system electrical supplies also independent?
			Response: Yes, the two independent ECC ventilation systems are provided with two independent electrical supplies.
10.107.	10.4.2.2 System Description	Each system draws in air from the intake location, handles the air by the system fan, filters the air and delivers the air to the ECC.	Where is the intake location? Could it draw contaminated air?
			Response: The air intake for one system is on the top of the reactor building and the other in the NGH, as explained in the sentence following the quoted sentence. Each system has its own pre-filter and HEPA filter located near the intake in order to minimise the possibility of contaminated air being supplied to the ECC.
10.108.	10.4.2.2 System Description	The air is ducted from the intake locations to the fans, then to the ECC, in independent fire-rated sheet metal ducts, suitably supported to withstand the appropriate seismic requirements.	Please specify "the appropriate seismic requirements"?
			Response: The appropriate seismic requirements are identified in Chapter 2, Section 2.6 which, in this case, means that the systems are Seismic Class 1.
10.109.	10.4.2.2 System Description Supply Fan	To provide air supply from intake point to the ECC.	Is there only one supply fan or one per redundant system?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: As stated in Section 10.4.2.2, para 1, there are two independent systems to provide full redundancy of operation, ie. there is one supply fan and fan motor for each of the two redundant systems.
10.110.	10.4.2.2 System Description Fan Motor	To provide drive power to fans	Is there only one motor or one per redundant system?
			Response: See response to Question 109.
10.111.	10.4.2.2 System Description Filters	Independent pre-filters and HEPA filters to provide a clean source of pressurisation air.	Only one bank of filters or two?
			Response: See response to Question 107.
10.112.	10.4.2.2 System Description Supply Air Ductwork	To transport the flow of supply air from the intake point, through the fan, to the ECC. The ductwork distribution system is fire rated from the intake point to the ECC. The system is suitably supported to meet seismic requirements for the system.	Please specify where these seismic requirements are in the PSAR?
			Response: See response to Question 108.
10.113.	10.4.2.2 System Description Relief Air Transfer Duct and Grilles	To provide a transfer path for the relief air from the ECC to the adjacent lobby.	What is “relief air”? What does this “transfer path” achieve?
			Response: The ECC ventilation system provides air to the ECC room in a “once-through” mode (ie there is no re-circulation). In order for the air to enter the room, it is necessary to exhaust or “relieve” the air from the room. The “transfer path” is the route taken by this “relief air”.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.114.	10.4.2.3 Functionality	Should there be a failure of the duty fan or any part of the duty power supply system, the stand-by system will be started manually from within the ECC, via a hard-wired connection to the system.	Why manual start of the standby system?
			Response: See response to Question 7.32. The operation of the ECC ventilation is not automatic, as it may not be needed. It is started on an "as required" basis to provide operator comfort only.
10.115.	10.4.2.6 Testing, Inspection and Maintenance	A programme of regular inspections and maintenance functions will be initiated. As the systems are reserved for emergency operation only, the inspections will incorporate test running of the fans and efficiency testing of the filters to prove full operational status.	Will this test degrade the filters? Will filters be replaced if this is the case?
			Response: The test running of the fans will result in the filters removing particulates from the air. One of the purposes of the test will be to determine the filter efficiency and condition and identify any necessity for the filters to be replaced.
10.116.	10.4.2.7.2 System Interdependence	The system is dependent on the following: a) Electrical Power Supply	Is it on a guaranteed supply?
			Response: The systems are supplied from the stand-by power supply from independent switchboards that are diesel backed.
10.117.	10.4.2.7.3 Redundancy	The system has 100% redundancy, commensurate with its Safety Category 1 classification. The redundant systems are completely independent.	Please identify where diversity and common mode failure consideration have been dealt with?
			Response: Diversity is not required since the ECC ventilation system is only required if the MCR becomes uninhabitable and operators have to move to the ECC.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.118.	10.4.2.8.1 Failure of Supply Fan	The design and installation of the system will be to Safety Category 1 standard, making the likelihood of mechanical failure extremely remote.	What does “extremely remote” mean?
			Response: The paragraph will be amended in the next revision of the PSR, to read “The design and installation of the system will be Safety Category 1, fulfilling the requirements of high reliability as expressed in Chapter 2, Section 2.3.5.”
10.119.	10.4.2.8.1 Failure of Supply Fan	A failure will be detected by loss of airflow at the air pressure detector in the supply duct at the ECC. Failure indication will be hard-wired to a display in the ECC and on failure the stand-by system will be manually started from the ECC.	Why manual start of a standby system which requires operator actions?
			Response: See response to Questions 7.32 and 10.114
10.120.	10.4.2.8.1 Failure of Supply Fan	Failure of the supply fan will cause the loss of ventilation and pressurisation air supply to the ECC from the affected system. Providing the stand-by system is fully operational, there will be no adverse affect on the habitability of the ECC.	Please explain the intent of the phrase “providing the stand-by system is fully operational”?
