



FOI202011054 – Annex A

Reference	Assessment Finding	Milestone
AF-UKEPR-CC-006	A future licensee shall use the information provided in the GDA PCSR and supporting references to derive OTS / Operating Rules (ORs) and EMIT for UKEPR operations (includes shutdowns, maintenance activities).	Fuel load
AF-UKEPR-CC-007	A future licensee shall use the information provided in the GDA PCSR Chapter 18.2 and supporting references as the starting basis for a live site specific safety case to derive OTS / Operating Rules (ORs) and EMIT for UKEPR operations (includes shutdowns, maintenance activities).	Fuel load
AF-UKEPR-CC-14	A future licensee shall provide evidence to substantiate the grace times claimed in the EDF and AREVA report PEPS-F DC 133 dated November 2012 for a UK EPR™ following prolonged loss of power and / or cooling events for all operating states.	Fuel load
AF-UKEPR-CC-18	A future UK EPR™ Licensee shall demonstrate how the long-term control of reactivity will be ensured following the total loss of AC power.	Fuel load
AF-UKEPR-CE-038	The Licensee shall develop the test criteria and related monitoring and alert arrangements for the initial and decennial pressure tests on the containment.	Containment pressure test
AF-UKEPR-CE-039	The Licensee shall investigate the potential for using Acoustic emissions and other non invasive detection systems on the inner containment structure as could be available to them at the time of site development.	Containment pressure test
AF-UKEPR-CE-054	The Licensee shall provide justification of the seismic class of all items of structures systems and components in the MCR.	Mechanical, Electrical and C&I Safety Systems - Before delivery to Site
AF-UKEPR-CE-058	The Licensee shall confirm that relay chatter is not a concern for the proposed plant and equipment for a particular site either through elimination of components which exhibit this behaviour or by suitable testing.	First Mechanical Electrical and HVAC (MEH) system hand-over activity to commissioning
AF-UKEPR-CE-059	The Licensee shall confirm that the seismic fragilities used are valid for the particular site conditions.	Fuel load
AF-UKEPR-CE-060	The Licensee shall develop a more refined set of containment fragilities for site specific application to the PSA.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-CE-068	The Licensee shall undertake analysis of the containment structure to reflect the actual concrete properties used in the construction.	Containment pressure test
AF-UKEPR-CE-69	The Licensee shall demonstrate to an acceptable level of confidence any claims made on the reliability of the containment under seismic loading. These claims shall be supported using modern methods of simulation such as FORM and SORM. This shall take into account the design process undertaken, and the variation in strengths achieved in the construction of the containment.	Containment pressure test
AF-UKEPR-CE-70	The Licensee shall confirm through appropriate simulation that the reliability of the containment structure against overpressure satisfies the safety case requirements. This shall take into account the design process undertaken, and the variation in strengths achieved in the construction of the containment. In addition, a full range of failure scenarios shall be considered.	Containment pressure test
AF-UKEPR-CI-001	The Licensee shall ensure that where RCC-E does not explicitly reference the requirements of relevant IEC SIS standards, or standard revisions (as appropriate to the C&I SIS employed in the UKEPR) these requirements are adequately addressed in the C&I SIS lifecycle covering design, procurement and implementation processes, etc. For further guidance see T14.TO1.01, T14.TO1.03, T14.TO2.01, T14.TO2.02, T14.TO2.03, T14.TO2.04, T14.TO2.05 and T14.TO2.06 in Annex 4.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-002	The Licensee shall demonstrate the compliance of the PS and associated platform with BS IEC 61513:2001, BS IEC 60880:2006 and BS IEC 60987:2007, and SAS / PAS and associated platform with BS IEC 61513:2001, BS IEC 62138:2004 and BS IEC 60987:2004. This demonstration should address platform and system requirements separately. For further guidance see T20.A1.5.2 in Annex 9; T15.TO2.05, T15.TO2.06, T15.TO2.08, T15.TO2.09, T15.TO2.10, T15.TO2.11, T15.TO1.39, T15.TO2.43 and T15.TO2.44 in Annex 5; and T16.TO1.01, T16.TO2.11, T16.TO2.28, T16.TO2.29 and T16.TO2.31 in Annex 6.	Release of Delivery of TXS Cabinets to Site

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-CI-003	The Licensee shall demonstrate that adequate company-level processes, or UKEPR project-level processes are established for configuration management of the set of all structures, systems and components that comprise the UKEPR C&I architecture including all SIS, which should be addressed within an overall Quality Assurance Plan or equivalent, as required by BS IEC 61513:2001 clause 5.4.1. For further guidance see T14.TO1.03 in Annex 4.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-005	The Licensee shall produce a comprehensive demonstration of the adequacy of Teleperm XS self checking and error handling. For further guidance see T15.TO2.33, T15.TO2.34 and T15.TO2.35 in Annex 5; and T17.TO2.05 in Annex 7.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-006	The Licensee shall justify all variations from the requirements of BS IEC 60880 (Ref.17) and BS IEC 60987 (Ref.18) with respect to the role of the independent assessor within the Teleperm XS development lifecycle, and implement compensating measures where necessary. For further guidance see T15.TO2.22 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-007	The Licensee shall identify / produce documentation which clearly specifies the Teleperm XS platform requirements. For further guidance see T15.TO2.13 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-008	The Licensee shall produce documentation which clearly identifies the traceability of requirements from the high level Teleperm XS specifications to the lower level design documents, and through to the platform test documents. For further guidance see T15.TO2.12, T15.TO2.14 and T15.TO2.15 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-009	The Licensee shall produce a comprehensive demonstration of fitness for purpose for the Teleperm XS platform.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-010	For SAP EDR.3 the evidence referenced by EDF and AREVA for PS reliability and availability is to be superseded by Failure Mode Effects Analysis calculations which were scheduled to be provided in December 2010. The Licensee shall update the CAE trail for EDR.3 and EDR.1 as appropriate, and produce the cited FMEA evidence and required justification. For further guidance see T15.TO2.50, T15.TO2.54 and T15.TO2.62 in Annex 5.	Release of Delivery of TXS Cabinets to Site

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-011	The Licensee shall produce a safety demonstration for the selection and use of Programmable Complex Electronic Components in the Teleperm XS platform, which form part of the Class 1 UKEPR Protection System, using appropriate standards and guidance. For further guidance see T14.TO1.02 in Annex 4; T15.TO1.2 and T15.TO1.3 in Annex 5; and T20.A1.5.5 in Annex 9.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-012	The Licensee shall produce a comprehensive safety demonstration addressing the adequacy of the SPPA-T2000 platform for Class 2 use covering hardware design, qualification and software design processes. For further guidance see T15.TO2.39, T15.TO2.40, T15.TO2.41, T15.TO2.42 and T15.TO2.44 in Annex 5; T17.TO2.06 in Annex 7; and T20.A2.3.4 in Annex 9.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-013	The Licensee shall produce adequate justification that the SPPA-T2000 Engineering System cannot cause unintended interference with the Class 2 SAS during plant operation. For further guidance see T15.TO2.61 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-014	The Licensee shall ensure that the software re-use argument presented addresses all Class 2 components of the SPPA-T2000 that contain dedicated devices with embedded software, or if no such software exists a positive statement saying so should be made. For further guidance see T15.TO2.60 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-015	The Licensee shall produce adequate justification that the issue raised by ASN concerning the adequacy of the quality system test records for the original development of the SPPA-T2000 platform does not compromise the claims made for this platform in the UKEPR design. For further guidance see T15.TO1.38 in Annex 5.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-016	The Licensee shall produce adequate justification that relevant issues raised by other national regulators concerning the adequacy of SIS have been adequately addressed where relevant to the UKEPR design and do not compromise the claims made for the UKEPR design.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-017	The Licensee shall implement the smart devices qualification methodology defined under GDA Issue GI-UKEPR-CI-04 and ensure implementation evidence is available for review for all safety classes.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-018	The Licensee shall ensure there is an adequate safety case for in-core instrumentation sensors and other sensors used in SIS. For further guidance see T13.TO2.44 in Annex 3.	Release of Delivery of TXS Cabinets to Site

