Question reference	Section Number and Name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO's Response
19.1.	19.3 Facilities	Auxiliary buildings	Please specify where the Auxiliary Building, the Small Fire Building (and what is it?) and the cooling towers are located or reference to the relevant sections or drawings in the PSAR.
			Response: Please refer to Chapter 4, Sections 4.7 and 4.9.
19.2.	19.4.1 Radioactive Material of Radiation Fields	(c) Contamination by release of fission products and fissile material.	Contamination may occur from other sources (activation products) or introduced by attached materials on equipment immersed in the pond.
			Response: Agreed, see Chapter 19, Section 19.4.1 items d) and e)
19.3.	19.4.1 Radioactive Material of Radiation Fields	(d) Contamination by concentration of fission products and activation and corrosion products in the pools or cooling systems.	Have these been estimated?
			Response: These estimates will be made during detail engineering and will be presented in the FSAR and will be updated during operation.
19.4.	19.4.1 Radioactive Material of Radiation Fields	Most of the activity is due to the activation of structural materials near the core, which receive fluxes of 3 x 10^{14} to 1 x 10^{12} neutrons/cm^2 /second.	Which structures "near the core" give "most of the activity"? What are the estimated lifetime fluences?
			Response: The cold neutron source (CNS) thimble, the beam tubes and Reflector Vessel chimney are located near the core and are subject to the fluxes stated. These are made of either Zircaloy or aluminium 6061 that are known to resist the expected fluxes during their design lives of between 10 and 40 years. The estimated lifetime fluence for reactor components is approximately 1 x 10^{23} $n.cm^{-2}$. Refer to Chapter 5, Section 5.9.2.1.
19.5.	19.4.2 Hazardous Substances	The Reactor Facility presents a low risk from these types of substances due to the small quantities used in the facility. Chemical compounds used in decontamination are examples of hazardous substances.	ARPANSA expects that the standards and material data sheets for the relevant hazardous substances would be referenced in the Decommissioning Plan.
			Response: Comment noted
19.6.	19.4.3 Physical Hazards	Standards and guidelines for the design and operation will be complied with to provide protection from these hazards.	ARPANSA expects that the standards for the relevant physical hazards would be referenced in the Decommissioning Plan.

Question reference	Section Number and Name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO's Response
			Response: Comment noted
19.7.	19.5 Decommissioning Waste Types and Management	(a) Intermediate Level Waste (ILW). (b) Low Level Waste (LLW). (c) Exempt Waste (EW). Waste which, after decay or decontamination can be managed as non radioactive waste.	Please specify or reference the criteria and definitions for these types of solid radioactive waste.
			Response: The reference for waste classification is IAEA, Classification of Radioactive Waste, Safety Series No 111-G-1.1.
19.8.	19.5.1 Reactor Internal Components	ILW will be dismounted, volume reduced, classified and packed in casks which are then removed from the reactor.	Are these existing casks or new special casks? How will volumes be reduced before removal from the reactor? What does 'dismounted' mean?
			Response: Commercially available containers, eg ISO standard skips, will be used. Either unbolted or cut using remote controlled devices to be procured later. Conventional tools available today can be used, however, it is anticipated that much better tools will be available for dismantling when the reactor is decommissioned, ie, in 45+ years time plus Safe Storage period, if applicable. Dismounting means dis-assembling or dismantling.
19.9.	19.5.3 neutron Beam Structures	The design has provisions for easy dismantling of the more activated components.	What provisions for easy dismantling are provided?
			Response: They are flanged so that they can be unbolted and removed without having to be cut.
19.10.	19.5.5 Isotope Handling Installations	The generation of active waste will be due to superficial contamination.	What does "superficial contamination" mean?
			Response: It should read "surface contamination". This will be changed in the next revision of the PSAR.
19.11.	19.5.8 Light Water Reactor from Hold-	This will be discharged to the ANSTO Waste Management System through line B or C of the	What is meant by "Light Water Reactor from Hold-up Tank"? ARPANSA expects that the sampling and criteria for discharge from the "hold-up tank" to ANSTO Waste Management

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	up Tank	Lucas Heights Science and Technology Centre (LHSTC).	Section would be specified in the Decommissioning Plan.
			Response: The title of Section 19.5.8 should be "Light Water" and the text should be amended to read "This represents the light water inventory in the reactor pool, service pool, decay tanks and other systems once the reactor is shutdown. This inventory will be discharged to the ANSTO Waste Management System through lines B or C, as appropriate, in accordance with its activity and the limit specified for each line." The text will be amended in the next revision of the PSAR. The above criteria will be specified in the Decommissioning Plan.
19.12.	19.5.10 Decontamination of Liquids	LLW liquids will be treated and conditioned.	Please specify or reference the criteria and definitions for these types of solid radioactive waste.
			Response: The title of Section 19.5.10 should be "Liquids to be Used for Decontamination". It refers to those liquids that will be used in the process of decontamination for the various systems, areas and tanks. According to the IAEA LLW (low level liquid waste) are those wastes that, when stored in a non-shielded container, have a contact dose below 2 mSv/h. This section deals with liquids. The criteria for the classification of wastes is that of IAEA Classification of Radioactive Waste - Safety Series N° 111-G-1.1
19.13.	19.6 Decommissioning Strategies	IAEA Regulations determine the three necessary decommissioning stages.	The relevant ARPANSA regulatory principles and guidelines should be described and referenced.
			Response: ARPANSA regulatory principles and guidelines will be referenced in the FSAR
19.14.	19.6.2 Choice of One Alternative	The choice of one of the options derives from the evaluation of the following aspects (a) to (k).	ARPANSA Guideline RG-1 Criteria (53) page 21 also includes: stability/integrity. Characterisation of radioactive inventory