			Response: Wording should have been: “Failure of the supply fan will cause the loss of ventilation and pressurisation air supply to the ECC from the affected system. In this event the stand-by system will ensure that there is no adverse affect on the habitability of the ECC.” This will be amended in the next revision of the PSAR.
10.121.	10.4.2.8.1 Failure of Supply Fan	If both supply fans are started inadvertently, the effect in the ECC will be an oversupply of air to the room. However, the pressurisation of the room will be maintained at design setpoint, and there will be no adverse effect on room habitability.	How is the pressurisation of the room maintained?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: Each independent relief air transfer path (see response to Question 10.113) incorporates a damper that is set to open when the pressure in the room reaches the set point condition of 50 Pa.
10.122.	10.4.2.8.2 Air Intake Failure	A failure at the air intake location could be caused by a blockage of the air intake or by the intake of contaminants.	Please explain how the "intake of contaminants" could cause a failure at the air intake location.
			Response: There will be a smoke detector in each supply duct that will automatically stop the operating system in the event of intake of smoke. The wording will be amended in the next revision of the PSAR to reflect this.
10.123.	10.4.2.8.3 Supply Duct Failure	There are no isolation dampers in the duct systems, therefore there can be no spurious isolation of the systems.	If there is no isolation of ducting, how can one system be in standby mode without affecting flow and/or pressure within the ECC?
			Response: The two systems are completely independent and do not require isolation dampers.
10.124.	10.4.3 Emergency Control Centre Air Conditioning 10.4.3.1 Design Basis	The system is designed to meet the objective of maintaining temperature conditions within the room at $22.5^{o}C \pm 1.5^{o}C$ during operation in accordance with AS1668.2.	Is this system totally independent of the ventilation system?
			Response: Yes.
10.125.	10.4.3.2 System Description	In the event of an emergency situation, the operation of the Emergency Control Centre Ventilation and Pressurisation System is initiated manually from within the ECC. This will start the duty air conditioning system.	Is it started independently to the ventilation systems? Are they linked?
			Response: The air conditioning system is started automatically when the ECCVPS is started since this indicates that the room is occupied. This is the only connection between these two systems.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.126.	10.4.3.2 System Description	The duty and stand-by systems operate completely independently of each other.	How can they be completely independent if automatic start of the standby unit occurs?
			Response: The two air conditioning systems do not share any common components and operate independently of one another. If one system fails, the other system will detect this and start-up automatically.
10.127.	10.4.3.2 System Description	The air conditioning units are not provided with standby power.	What is the effect on ECC habitability on loss of standard power supply?
			Response: The air conditioning systems will be unavailable and the temperature in the room will equilibrate with external ambient temperature.
10.128.	10.4.4 Main Control Room Air Conditioning 10.4.4.1 System Description	The Main Control Room (MCR) is provided with air conditioning by two air handling units, located in level 10 plant room 10.04. The units provide run and stand-by capacity with 100% redundancy of all main components.	This appears to be the same location as the ECC fan and filter units. Please explain the application of the principles of separation and redundancy in this case.
			Response: The MCR air handling units and ECC fan and filter units are located in the same plant room with appropriate separation from each other.
10.129.	10.4.4 Main Control Room Air Conditioning 10.4.4.1 System Description	Each air handling unit provides cooling, heating and filtration using pre-filters and HEPA filters. Motorised air control dampers provide return air or full outside air operation.	Are these operational from within the MCR?
			Response: Yes: these units are controlled automatically by the Building Management and Control System during normal operation and manually from either the MCR or the ECC (as appropriate) in the emergency mode.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.130.	10.4.4 Main Control Room Air Conditioning 10.4.4.1 System Description	Emergency mode operation is initiated manually from within the MCR or the ECC. This will put the duty air conditioning system into full outside air (pressurisation) mode.	Please explain / justify emergency mode operation being initiated by manual operation.
			Response: See response to Questions 7.32 and 10.113.
10.131.	10.4.5.2 System Description	The air handling unit provides cooling, heating and filtration. Motorised air control dampers provide return air or full outside air operation.	Are these dampers manually adjusted or automatic?
			Response: The dampers are adjusted automatically during normal operation to provide temperature control. In the emergency mode, the dampers fail safe to the "full outside air" position.
10.132.	10.4.5.2 System Description	The air handling unit has two (2) air movement fans. The fans provide full redundancy of air movement.	Are the 2 AHU power supplies separated?
			Response: Power supplies for the 2 AHUs are provided from different trains of the electrical system.
10.133.	10.4.5.2 System Description	The AHU fans are not provided with standby power.	If there is no standby power, how do they remove smoke from the rooms by ventilation?