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AF-UKEPR-CI-019	The Licensee shall ensure the fail-safe principle (including the application of the appropriate response to C&I equipment failures) is implemented in the design of UKEPR C&I nuclear safety functions. For further guidance see T16.TO2.18 in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-020	The Licensee shall demonstrate that EPR C&I SIS comply with relevant IEC standards in their installation, commissioning and operational lifecycle phases. For further guidance see T16.TO2.28 and T16.TO2.30 in Annex 6.	Power raise
AF-UKEPR-CI-021	The Licensee shall demonstrate that the use of a different compiler with the SIVAT tool compared to that used to generate the object code which will run on the PS does not compromise the integrity of the PS application software development lifecycle. For further guidance see T16.TO2.19.b in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-022	The Licensee shall demonstrate the adequacy of the Protection System application code testing process with respect to functional coverage. For further guidance see T16.TO2.19 item a) in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-023	The Licensee shall demonstrate the adequacy of conformance of the Protection System with EQU.1 (qualification procedures), EDR.2 (redundancy, diversity and segregation), EDR.3 (common cause failure), EMT.7 (functional testing), ESS.18 (failure independence), ESS.21 (reliability), and ESS.23 (allowance for unavailability). For further guidance see T15.TO2.52 in Annex 5; T16.TO2.01, T16.TO2.03, T16.TO2.04, T16.TO2.05, T16.TO2.06, T16.TO2.07 and T16.TO2.08 in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-024	The Licensee shall produce evidence to demonstrate the adequacy of the design and implementation of the PS calculated trip functions. For further guidance see T16.TO2.33.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-025	The Licensee shall demonstrate that the differences of functional coverage across the PS trains do not give rise to any safety concerns (such as an inability to meet the reliability requirements or the single failure functional criterion requirements) when failures occur within a train, or any train is taken out of service for maintenance. For further guidance see T17.TO2.09 in Annex 7, T18.TO2.01 in Annex 8 and T20.A1.4.3 in Annex 9.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-026	The Licensee shall implement a series of statistical-based tests (i.e. as justified in response to GDA Issue GI-UKEPR-CI-02, see below) as one component of the ICBMs for the UKEPR Protection System.	Power raise

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-027	The Licensee shall produce a full set of UKEPR PS development records demonstrating compliance with the requirements of the development process (e.g. D-01.3: Master Test Plan, D-01.4: Protection System - System Requirements Specification) and method documents. Traceability of requirements and qualification of tools should also be addressed. For further guidance see T16.TO2.10, T16.TO2.12, T16.TO2.13, T16.TO2.14, T16.TO2.15, T16.TO2.16, T16.TO2.17 and T16.TO2.20 in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-028	The Licensee shall demonstrate the adequacy of conformance of the SAS / PAS to EDR.1 (failure to safety), EDR.2 (redundancy, diversity and segregation), EDR.3 (Common cause failure), EQU.1 (qualification), EMT.7 (functional testing) and ESR.5 (standards for computer-based equipment). For further guidance see T16.TO2.22, T16.TO2.23, T16.TO2.24, T16.TO2.25, T16.TO2.26 and T16.TO2.27 in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-029	The Licensee shall demonstrate that adequate arrangements are in place to ensure that the UKEPR Class 1 PACS meets relevant design standards, adequate defences against CCF are provided and correct prioritisation is provided. For further guidance see T17.TO2.08, T17.TO2.19 and T17.TO2.27 in Annex 7.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-030	The Licensee shall demonstrate that adequate arrangements are in place to ensure that the UKEPR Class 1 SICS meets relevant design standards. For further guidance see T16.TO2.32 in Annex 6.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-031	Definition and assignment of functions to C&I SIS - The Licensee shall ensure that for the UKEPR there is a rigorous definition of the overall system architecture, the assignment of functions to SIS, interfaces and independence requirements. For further guidance see T17.TO1.02, T17.TO1.25, T17.TO2.03, T17.TO2.10, T17.TO2.17, T17.TO2.26 and T17.TO2.27 in Annex 7; and T18.TO2.03 and T18.TO2.07 in Annex 8.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-032	PCSR Update - The Licensee shall update the PCSR and supporting documentation to take account of the changes made to address RI-UKEPR-002 and RO-UKEPR-43. For further guidance see T17.TO1.11, T17.TO1.14 and T17.TO1.25 in Annex 7; and T18.TO1.01 in Annex 8.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-033	<p>The Licensee shall implement a rigorous programme of PS ICBMs covering:</p> <ul style="list-style-type: none"> <li>· Statistical and functional testing based on 50,000 tests of which 48,000 will be statistical (see also AF-UKEPR-CI-026), taking cognisance of any emerging research results.</li> <li>· Static analysis (using MALPAS) and concurrency analysis (using SPIN/Promela if demonstrated to be feasible or other means such as manual review).</li> <li>· Functional analysis (by reverse engineering) and integrity checking of the RTECONF module.</li> <li>· Source to Code Comparison (including completion of an As Low As Reasonably Practicable (ALARP) demonstration if it is considered not reasonably practicable to apply the SCC technique to the PS interface units).</li> </ul> <p>Also, to ensure the justification of PS core units' non-interference by the interface units is completed (i.e. as committed to in the response to TQ-EPR-1607, Ref. 86).</p> <p>For further guidance on development of a rigorous programme of PS ICBMs see Technical Observations GICI02.TO2.15 to GICI02.TO2.25 in Annex 12.</p>	Power raise
AF-UKEPR-CI-034	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Revise the SAPS conformance CAE trails (Ref. 91) to ensure, as appropriate, the claims and argumentation for each SAP and its guidance paragraphs are fully addressed (see also AF-UKEPR-010, AF-UKEPR-023 and AF-UKEPR-028) in the CAE trails.</li> <li>· Include the additional claims, arguments and evidence generated during closure of the GDA Issues into the PCSR key claims (Ref. 89) and SAPS conformance CAE trails(Ref. 91).</li> <li>· Reference the evidence generated during C&amp;I systems' development, installation and commissioning in the PCSR key claims and SAPS conformance CAE trails.</li> </ul> <p>For further guidance on the completion of the CAE trails see Technical Observations GICI03.TO2.01 and GICI03.TO2.02, in Annex 13 for PCSR key claims, and GICI03.TO2.03, GICI03.TO2.04 and GICI03.TO2.05 in Annex 13 and GICI06A9.TO2.17 in Annex 16 for SAP conformance.</p>	Power raise

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-035	<p>The Licensee shall address the open points on the PCSR summarised below by updating the PCSR to:</p> <ul style="list-style-type: none"> <li>· include the justification of the adequacy of programmable complex electronic components;</li> <li>· include the UNICORN platform and NCSS justifications; and</li> <li>· address the inconsistencies in the status of the PICS and the interfaces between the Class 1 PS and other systems.</li> </ul> <p>Further guidance on open points to be addressed in the development of the PCSR is provided in PCSR review pro-forma 'PCSR Chapter Review for CI Rev 2', Ref. 106.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-036	<p>The Licensee shall develop the SPPA-T2000 platform BSC and complete the safety case to:</p> <ul style="list-style-type: none"> <li>· Include a clear definition of the BSC scope and improvements to structure to clearly identify the impact of the S5 to S7 SPPA-T2000 platform version change.</li> <li>· Revise the BSC / safety case claims and arguments to correctly and fully address each SAP and its guidance paragraphs (see also AF-UKEPR-CI-010, AF-UKEPR-CI-023 and AF-UKEPR-CI-028).</li> <li>· Include evidence generated during C&amp;I system development, installation and commissioning including standards compliance, reliability and response time evidence to support the safety case claims and arguments (see also AF-UKEPR-CI-002, AF-UKEPR-CI-020 and AF-UKEPR-CI-029).</li> </ul> <p>For further guidance on the completion of the BSC (including its extended scope and supporting documents) see Technical Observations GICI05.TO2.01 to GICI05.TO2.06 in Annex 15 and GICI06.A1.TO2.05 in Annex 16.</p>	Power raise