Question reference	Section Number and Name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO's Response
			Expected physical and radiation conditions of the facility Component handling and shielding Material recycling Building
			Response: Comment noted
19.15.	19.6.3 Decommissioning Plans	The Decommissioning Plans will include the following items ….	ARPANSA expects the Decommissioning Plan to cover the arrangements for the availability and guarantee of decommissioning funds. The list should also include the conduct of a characterisation survey of facility prior to decommissioning.
			Response: Comment noted. Funds availability for decommissioning will be addressed in the Decommissioning Plan to be prepared at the end of the facility life.
19.16.	19.7 Activities During Decommissioning	(a) Characterisation of the facilities prior to dismounting activities. (j) Dismantling of the reactor internal components and reduction of the volume under water. (k) Dismantling of neutron beam guides with waste segregation. (p) Dismantling of the concrete biological shielding layers that may be activated in contact with the Reactor Pool Tank. A very small quantity of activity is expected.	(d) Should 'dismounting' be 'dismantling'? (j) How? (k) Internal or External dismantling? Can it be done underwater without leakage? (p) What are the "biological shielding layers"?

Question reference	Section Number and Name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO's Response
			Response: (d) Yes. This will be amended in the next revision of the PSAR. (j) Unbolt or cut where necessary. (k) Neutron guides (glass) are housed inside the beam tubes and are not in contact with water. They are withdrawn from inside the tubes (from the reactor face) and segregated. (p) This refers to the depth or part of concrete that will be activated. The activated zone/layer is expected to be thin and can be segregated by scraping or chipping.
19.17.	19.8 Design Characteristics to Facilitate Decommissioning	The protection of personnel involved in the decommissioning activities will be ensured by the above mentioned characteristics, together with careful planning of the decommissioning, including application of the optimisation principle and compliance with dose limits set by ARPANSA.	Where are the "above mentioned characteristics" explained? ARPANSA also agrees relevant dose constraint, ALARA objectives etc with the Licence Holder.
			Response: The "above mentioned characteristics" are described in Sections 19.8.1, 19.8.1.3 and 19.8.3 respectively.
19.18.	19.8.1.1.2 Specification of Construction Materials	All materials subject to a neutron flux that could induce significant activation will be specified to nuclear grade standards, reduce activation by minimisation of impurities which place low limits on impurities which are susceptible to high levels of activation.	Please specify or reference the nuclear grade standards. How do you reduce activation by minimisation of impurities?
			Response: Each material in the reactor will be provided in accordance with appropriate standards. Information is provided in Chapter 2, however, the standard for Zircaloy-4, the main structural material exposed to significant radiation fields, is ASTM B 352-97. The activation is reduced because impurities that are prone to activation (e.g. cobalt) are reduced.

			Response: A small cutting system is provided inside the service pool. See Chapter 12, Sections 12.4.4.1 and 12.4.4.3.
19.21.	19.8.1.3.3 Decontamination Considerations	Connections will be provided when appropriate to facilitate the decontamination of the interiors of the equipment and lines, e.g. using a mobile chemical solution circulation system.	The details of these connections to facilitate decontamination will be reviewed in the detailed design.
			Response: Comment noted
19.22.	19.8.1.3.3 Decontamination Considerations	Moreover, during decommissioning it will be possible to install additional equipment in areas closer to higher activity areas when appropriate. This is the case of the Process Room (Level –5), where a large part of the dismantling of piping and units is carried out.	This Process Room appears to be a small area. Will it be adequate for the decommissioning tasks envisaged?
			Response: Yes, the Process Room (Level –5, room 06) is adequate for the decommissioning tasks envisaged; it is approximately 30 m x 5 m.
19.23.	19.8.1.3.4 Handling Provisions	The 25 tonne capacity building crane at the Reactor Hall and the 20 tonne capacity building crane at the Reactor Beam Hall, as well as other hoists and lifts included in the Reactor Facility, will facilitate handling operations during decommissioning.	Please reference the figure or drawing where the 25 tonne Reactor Hall crane is shown (it does not appear on the drawing Fig 4.4/8.).
			Response: The 25 tonne crane is shown in Chapter 1, Figure 1.2/3 and is located above the Reactor Hall.
19.24.	19.8.1.3.4 Handling	The design of areas where decommissioning	Please identify these areas.

Question reference	Section Number and Name	Topic for clarification	ARPANSA Comment, Issue or Question and ANSTO's Response
	Provisions	operations are to be carried out will be serviced with fixed or portable cranes, fixed or portable rails and floor openings with removable lids to facilitate the transit of units.	
			Response: All of Level –5 Level 0: around the reactor block face and the area next to the Transfer Hot Cell Level 10: pneumatic system tube Level 13: Reactor Hall, including the pools and hot cells.
19.25.	19.8.1.3.4 Handling Provisions	The floor load capacity takes into account the possibility of the transit of components in heavy packages and radioactive material transport casks.	Please identify or reference where the floor load capacity for each level is given?
			Response: This information was obtained during the design of the reactor building described in Chapter 4. The information will be made available to operational and decommissioning staff through the Reactor Operating Manuals.
19.26.	19.8.3 Measures to Facilitate Auxiliary Operations During Decommissioning	Several characteristics of the Reactor Facility layout will facilitate key auxiliary operations to be carried out during the decommissioning, for example: (a) Space is available to place a classification system for decommissioning tools. (b) Space is available to place a decontamination laboratory for decommissioning tools. A computer 3D model of the plant will allow planning and optimisation of decommissioning activities.	Indications of where these spaces are would be expected in the design and decommissioning plans. When will the 3D model be available?
			Response: The information will be part of the Decommissioning Plan. The 3D model will be produced during detail engineering.