			Response: The ongoing development of the design during the detail engineering phase has resulted in the AHUs now being provided with stand-by power. This will be detailed in the FSAR.
10.134.	10.4.6 Loading Hot Cell Exhaust 10.4.6.2 System Description	The intake and exhaust connections at each side of the loading cell are protected by HEPA filters, which maintain a barrier between the cell and the surrounding environment.	What about gaseous discharges?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: The loading cell is provided purely for the loading and unloading of target cans. No process operations will be performed in this cell and as such, no release of radioactive gas is anticipated.
10.135.	10.4.6 Loading Hot Cell Exhaust 10.4.6.2 System Description	Run and stand-by exhaust fans, are located in level 10 plant room 10.05. The exhaust air is discharged into the main discharge stack, along with the discharge from the active and fume exhaust system.	Given that the only monitoring appears to be at the stack, on high radioactivity being detected in the stack, how will isolation of each exhaust system occur and the source of the radioactivity be identified?
			Response: The reactor ventilation exhaust is provided with three 3-way redundant monitors (activated iodine, particulate and noble gases) before it enters the stack that can initiate containment isolation via the FRPS. The stack itself is provided with single activated iodine, particulate and noble gases monitors plus a tritium monitor. This arrangement enables the operator to discriminate between releases within the containment and releases from other locations.
10.136.	10.4.6 Loading Hot Cell Exhaust 10.4.6.2 System Description	The system provides 100% redundancy of all main components.	Does the system include the stack? What happens if the stack is not available or functional?
			Response: No, the stack is a passive component and redundancy is not required. If it is unavailable (eg due to maintenance), the reactor will be shutdown.
10.137.	10.4.6 Loading Hot Cell Exhaust 10.4.6.2 System Description	Should there be a failure of the duty exhaust fan, or any part of the duty power supply system, the respective stand-by system will start automatically.	Is the standby system fed from the standby power supply?
			Response: Yes
10.138.	10.4.6 Loading Hot Cell Exhaust 10.4.6.2 System Description	The exhaust fans are provided with standby power.	Is this standard power supply with standby backup or UPS?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: The fans are supplied from the standby power supply. A supply from the UPS is not required.
10.139.	10.4.7.2.2 Active Areas	1. Level 0 2. Level 4	Are the ventilation filter rooms classified as active areas?
			Response: Yes, they will be classified as blue contamination areas since there is a potential for surface or airborne contamination in excess of the limit identified in the relevant ANSTO Safety Directive
10.140.	10.4.7.2.2 Active Areas	A failure of any duty or stand-by item will not affect the ability of the alternative system to operate.	Are all power supplies and cable trays separated?
			Response: Yes as described in Chapter 9.
10.141.	10.4.9.1.2 Level 4 Blue Area Air Conditioning	The blue areas of Level 4 are air conditioned by an air handling unit positioned in the plantroom 4.112.	This is also the chemical ventilation room. Why are these together?
			Response: The air handling units for the Level 4 Blue area and the Blue Chemistry laboratory are located in the same plant room. This plant room is adjacent to both areas. However, these units are independent of each other and there is no mixing of air between these systems.
10.142.	10.4.9.1.3 Level 4 Blue Chemistry Laboratory Air Conditioning	The Blue Chemistry laboratory is air conditioned by a separate air handling unit positioned within plant room 4.112.	Is this also the chemical ventilation room? Is this a different unit from that mentioned above?
			Response: See response to Question 10.141.
10.143.	10.4.9.1.10 Level 4 White Area Air Conditioning	The ECC and Health Physics areas have VAV diffusers to provide individual temperature control. Filtration is by panel filters located at the AHU. The system is monitored and controlled by the BMCS.	What is VAV?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: VAV stands for Variable Air Volume. The rate of air supply is controlled to maintain the appropriate temperature conditions in the room (ie. the hotter the room, the more air is supplied to the room).
10.144.	10.4.9.2.2 Reactor Building Outside Air Supply	The RBH storeroom and NGH workshops are supplied with filtered outside air. The fan is located in the RBH AHU plant room.	Where is this Plant Room?
			Response: This room (Room D 00.002) is adjacent to the RBH at Level 0.
10.145.	10.4.10.1.3 Hot Cells Exhaust System	The following are the main safety design bases of the Hot Cells Exhaust System: 1. To allow for Hot Cells cleaning during recovery operations.	How is this achieved? Is this a safety system?
			Response: This is not a safety system. The cleaning of the hot cells during recovery operations is performed by re-circulation of the air through HEPA/charcoal absorption filters as discussed in Section 10.4.10.3.3.