Reference	Assessment Finding	Milestone
AF-UKEPR-CI-037	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Complete and update the diversity submission documents (i.e. Refs 138, 141 and 142) in line with the commitments made during the GDA closure phase (i.e. in Refs 141, 143, 147, and TQs TQ-EPR-1628 and TQ-EPR-1629 Ref. 86). For further guidance see Annex 16 Technical Observations GICI06.A1.TO2.06 and GICI06.A1.TO2.07.</li> <li>· Remove inconsistencies in the definition of the diversity criteria for the PS / SAS (Ref. 140), NCSS (Ref. 144), PACS (Ref. 145), and the sensors and conditioning modules (146). For example, the signal diversity levels 1 and 2 in one scheme are levels 2 and 3 in another. For further guidance see Annex 16 Technical Observation GICI06.A1.TO2.08.</li> <li>· Complete diversity analysis, in line with the methodology and criteria, for the three major C&amp;I platforms (i.e. Teleperm XS, SPPA-T2000 (version S7) and UNICORN), the three major C&amp;I systems built on those platforms (i.e. PS, SAS and NCSS) and other C&amp;I systems built on the platforms if diversity claims are made in the safety case. For further guidance see Annex 16 Technical Observations GICI06.A1.TO2.04, GICI06.A1.TO2.07 and GICI06.A1.TO2.09, and Annex 11 Technical Observation GICI01.TO2.31.</li> <li>· Ensure the final systems using the Teleperm XS and SPPA-T2000 (version S7) platforms include the modifications proposed in Ref. 151. For the Teleperm XS platform replace the AMPRO firmware. For the SPPA-T2000 (version S7) replace the ASPC2 ASIC used for Profibus control. Also to implement the design constraint on SPPA-T2000 (version S7) to prevent the use of the AV42 module and the OLMAS ASIC. For further guidance see Annex 16 Technical Observation GICI06.A1.TO2.04.</li> </ul>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-038	<p>The Licensee shall complete the demonstrations of reliability and independence for inclusion in the safety case, in particular to:</p> <ul style="list-style-type: none"> <li>· Undertake the modifications to the PS and / or its periodic test arrangements to allow the reliability targets (e.g. for trip on low DNBR by increasing the frequency of periodic tests) to be met.</li> <li>· Complete the hardware reliability evaluations for the final designs of the SIS (i.e. the PS, SAS and NCSS).</li> <li>· Complete the justification of inter divisional and inter system independence and isolation of the SIS. For further guidance see in Annex 16 Technical Observations GICI06.A2.TO2.11, on the PS modifications and reliability, and GICI06.A2.TO2.06 and GICI06.A2.TO2.14 on independence and isolation.</li> </ul>	Release of Delivery of TXS Cabinets to Site

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AF-UKEPR-CI-039	<p>The Licensee shall fully define the PE and ICBMs for CBSIS. In particular, to:</p> <ul style="list-style-type: none"> <li>· Ensure that the generic guidance for CBSIS for concurrency analysis addresses adequacy of tools (e.g. such as the CodeSonar® tool used for Class 1, 1x10<sup>-3</sup> pfd systems) and dynamic memory capacity.</li> <li>· Complete the definition of the SPPA-T2000 ICBMs including identification and justification of the key elements to be analysed by the manual review, approach to software integrity checking and dynamic testing.</li> </ul> <p>For further guidance on the completion of the demonstration of the adequacy of the PE and ICBMs for CBSIS see Technical Observations GICI06.A3.TO2.07 and GICI06.A3.TO2.08 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-040	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Ensure the analysis of the non disturbance of the PS by signals coming from lower classified systems is updated to reflect any future design changes and the final PS design.</li> <li>· Confirm whether there is an EDG “start up in test” signal into the PS, and if so update the relevant non disturbance justification or produce a CMF for the change.</li> </ul>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-041	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Confirm that the SAS functional and safety interlocks referred to in TQ-EPR-1532 response inhibit spurious commands from the PICS, and produce a justification of the adequacy of the interlocks.</li> <li>· Produce a comprehensive justification that Class 2 systems cannot be adversely affected by lower class systems. This justification to include the RCSL and systems based on SPPA-T2000 platform version S7 technology.</li> <li>· Produce an analysis for the final UK EPR™ SAS design that demonstrates that a “spurious but valid command sent to the SAS from the PICS” will affect at the very worst only one division and the consequences can be managed (e.g. by an update of Ref. 203). The analysis to include justification that the consequences of a spurious multi-division grouped command being received and enacted by the SAS are acceptable, for all such commands (as committed to in Ref. 203).</li> </ul> <p>For further guidance on independence of SAS from PICS see Technical Observations GICI06.A5.TO2.03 to GICI06.A5.TO2.06 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site

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AF-UKEPR-CI-042	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Ensure that the development of the PSOT, including the QDS system (hardware and software), is carried out according to appropriate international standards, including BS IEC 61513, BS IEC 60880, and BS IEC 60987, that tools and COTS components are suitably qualified, that justification is produced, and documentation updated.</li> <li>· Ensure that indication is provided to operators of the status of all resets, permissives, and manual controls, or where this is not to be done, produce a justification as to why this is acceptable and is not reasonably practicable.</li> <li>· Once the design has been completed, fully document the Class 1 displays and controls to be provided for the UK EPR™, and produce full justification of adequacy, to include the functional coverage of controls and displays in the MCR and RSS for all operational states.</li> </ul> <p>For further guidance on Class 1 controls and displays see Technical Observations GICI06.A6.TO2.08 to GICI06.A6.TO2.018 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-043	<p>The Licensee shall complete the demonstration of the adequacy of the UK EPR™ end-to-end response times for those functions important to safety which use the Class 3 Terminal Bus and / or Plant Bus using SPPA-T2000 platform version S7 information. The Licensee to:</p> <ul style="list-style-type: none"> <li>· Perform a design analysis of the end-to-end response times using SPPA-T2000 platform S7 version information (i.e. updating the SPPA-T2000 platform S5 version analyses provided during GDA).</li> <li>· Undertake a programme of performance / response time tests on fully representative UK EPR™ equipment (including SPPA-T2000 platform version S7 components) that include consideration of avalanche conditions both generated by the plant and internal to the SPPA-T2000 platform S7 version equipment).</li> <li>· Ensure an accurate predictability model for SPPA-T2000 platform S7 version level 1 (AS620B and SAS network) response times is developed (drawing on the results of the design analyses and performance / response time tests) to inform the design decisions for the UK EPR™, in particular, in relation to the allocation of functions to processor modules and the need for point-to-point communications.</li> </ul> <p>For further guidance on the completion of the demonstration of the adequacy of the end-to-end response times see Technical Observations GICI06.A8.TO2.04 and GICI06.A8.TO2.06 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site

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AF-UKEPR-CI-044	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Produce a comprehensive sensor and conditioning diversity implementation plan that identifies the main activities to be carried out during the SSP, including completion of the functional analysis of sensor and conditioning modules CCF (e.g. see PELA-F DC 3 (Ref. 233), diversity cases associated with conditioning modules involved in the mitigation of faults in support functions and the spent fuel pool).</li> <li>· Where signal diversity criteria Sgd=3 is identified and no diverse parameter is available, employ devices that use diverse measuring principles.</li> <li>· Produce a comprehensive substantiation of the reliability claims for sensors and conditioning modules using the methodology defined in PELA-F DC 7 (Ref. 235).</li> </ul> <p>For further guidance on what is needed to address this Assessment finding see Technical Observations GICI06.A9.TO2.19 and GICI06.A9.TO2.25 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-045	<p>The Licensee shall confirm the adequacy of the allocation of conditioning modules and sensors (i.e. one group to the PS and other to the SAS / NCSS) by completing sufficient detailed calculations (e.g. as referred to in PEPS-F DC 148, Ref. 236).</p> <p>For further guidance on what is needed to address this Assessment finding see Technical Observation GICI06.A9.TO2.24 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-046	<p>The Licensee shall produce a comprehensive PACS module diversity implementation plan that identifies the main activities to be carried out during the SSP, including: completion of the PACS module diversity analysis (e.g. diversity cases associated with support functions (see Ref. 238), impact of SIS maintenance and potential for allocation on a functional basis).</p> <p>For further guidance on what is needed to address this Assessment Finding see Technical Observations GICI06.A9.TO2.16, GICI06.A9.TO2.20 and GICI06.A9.TO2.21 in Annex 16 and Fault Studies Assessment Report (Ref. 87).</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-047	<p>The Licensee shall, for those actuators that are not driven by PACS modules and / or switchgear, perform an assessment to identify any embedded or associated C&amp;I components such as positioners, variable speed drives, feedback devices etc. and provide a justification of their adequacy (e.g. in a similar way as for the PACS modules, by developing and implementing diversity criteria, implementation plans and component reliability substantiations).</p>	Release of Delivery of TXS Cabinets to Site

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-048	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Update document PEPS-F DC 90 so that it clearly defines the requirements for design in respect of common cause failure during maintenance.</li> <li>· When C&amp;I categorisation and classification is complete, update the documentation (e.g. ECEF091489) to record the final categorisations of functions and classifications of systems, identifying any categorisation shortfalls and providing full justification, as necessary.</li> <li>· Ensure that the requirements (e.g. PEPS-F DC 90 rev. C) in respect of diversity and defence-in-depth are followed during the detailed design of the UK EPR™, and where the requirements are not met, produce a justification.</li> <li>· Review the C&amp;I design requirements documents (e.g. ECECC120414) to identify whether all relevant ONR C&amp;I SAPs and their related guidance paragraphs are considered, updating these where relevant SAPs are not found, or not comprehensively met (i.e. including the related guidance paragraphs).</li> <li>· Review the document 'UK EPR I&amp;C Architecture' ECECC100831 Rev B to identify discrepancies with other UK EPR™ documentation, and resolve these (e.g. Figure 2, shows outputs from the PS and NCSS passing through an SPPA T2000 PACS interface and FA3 references should be replaced by UK specific ones).</li> </ul> <p>For further guidance on ensuring the adequacy of the design principles and guidance influencing the provision of diversity and defence-in-depth, and allocation of functions to diverse systems see Technical Observations GICI06.A9.TO2.14, GICI06.A9.TO2.17, GICI06.A9.TO2.18, GICI06.A9.TO2.22 and GICI06.A9.TO2.23 in Annex 16.</p>	Release of Delivery of TXS Cabinets to Site

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-050	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Document and justify the adequacy of the final NCSS design in the safety case (e.g. the approach to testing, fail safe capability and selection of single or dual chain architecture for manual functions, etc.).</li> <li>· Confirm the adequacy of the final NCSS design, in relation to reduction of plant risk, by including NCSS design details into the PSA.</li> <li>· Define how, once triggered, the action of an NCSS automatic function will be reset and confirm this meets the requirements of SAP ESS.14.</li> <li>· Assess the effect of power loss within the NCSS system on plant safety (e.g. power loss leading to a failure to actuate when required or send alarms to operators).</li> <li>· Define and justify the response times and reliabilities for all NCSS functions (including the energise to actuate AVACT module and consideration of the impact of maintenance on system reliability).</li> <li>· Review the quality control procedures and update these to ensure adequate coverage of standards and activities (e.g. including demonstration of conformance to the requirements of standards BS IEC 61513 and BS IEC 60987, regression testing of engineering and test tools following a version change, and independence of qualification teams).</li> </ul> <p>For further guidance on the completion of the NCSS safety case see Technical Observations GICI01.TO2.18 to GICI01.TO2.21 and GICI01.TO2.23 to GICI01.TO2.34 in Annex 11.</p>	Release of Delivery of TXS Cabinets to Site

Reference	Assessment Finding	Milestone
AF-UKEPR-CI-051	<p>The Licensee shall:</p> <ul style="list-style-type: none"> <li>· Complete the trial qualification of the Class 1 smart device, assess the effectiveness of the qualification, and update the smart device qualification documentation and processes where improvements are identified.</li> <li>· Address the omissions in the Class 2 smart device trial qualification, assess the effectiveness of the qualification, and update the qualification documentation and processes where improvements are identified.</li> <li>· Confirm that a change in the Emphasis version will not adversely affect the qualification of smart devices.</li> <li>· Ensure that all smart device features (e.g. such as clock synchronisation and removable data logging memory), that have the potential to adversely affect the operation of safety functions are identified and, as appropriate, included within the qualification.</li> <li>· Ensure that all smart devices are qualified in accordance with the updated procedures, see AF-UKEPR-CI-017.</li> <li>· Where smart devices contain software that has been developed to a lower standard than that required by the classification of the device, a justification should be provided for the adequacy of this software (e.g. as Pre-Developed Software using appropriate standards and guidance), and that this software will not have an adverse effect on the safety functions (to include potential to corrupt program and data memory areas, and hardware settings).</li> </ul> <p>For further guidance on smart device qualification see Technical Observations GICI04.TO2.03 to GICI04.TO2.08 in Annex 14.</p>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CI-052	<p>The Licensee shall ensure that fully developed safety cases are produced that address:</p> <ul style="list-style-type: none"> <li>· the C&amp;I CMFs submitted during GDA; and</li> <li>· development of the safety cases outlined in the Basis of Safety Cases (BSCs) produced in response to the C&amp;I GDA Issues (i.e. for the NCSS, PSOT and SPPA-T2000 version change).</li> </ul>	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-CSA-001	<p>The licensee shall provide the ventilation strategy supporting the concept of inaccessible/accessible areas during normal operations and accident conditions for situations where one or more of the foils and dampers have failed.</p>	Containment pressure test
AF-UKEPR-CSA-002	<p>The licensee shall provide the test results to support the claims for the performance and the reliability of the foils and dampers used in the CONVECT system.</p>	Containment pressure test

Reference	Assessment Finding	Milestone
AF-UKEPR-CSA-003	The licensee shall provide clarification of the impact of the availability of the foils and dampers on plant operation and specifically, how this is controlled by technical specification.	Containment pressure test
AF-UKEPR-CSA-004	The licensee shall provide analysis to examine the impact of unintended and/or undetected opening of the foils and dampers on the pressure and temperature monitoring informing the accident management procedures.	Containment pressure test
AF-UKEPR-CSA-005	The licensee shall provide analysis to examine the impact of incomplete operation of the CONVECT system.	Containment pressure test
AF-UKEPR-CSA-006	The licensee shall justify that the isolation systems and containment penetrations meet the site specific loading requirements (pressure, temperature, moisture and leakage) in accident conditions.	Cold Ops
AF-UKEPR-CSA-007	The licensee shall demonstrate that the design of insulation and the strainer structures associated with the safety injection system is such that the risk of sump blockage has been reduced to the lowest level reasonably practicable. In particular, the licensee should produce an analysis of the options and justify the choice of insulating technology.	Containment pressure test
AF-UKEPR-CSA-008	The licensee shall justify the measurement systems indicating core conditions used to initiate the accident management procedures, such as, core outlet temperature measurements and the reliability of instrumentation routed via the RPV head; the justification should give consideration to common cause failure.	Cold Ops
AF-UKEPR-CSA-009	The licensee shall provide an analysis of the impact on safety from degradation through ageing of the in-vessel thermocouples with a view of establishing maintenance plans assuring the integrity of this equipment over long operational periods and throughout the plant's lifetime.	Cold Ops
AF-UKEPR-CSA-010	The licensee shall provide a robust justification of the operational requirements of the PDS during fault conditions. The justification is expected to fully consider the PDS implementation and Operating Strategies for Severe Accident (OSSA) for the UK EPR.	Cold Ops
AF-UKEPR-CSA-014	The licensee shall provide additional justification to: <ul style="list-style-type: none"> <li>· demonstrate that the weld beads and outer frame meet the loading requirement, and</li> <li>· support a testing programme to capture unacceptable defects in the weld beads.</li> </ul>	Receipt of first major NSSS shipment to site