10.146.	10.4.10.1.4 Heavy Water Room Ventilation System	The following are the main safety design bases of the Heavy Water Room Ventilation System: 1. To appropriately treat, control and present for monitoring the airborne tritium releases to the environment, during normal and abnormal operation. 2. To allow periodic testing and in-service inspection.	What plant is within the Heavy Water Plant Room? What are the likely radiation levels within the room? Is the room accessable while operating? Where and how is monitoring for tritium achieved?

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
			Response: The Reflector Cooling and Purification System (including the Deuterium Recombination System) is located within the heavy water plant room. The dedicated ventilation system is located in a separate room that is accessible during power operation although the heavy water plant room is not accessible during normal operation. The radiation levels in the heavy water plant room and the ventilation system's plant room are discussed in Chapter 12, Section 12.5. The heavy water room ventilation system is provided with an on-line tritium monitor.
10.147	10.4.10.3.2 Reactor Air Exhaust System	Exhaust fans have manual air inlet valves, for regulation or closing for maintenance, and automatic valves at the fan air discharge that close when the fan stops. Automatic valves are pneumatically operated.	Do the automatic valves require an air supply system within the containment boundary and how is it isolated?
			Response: The provision and isolation of air supplies to valves within the containment is discussed in Chapter 7, Section 7.8. Safety systems (eg. the FSS, the SSS and the containment isolation provisions themselves) are provided with dedicated compressed air reservoirs. The compressed air system is discussed in Section 10.5.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.148	10.4.10.3.2 Reactor Air Exhaust System	To be set in operation only during containment isolation mode and on a by-pass duct there are two charcoal filters, installed within individual filter housings that allow safe filter replacement with plastic bags (bag in-bag out). The filter housing has manual inlet valves (normal open) and automatic normal-closed closing valves at the air outlets. These filters are provided for air clean-up during recovery operations; the filtered air is recirculated within the containment through a recirculation line that is automatically opened when the containment is isolated.	Is recirculation automatically initiated on containment isolation or only on “high stack radioactivity”?
			Response: Re-circulation is automatically initiated on containment isolation. See Chapter 7, Section 7.8.
10.149	10.4.10.3.3 Hot Cells Exhaust System	In containment isolation mode an isolation valve closes the connection to the exhaust discharge duct and the injection valve opens fully so that all the filtered air is recirculated through the cells. This enables air clean-up under abnormal conditions.	Is the air drawn from the Hot Cells, to maintain a negative pressure, separately monitored for radioactivity
			Response: No.
10.150	10.4.10.3.4 Heavy Water Room Ventilation System	The heavy water room at Level –5 contains the Reflector Cooling and Purification System and the Second Shutdown System components that contain heavy water. The room is airtight and has special features to control tritium. The ventilation system removes the required amount of air to keep the pressure in the room below the pressure in surrounding areas (see Figure 10.4/4).	Are these special features the air dryer recirculation units and the molecular sieve?
			Response: Yes. This is discussed in the paragraphs following the identified statement.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.151	10.4.10.3.4 Heavy Water Room Ventilation System	Since tritium that may be released from the heavy water systems would be found mainly as water vapour in the air, the system has a molecular sieve to control humidity levels. The molecular sieve beds can be changed through plastic bags (bag-in/bag-out).	Where are these located?
			Response: The heavy water room ventilation system (including the molecular sieves) is located in a dedicated room on Level –5 adjacent to the heavy water plant room.
10.152	10.4.10.3.4 Heavy Water Room Ventilation System	Two air dryer recirculation units (one on stand-by) are located in the heavy water ventilation room to cool and clean the air.	Where is the ventilation room located?
			Response: See response to Question 10.151
10.153	10.4.10.3.4 Heavy Water Room Ventilation System	To prevent de-activation, the molecular sieve beds are in an inert nitrogen atmosphere.	How does this work?
			Response: During normal operation, the molecular sieves are bypassed and the inert nitrogen atmosphere prevents degradation of the sieves due to the ingress of humidity. Upon detection of tritium, the heavy water room ventilation system operation mode is changed to enable re-circulation through the molecular sieves.
10.154	10.4.10.4.1 Containment In Normal Mode	A differential pressure loop keeps a negative pressure of -150 Pa inside the containment by acting upon a control valve placed on the air intake line.	Is this a differential pressure loop to what is shown in Figure 10.4/1-1?
			Response: This is the differential pressure loop that is shown in Figure 10.4/1.

Question reference	Section number and name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO Response
10.155	10.4.10.5.2 Failure of Fresh Air Fans	Stopping of the exhaust fan stops the pressure drop inside the containment, which is now isolated due to the automatic closure of the valve on the fan discharge. Under this situation the CERS will control the temperature.	What containment pressure would result from exhaust isolation while the intake fans continue to operate?
			Response: The containment pressure reached in this scenario is about 1.8 kPa. This is less than the structural design pressure for the containment of 2.5 kPa.