<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-CSA-015	The licensee shall justify that potential presence of chunks of concrete above the melt plug at the time of bottom head failure has no significant consequences on the melt plug opening.	Receipt of first major NSSS shipment to site
AF-UKEPR-CSA-016	The licensee shall define the examination, maintenance, inspection and testing requirements necessary for the melt plug to fulfil its safety functions.	Containment pressure test
AF-UKEPR-CSA-021	The licensee shall provide the measure(s) and arrangement(s) for inspection in order to ensure that the reactor pit is kept sufficiently dry.	Containment pressure test
AF-UKEPR-CSA-025	The licensee shall provide the available measures to limit the containment pressure, in the event of a severe accident leading to the failure of the CHRS, to prevent uncontrolled radiological releases from the primary containment.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-CSA-026	The licensee shall provide a comprehensive set of documentation for the GASFLOW and the COM3D codes used in support of the PCSR. This should include, but not be restricted to: <ul style="list-style-type: none"> <li>· Detailing the modelling used,</li> <li>· Guidance on the code limits of applicability, its use and qualified uncertainty allowances, and</li> <li>· Substantiation of the codes' validity by comparison against measurements and independent analysis.</li> </ul>	Active Pre-Commissioning Safety Report (PCmSR)
AF-UKEPR-EE-007	The future licensee shall carry out studies to assess the consequences of AVR failure for each power plant.	Cold Ops
AF-UKEPR-EE-011	The future licensee shall carry out a harmonic study for each power plant.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-EE-014	The future licensee shall carry out studies to assess the effects of overvoltages following system disturbances for each power plant taking account of the recommendations of the DIDEISYS task group. The future licensee shall undertake studies to verify the resilience of motors and couplings to voltage disturbances.	Cold Ops
AF-UKEPR-EE-016	The future licensee shall identify all Smart Devices to be used in electrical equipment to enable full verification of these devices to be carried out.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-EE-020	The future licensee shall provide an effective monitoring system for faults on the IT system and shall ensure that switchgear has been type tested to ensure that it can clear faults in the event of a double earth.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FD-001	The licensee shall review the fuel assembly measurements taken from the first core offload at Flamanville and determine the impact that the data has on the safety justification of the proposed core management.	Fuel on-site
AF-UKEPR-FD-002	The licensee shall review the results of available EPR physics testing and confirm uncertainty allowances in the safety case.	Fuel load
AF-UKEPR-FD-003	The licensee shall demonstrate that the procedures proposed for loading the reactor core with fuel will ensure that an uncontrolled criticality is incredible or that all reasonably practical measures have been taken to prevent this.	Fuel load
AF-UKEPR-FD-004	The licensee shall acquire and report data on hydride reorientation to demonstrate that irradiated cladding with predominantly radially-orientated hydride precipitates can retain adequate ductility at the hydride levels proposed.	Fuel on-site
AF-UKEPR-FD-005	The licensee shall repeat the recent OECD benchmark studies on boiling flow in rod bundles and update the FLICA qualification documents.	Fuel load
AF-UKEPR-FD-006	The licensee shall review as-built flow rates and reflect conclusions for flow-induced wear in the maintenance schedule for affected components.	Power raise
AF-UKEPR-FD-007	The licensee shall revise their reported analysis of the RIA fault to demonstrate that no fuel breaches the clad temperature limits designed to ensure residual ductility and provide an assessment of whether it may be reasonably practical to change the rod insertion limit to prevent any fuel entering the DNB condition.	Install RPV
AF-UKEPR-FD-008	The licensee shall review the derived criteria for cladding failure in RIA faults in the context of the results of the relevant experiments in the current CABRI programme if they become available.	During Operational phase
AF-UKEPR-FS-002	The future licensee shall justify the applicability of the critical heat flux correlation used in the analysis of main steamline break faults for natural circulation conditions following the tripping of the reactor coolant pumps.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-003	The future licensee shall analyse the steamline break fault at hot zero power conditions assuming zero xenon and zero boron but with all RCCAs inserted to demonstrate that following a return to power that the fuel does not enter DNB.	Fuel load
AF-UKEPR-FS-004	The future licensee shall provide the methodology for determining the uncertainty allowance for the low DNBR trip setpoint and the $DNBR_{LCO}$ site limit for Type I and Type II fault transients (as defined in Chapter 14.1 of the PCSR). This will need to include a justification of the algorithm used in the RPS for calculating these setpoints from the measurements made by the in-core detectors and the allowance for uncertainties due to the use of these detectors including the uncertainties associated with their calibration.	Fuel load
AF-UKEPR-FS-005	The future licensee shall assess the radiological consequences (and demonstrate compliance with Target 4 of the SAPs) of multiple consequential steam generator tube ruptures occurring following a steamline break assuming the single failure of the Main Steamline Isolation Valve failing to close on the steamline associated with the fault.	Fuel on-site
AF-UKEPR-FS-006	The future licensee shall review the MANTA validation report and perform a PIRT and scaling analysis to confirm the relevance of the validation evidence to the UK EPR design. AND The future licensee shall perform any potential commissioning tests needed to provide further validation evidence for MANTA code identified from this review.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-007	The future licensee shall use the MANTA/SMART/FLICA coupled code to perform calculations against a NEA international benchmark such as a BWR stability benchmark (Ref. 47) or some other suitable test data agreed with the regulator.	Fuel load
AF-UKEPR-FS-009	The future licensee shall perform a quantitative ALARP assessment as to whether there should be a temporary reduction in reactor power when one EFWS pump is put into maintenance such that 1-out-of-4 EFWS pumps would provide adequate heat removal following a feedline break fault.	Fuel on-site
AF-UKEPR-FS-010	The future licensee shall develop suitable maintenance arrangements to ensure the functional diversity of divisions 1 & 4 and divisions 2 & 3 of the Emergency Feedwater System (EFWS) pumps and the functional diversity of the emergency diesel generators and the station blackout diesel generators are ensured.	Fuel on-site

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-FS-012	The future licensee shall perform transient analysis studies to confirm that the forced reduction in coolant flow ATWT case with failure of RCCAs to insert is bounded by (or equivalent to) the loss of off-site power ATWT case with failure of the RCCAs to insert.	Fuel on-site
AF-UKEPR-FS-013	The future licensee shall perform a sensitivity study to the loss of off-site power ATWT case with failure of the RCCAs to insert in which Interim insertion of RCCAs is assumed. This is to demonstrate that the power distribution is not distorted such that fuel enters DNB.	Fuel on-site
AF-UKEPR-FS-015	The future licensee shall demonstrate that for the uncontrolled RCCA bank withdrawal at power fault there is a diverse trip signal is available for the full range reactivity insertion rates and power levels.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-016	The future licensee shall demonstrate that for the uncontrolled RCCA bank withdrawal at power fault that the trip setpoints on the diverse protection system are adequate to ensure that the fuel does not enter DNB.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-017	The future licensee shall provide transient analysis to demonstrate that adequate protection is provided for a CVCS malfunction resulting in boron dilution while at power with failure of the reactor protection system to trip the reactor.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-018	The future licensee shall demonstrate that a fuel loading error involving the two most onerous fuel assemblies will not result in fuel entering DNB upon return to power.	Fuel on-site
AF-UKEPR-FS-020	The future licensee shall perform SBLOCA with ATWT sensitivity studies to investigate the margins provided by the adopted Interim cooldown rate to avoid recriticality while ensuring adequate cooling of fuel.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-021	The future licensee shall provide transient analysis of the long term aspects of PCC-4 LBLOCA faults to demonstrate that all safety criteria are met, updating the CATHARE/CONPATE analysis that is currently presented in GDA PCSR.	Fuel load
AF-UKEPR-FS-022	The future licensee shall ensure spurious C&I signals as initiating events are covered in the UK EPR safety case.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-FS-024	The future licensee shall identify checks on the functionality of the spent fuel pool cooling siphon breakers to be undertaken during commissioning and during the lifetime of the pool.	Cold Ops

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-028	The future licensee shall provide site specific radiological consequences analysis for design basis events (including hazards), taking due cognisance of usual UK methodology assumptions and explicitly comparing the results against Target 4. Single failure assumptions and sensitivity cases should be reviewed and addressed on their merits for the UK.	Fuel on-site
AF-UKEPR-FS-101	The future licensee shall develop the conceptual design for the safeguard building main HVAC systems proposed under CMF#41 into a fully developed detailed design sufficient for a detailed specification of the requirements for the mechanical, electrical and C&I sub-systems. This needs to demonstrate that mechanical diversity has been achieved between trains 1 and 4 and trains 2 and 3 as well as with the safeguard building diverse HVAC system. It also needs to demonstrate that the ventilation trains of the safeguard building main HVAC can provide adequate cooling following failure of their associated chilled water train.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-104	The future licensee shall determine the consequences of failure for the control rod drive mechanisms and the ex-core flux instrumentation of the containment cooling ventilation system.	Fuel load
AF-UKEPR-FS-107	The future licensee shall perform thermal analysis to confirm that the EFWS and LHSI are able to function continuously on demand following loss of HVAC cooling to their pump rooms.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-108	The future licensee shall perform thermal analysis to confirm the timescales for consequential loss of C&I and electrical equipment following loss of a safeguard building HVAC train due to failure of its supply from a) the 690 V switchboard and b) the 10 kV switchboard.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-112	The future licensee shall perform UK EPR™ specific transient analysis studies for the SBO sequence with failure of the SSSS. The analysis will need to confirm that adequate grace time is available for operator action to start the UDGs and restore adequate cooling and whether the CHRS is sized sufficiently such that one CHRS train is functionally capable of providing adequate cooling to the IRWST or demonstrate that the current design of the CHRS is ALARP.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-115	The future licensee shall perform thermal analysis to determine the timescales for which consequential loss of C&I and electrical equipment would occur as a result of the total loss of all the HVAC systems during the station blackout sequence prior to restoration of the UDGs. Adequate validation evidence will need to be presented to support the thermal analysis possibly including representative destructive testing.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-116	The future licensee shall perform thermal analysis to confirm that the C&I and electrical equipment needed to operate the severe accident mitigation measures will remain available despite the complete loss of all HVAC systems following the severe accident sequence associated with station blackout occurring together with subsequent failure of the UDGs to start. Adequate validation evidence will need to be presented to support the thermal analysis possibly including representative testing.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-117	The future licensee shall update the PCSR to capture the revised safety case for loss of essential support systems.	Fuel on-site
AF-UKEPR-FS-118	The future licensee shall confirm that the technical specifications for control of availability of the CHRS will not allow planned maintenance to be performed on both trains of the CHRS at the same time.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-120	The future licensee shall provide a safety analysis bounding limit (SABL) for fission gas pressure distribution as a function of burn-up for incorporation into the technical specifications.	Fuel on-site
AF-UKEPR-FS-30	The future licensee shall provide a revised PSA for external heterogeneous boron dilution faults.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-31	The future licensee shall explicitly demonstrate that the design basis safety case for external heterogeneous boron dilution faults meets the requirements of the PCC analysis rules presented in the PCSR.	Fuel load
AF-UKEPR-FS-32	The future licensee shall demonstrate the functional capability of the CVCS letdown line to purge an unborated slug from a loop on the primary circuit. Ideally, the demonstration should take the form of a test performed upon either a full scaled test rig or an EPRTM reactor plant during commissioning.	Mechanical, Electrical and C&I Safety Systems - Before delivery to Site

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-33	The future licensee shall review the feasibility of providing additional interlocks on the RHR system to ensure the system is purged with borated water from the IRWST prior to injection into the RCS and to ensure that the RHR is used to purge the hot and cold legs of loop 1 prior to RCP restart.	Mechanical, Electrical and C&I Safety Systems - Before delivery to Site
AF-UKEPR-FS-34	The future licensee shall implement the human factors issue register recommendations for design and procedure features from the human factors analyses to support the heterogeneous boron dilution safety case, or provide a justification as to why these are not required to meet ALARP requirements.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-FS-36	The future licensee shall perform PIRT and scaling analyses for the Juliette test rig to confirm its applicability for providing validation evidence of the important thermal hydraulic phenomena associated with heterogeneous boron dilution faults and to confirm safety margins.	Fuel load
AF-UKEPR-FS-37	The future licensee shall provide further justification for the flow resistance data assumed in the CFD modelling of the flow distribution device.	Fuel load
AF-UKEPR-FS-38	The future licensee shall provide further justification for not selecting failure of an additional train of the safety injection system as the most onerous single failure for the inherent heterogeneous boron dilution safety case.	Fuel load
AF-UKEPR-FS-39	The future licensee shall perform PIRT and scaling analyses for the PKL test rig to confirm its applicability for providing validation evidence of the important thermal hydraulic phenomena associated with heterogeneous boron dilution faults.	Fuel load
AF-UKEPR-FS-40	The future licensee shall provide further justification for the CFD modelling of the boundary conditions assumed in the coldleg loops for the inherent boron dilution transient analysis studies.	Fuel load
AF-UKEPR-FS-41	The future licensee shall demonstrate that the ex-core neutron flux detectors are functionally capable of providing diverse protection against excessive increase in secondary steam flow faults including spurious lifting of the Main Steam Relief Train (MSRT) valves so as to avoid Departure from Nucleate Boiling (DNB).	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-42	The future licensee shall demonstrate that the in-core Self-Powered Neutron Detectors (SPND) are functionally capable of protecting against Rod Cluster Control Assembly (RCCA) misalignment faults including one or more dropped RCCAs and against uncontrolled single RCCA withdrawal faults assuming the loss of the most onerous SPND finger due to a single failure such that DNB is avoided using conservative PCC analysis rules and conservative methods and assumptions.	Fuel load
AF-UKEPR-FS-43	The future licensee shall explore the feasibility of using the axial offset signal on the ex-core detectors as a diverse means of ensuring the reactor is sufficiently well trimmed so as to avoid entering DNB following RCCA misplacement faults including the dropping of more than one RCCA together with common mode failure of the SPNDs.	Fuel load
AF-UKEPR-FS-44	The future licensee shall determine which of the options identified within Change Management Form (CMF) #59 is to be developed into fully worked up proposal to provide diverse protection against homogeneous boron dilution faults occurring during shutdown conditions.	Fuel load
AF-UKEPR-FS-46	The future licenses shall provide a fully integrated safety case for the station blackout sequence.	Fuel load
AF-UKEPR-FS-47	The future licensee shall review the definition of the controlled state against the definition of the non-hazardous stable state to ensure that the categorisation of reactivity control function (and classification of associated systems responsible for RCS boration) is appropriate.	Fuel load
AF-UKEPR-FS-48	The future licensee shall perform an ALARP assessment on the feasibility of providing a diverse means of isolating one pair of steam lines from the other pair following a break on the secondary side.	Fuel load
AF-UKEPR-FS-51	The future licensee shall perform an ALARP assessment on the feasibility of tripping the main feedwater pumps as a diverse means of ensuring feedwater isolation.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-53	The future licensee shall update the PCSR to reflect the definition of controlled state for fuel pool faults, the functioning of the RCSL anti-dilution safety function, the change in protection claimed for excessive increase in secondary steam flow faults with failure of PS and the inclusion of support system functions in the fault and protection schedule.	Fuel on-site



Reference	Assessment Finding	Milestone
AF-UKEPR-FS-61	The future licensee shall develop a PSA model of the UK EPR™ C&I systems to adequately assess the impact on risk of the allocation of sensors, conditioning modules and PACS modules, especially in terms of dependency.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-62	The future licensee shall provide justification for those functions on the SAS and NCSS for which reliance will be placed upon manual actuations.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning.
AF-UKEPR-FS-63	The future licensee shall provide transient analysis studies to demonstrate that there is adequate diverse protection against the loss of one RCP.	Fuel load
AF-UKEPR-FS-64	The future licensee shall provide transient analysis studies to demonstrate that there is adequate diverse protection against the uncontrolled single RCCA withdrawal fault.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-65	The future licensee shall review the allocation of conditioning modules for the in-core and ex-core detectors to reduce the risk to ALARP of both systems being unavailable following common failure of a single design of conditioning module.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-FS-66	The future licensee shall perform a review of the allocation of conditioning modules using the PSA model developed under AF-UKEPR-FS-61 taking into account plant maintenance states and provide a technical justification for excluding consideration of the most onerous plant maintenance state within the safety principles applied to the UK EPR™ C&I architecture.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-68	The future licensee shall perform a review of the allocation of PACS modules using the PSA model developed under AF-UKEPR-FS-61 taking into account plant maintenance states.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-69	The future licensee shall review all valve and motor actuations to ensure that the design logic is such that common mode failure of a PACS module cannot result in the failure of two diverse systems both contributing to the same safety function. Consideration also needs to be given to common mode failure of the PS resulting in a spurious signal that overrides a correct signal from the SAS/NCSS.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-FS-71	The future licensee shall consider the feasibility of providing a manual actuation function on the NCSS of the Extra Boration System (EBS).	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island

Reference	Assessment Finding	Milestone
AF-UKEPR-FS-73	The future licensee shall consider the feasibility for providing the capability for manually actuating the stand-still seal system on the NCSS.	Fuel load
AF-UKEPR-FS-76	The future licensee shall present its proposed maintenance arrangements for Class 3 duty systems such as the CVCS.	Mechanical, Electrical and C&I Safety Systems - Before delivery to Site
AF-UKEPR-FS-83	Provide evidence that the watertight barriers surrounding the Fuel Transfer Tube are appropriately qualified.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-FS-85	Develop and update the SFP PSA (including Cask Loading Pit faults) considering all the relevant modifications and any other update of the deterministic safety case and provide a full scope, modern and well documented SFP PSA for the UK EPR™ plant (including evaluation of fuel damage, radioactive releases and consequences).	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-FS-86	Complete the development work on the optimisation of operator actions claimed to prevent SG dry-out post SGTR faults. The revised proposal is required to fully consider the expectations of Emergency Operating Procedures (EOP) for the UK EPR™.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-FS-87	Demonstrate that diverse protection is provided for each safety function for frequent SGTR faults.	Fuel load
AF-UKEPR-FS-88	Provide a robust justification that the position of the steam line activity sensors is optimised to maximise their sensitivity for detecting the activity released from SGTR faults or to minimise potential radiological discharge to atmosphere.	Release of Delivery of TXS Cabinets to Site
AF-UKEPR-FS-89	Review and update the definition of the “controlled state” for SGTR faults.	Fuel load
AF-UKEPR-FS-94	The future licensee shall develop the design changes to cooling chain systems proposed under CMF#75 into a fully developed detailed design sufficient for a detailed specification of the requirements for the mechanical, electrical and C&I sub-systems.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-HF-001	The licensee shall ensure comprehensive identification of human based safety claims, and justify the relevance and applicability of the claims to the UKEPR as part of the HRA revision.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-002	The licensee shall explicitly highlight the human error probabilities associated with Type A HFES as part of the Level 1 HRA revision.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-HF-003	The licensee shall undertake a systematic analysis to demonstrate that all credible Type B HFEs are included in the revised Level 1 HRA.	Fuel load
AF-UKEPR-HF-004	The licensee shall undertake a systematic analysis to demonstrate that all credible Type C HFEs are included in the revised Level 1 HRA.	Fuel load
AF-UKEPR-HF-005	The licensee shall undertake a systematic analysis to demonstrate that all credible HFEs are included in the revised Level 2 HRA.	Fuel load
AF-UKEPR-HF-007	The licensee shall review available HRA methods for the proposed UKEPR HRA revision, in the light of the digital nature of operator interfaces. The choice of HRA method shall be justified as appropriate in line with ND TAG T/AST/063.	Fuel load
AF-UKEPR-HF-008	The licensee shall justify the HEP values applied for pre-accident task recovery in the light of comments made in the GDA Step 4 HF report, as part of the HRA revision.	Fuel load
AF-UKEPR-HF-009	The licensee shall provide information on how the raw data applied to Type B HFE quantifications has been processed, as part of the HRA revision.	Fuel load
AF-UKEPR-HF-010	The licensee shall justify the quantitative modelling of error recovery as part of the HRA revision.	Fuel load
AF-UKEPR-HF-011	The licensee shall justify the approach for the HRA modelling of diagnostic errors when revising the HRA.	Fuel load
AF-UKEPR-HF-012	The licensee shall justify the HRA method applied to the revised Level 2 PSA, and clearly highlight any deviation from its typical and expected application.	Fuel load
AF-UKEPR-HF-013	The licensee shall ensure that identical actions are quantified by the same approach in both the Level 1 and 2 PSA HRAs – or alternatively the licensee shall ensure that the HRA methods used for the Level 2 PSA HRA are not optimistic relative to the Level 1 PSA HRA assessments.	Fuel load
AF-UKEPR-HF-014	The HRA methods used for OSSA actions in the Level 2 PSA shall be fully justified and ensure qualitative insights are obtained for the development of OSSA guidance.	Fuel load
AF-UKEPR-HF-015	The licensee shall calculate the HEPs for initiating human errors based on an analytical process that includes consideration of dependency within the initiator and with other initiating HFEs.	Fuel load
AF-UKEPR-HF-016	The licensee shall provide evidence to support the claims that maintenance and test procedures will minimise the potential for human error dependence.	Fuel load
AF-UKEPR-HF-017	The licensee shall justify the assertion of zero dependency within sequences.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-HF-018	The licensee shall provide evidence of the application of a systematic consideration of coupling mechanisms relating to dependency level allocations within the HRA.	Fuel load
AF-UKEPR-HF-019	The licensee shall qualitatively substantiate the dependency levels applied within the HRA.	Fuel load
AF-UKEPR-HF-020	The licensee shall identify multiple operator actions within cutsets and reconsider and justify those where the combined HEPs are lower than $1.0 \times 10^{-5}$ .	Fuel load
AF-UKEPR-HF-021	The licensee shall provide a comprehensive justification for the allocation of levels of dependence for OSSA actions modelled in the Level 2 PSA.	Fuel load
AF-UKEPR-HF-022	The licensee shall ensure that the adequacy of HF maintenance and maintainability requirements is explicitly addressed in their V&V programme.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-023	The licensee shall ensure that the system and equipment design specifications contain a detailed set of HF requirements and are based on recognised standards where appropriate.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-030	The licensee shall design the UKEPR workstations to accommodate the UK user population, based upon reasonable estimates of the secular trend. The anthropometric data applied shall be justified.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-031	The licensee shall provide justification and evidence of the suitability of the workspaces and working positions in the UKEPR (not limited to the MCR) for the UK working population.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-032	The licensee shall provide further information on and justification relating to the emergency lighting design and relevant plant wide minimum lighting levels.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-033	The licensee shall undertake detailed analysis of the thermal environment in the MCR and RSS and provide justification of its applicability for the full range of conditions envisaged for operations from each location.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-034	The licensee shall verify that the target noise levels have been met as part of the V&V of the UKEPR.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning

Reference	Assessment Finding	Milestone
AF-UKEPR-HF-035	The licensee shall produce the detailed design and justification of the human machine interfaces for the UKEPR.	Fuel load
AF-UKEPR-HF-036	The licensee shall provide an HMI style guide (or equivalent); using recognised modern standards to guide detailed design and justification of the interfaces and displays for the UKEPR.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-HF-037	The licensee shall ensure that PICS functional degradation is alerted to the operators.	Fuel load
AF-UKEPR-HF-038	The licensee shall ensure that the information presented to the operators supports situation awareness. Should a POP be proposed for the UKEPR, consideration should be given to dedicated formats.	Fuel load
AF-UKEPR-HF-039	The licensee shall provide a justification and evidence of the visibility of the detailed POP displays proposed for the UKEPR.	Fuel load
AF-UKEPR-HF-040	Assessment Finding AF-UKEPR-HF-40 – The licensee shall justify the design of the hard wired OS/OA panels for the UKEPR.	Fuel load
AF-UKEPR-HF-041	The licensee shall undertake detailed design and justification of the SICS panel for the UKEPR.	Fuel load
AF-UKEPR-HF-042	The licensee shall undertake detailed analysis and justification of the implementation of the PICS in the RSS to ensure that all required operations can be achieved.	Fuel load
AF-UKEPR-HF-043	The licensee shall justify the design of the audible alarm signals for the UKEPR.	Fuel load
AF-UKEPR-HF-044	The licensee shall demonstrate that a consistent approach to alarm prioritisation and configuration is taken throughout the UKEPR.	Fuel load
AF-UKEPR-HF-045	The licensee shall set a maximum rate of alarm activation in the UKEPR alarm design specification.	Fuel load
AF-UKEPR-HF-046	The licensee shall include a permanent display of active alarms in the UKEPR MCR alarm design specification, or justify why this is not required.	Fuel load
AF-UKEPR-HF-047	The licensee shall explain and justify the reliance of any manual actions on response to alarms during SOA operation.	Fuel load
AF-UKEPR-HF-048	The licensee shall justify the design of procedures for application on the UKEPR.	Fuel load
AF-UKEPR-HF-049	The licensee shall substantiate that the SOA procedures ensure that claimed safety actions are reliably completed within the timescales required by the safety case.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-HF-050	The licensee shall ensure that the PICS continuously displays an appropriate overview to support implementation of the selected SOA during SOA operation or a justification as to why this is not reasonably practicable.	Fuel load
AF-UKEPR-HF-051	The licensee shall justify the design of the SICS panel and the administrative controls relating to transfer from PICS to SICS.	Fuel load
AF-UKEPR-HF-052	The licensee shall validate the entire suite of MOP for the UKEPR.	Fuel load
AF-UKEPR-HF-053	The licensee shall substantiate the proposed manning levels and organisational structure for the UKEPR.	Fuel load
AF-UKEPR-HF-054	The licensee shall analyse and substantiate the workload levels for UKEPR MCR operators.	Fuel load
AF-UKEPR-HF-56	The Licensee shall determine the impact of credible degradation and failure modes of the C&I systems on the PICS displays and their resulting impact on any claimed operator actions. The licensee will need to re-substantiate any affected HBSCs.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-57	The Licensee shall determine the most effective use and presentation of alarms to support claimed operator actions during SOA and OSSA operations. This shall include consideration of the use of the Plant Overview Panels as a means of displaying alarms and how any specific alarm monitoring should be included in SOA operation by both the OA, OS team and the SE.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-58	The Licensee shall determine if internal floods generate additional alarms that are likely to mask or delay response to key alarms or indications prompting operators to undertake claimed leak response actions. The licensee shall provide an appropriate justification that any claimed operator actions required to support the Internal Hazards flooding case are reliably achievable within the required timescales.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-HF-59	The Licensee shall provide further substantiation for PICS to SICS transfer and the time required to start reliable SICS (or NCSS) panel operation. It shall also justify that operating roles from the SICS panel can provide the most effective approach for operation from the SICS panel.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-IH-003	The Licensee shall provide evidence to demonstrate that the design of the doors required to open in the event of increased pressure (due to a steam release) will do so at the requisite pressure and thus allow the steam release path to be realised in accordance with the requirements of the safety case.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning

Reference	Assessment Finding	Milestone
AF-UKEPR-IH-004	The Licensee is required to provide evidence relating to the specification of cables including wrapping and layout to demonstrate that the cables within the cable raceways (HLK/N3403ZL) are able to withstand temperatures of 300°C and pressures of up to 2 bar.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-IH-005	The Licensee shall provide evidence to demonstrate that the design of the doors required to remain intact in the event of increased pressure (due to a steam release) will withstand requisite pressure and ensure that the engineered discharge routes for the steam release to be realised in accordance with the requirements of the safety case.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-IH-006	The Licensee shall provide evidence to demonstrate that the potential for a hydrogen explosion within the Battery Rooms during the most onerous operating conditions has been considered within the UKEPR design.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-IH-14	The Licensee shall ensure that the detailed analysis of the Human Based Safety Claim associated with isolation of the ESWS is undertaken. In the event that it cannot be substantiated the option relating to automatic isolation of the ESWS should adequately consider the balance of risk associated with automatic isolation of a safety system as well as the associated classification of that system.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-IH-15	The Licensee shall review the potential flooding scenarios that require automatic isolation following detection of a leak or break and provide substantiation of the classification and categorisation of those systems.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-001	The licensee shall make available evidence of the detailed design substantiation, Factory Acceptance Test (FAT) information, and Site Acceptance Test (SAT) information for individual mechanical items and their associated systems, which are important to safety.	Fuel on-site
AF-UKEPR-ME-005	The licensee shall ensure that the identification of plant limits and conditions, and EMIT requirements, from the safety case is completed to cover all Mechanical Engineering equipment important to safety. The licensee shall generate sufficient safety case information to satisfy the requirements of LC 23 and LC 28, and specifically a suitable interface shall be established to facilitate transfer of this information from the Responsible Designer, in due course.	Fuel on-site

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-ME-007	The licensee shall ensure that the RCCA CMF-013 design change is fully substantiated and reflected in all design and safety documentation.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-008	The licensee shall generate evidence to demonstrate that the CRDMs meet their seismic design intent.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-011	The licensee shall clarify and justify the operating limits and conditions of the Reactor and the Reactor Coolant Pumps on the loss of the Chemical and Volume Control System seal injection system and / or the thermal barrier heat exchanger.	Fuel on-site
AF-UKEPR-ME-013	The licensee shall ensure that the Reactor Coolant Pump maintenance requirements are adequately specified to meet the safety functional requirements throughout their operational life.	Fuel on-site
AF-UKEPR-ME-014	The licensee shall ensure the design of all rigging equipment associated with lifts of nuclear safety significance is completed, and in doing so shall systematically review these rigging arrangements to identify faults, and review and implement reasonably practicable improvements to either eliminate such faults by design, or limit their frequency by the provision of engineered protection systems.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-019	The licensee shall establish an appropriate filter change doctrine for all safety important filters within the nuclear ventilation systems.	Fuel on-site
AF-UKEPR-ME-022	The licensee shall ensure that fume cupboards within the UKEPR are not used for the containment of radioactive substances.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-027	The licensee shall ensure that the diesel EMIT requirements are adequately transferred into the Plant Maintenance Schedule, (although the topic is also covered generically under cross-cutting Regulatory Observation RO-UKEPR-055).	Fuel on-site
AF-UKEPR-ME-028	The licensee shall ensure that the UKEPR diesel systems adequately take into account the regulation amendment in respect of fuels, (Motor Fuel (Composition and Content) Regulations 1999), in terms of meeting their safety functional requirements.	Install diesels generators complete



<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-ME-031	The licensee shall make and implements adequate EMIT instructions to control the hazard of inadvertent use of an incorrect filter cartridge in a mechanical process filter.	Fuel on-site
AF-UKEPR-ME-032	The licensee shall ensure that the IRWST filtration system tests are satisfactorily completed to qualify the performance of the UKEPR design.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-ME-034	The licensee shall review the safety case Operational Limits and Conditions to ensure that procedures are adequate to detect any passing of the outer RPV seal, such as measurements of containment activity, humidity, and drainage.	Fuel on-site
AF-UKEPR-ME-035	The licensee shall develop adequate EMIT procedures for the detection of leaks of boric acid generally within containment, against the background of worldwide Operational Experience Feedback.	Fuel on-site
AF-UKEPR-PSA-002	The licensee shall ensure that the scope of the PSA is expanded to include hazards, such as fire and flooding during non power operating states.	Fuel on-site
AF-UKEPR-PSA-005	The licensee shall ensure that all of the success criteria underpinning the UKEPR PSA should be best estimate.	Fuel load
AF-UKEPR-PSA-006	The licensee shall ensure that the design and operational assumptions used in the non UKEPR studies (Ref. 43) are adhered to and confirmed for the UKEPR, or alternatives justified.	Fuel on-site
AF-UKEPR-PSA-008	The licensee shall ensure that the PSA documentation for the UKEPR PSA contains clear and explicit links between the grace periods for human action and the supporting analysis and the timing of cues for those actions.	Fuel on-site
AF-UKEPR-PSA-009	The licensee shall ensure that, in the development of best estimate success criteria noted in AF-UKEPR-PSA-005 all of the relevant phenomena are shown to be bounded, and that the success sequence end points are justified as real successes, not simply time bound because there has been no failure in 24 hr.	Fuel on-site
AF-UKEPR-PSA-013	The licensee shall ensure that future development of the PSA properly accounts for multiple demands on safety valves and should make use of current best estimate reliability data.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island

Reference	Assessment Finding	Milestone
AF-UKEPR-PSA-015	The licensee shall ensure that the modelling of the C&I in the PSA is reviewed and if necessary amended as the details of the C&I systems evolve. This should include explicit consideration of C&I based initiating events (including spurious signals) and the potential for dependencies such initiators and the safety mitigation systems and potential dependencies between the cues for operator action and signals used for the automatic C&I.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-016	The licensee shall ensure that future updates of the model explicitly include the actuators associated with the compact model, and also take account of any CCF related to the actuators.	Fuel load
AF-UKEPR-PSA-017	The licensee shall ensure that substantiation for the HRA in the form of task analysis, procedures and training is provided to underpin the numerical HFE values used in the PSA. The substantiation should include further consideration of pre-initiating HFEs and the potential for HFE dependencies (pre & post fault).	Fuel load
AF-UKEPR-PSA-018	The licensee shall ensure that Level 2 PSA sensitivities to individual and collective HEPs are used to provide insights into the development of the EPR severe accident guidance (OSSA).	Fuel load
AF-UKEPR-PSA-020	The licensee shall ensure that the PSA uses an appropriate LOOP frequency for the site and justified ratios used for long and short duration LOOP, both in terms of initiating event and conditional LOOP.	Fuel load
AF-UKEPR-PSA-022	The licensee shall ensure that the implicit rather than explicit inclusion of test intervals (Ts) are revisited for the data inputs to the Operational PSA post GDA.	Fuel load
AF-UKEPR-PSA-023	The licensee shall ensure that the basis for the time periods assumed for maintenance and test unavailabilities is justified and that those time periods, together with the “allowable” maintenance combinations assumed in the PSA are incorporated into the Technical Specifications and EMIT programmes, or alternative values/ strategies justified.	Fuel load
AF-UKEPR-PSA-024	The licensee shall use the PSA to explore intersystem CCF effects and to inform the incorporation of appropriate defences (e.g. detailed design, procurement strategy and operational features such as test and maintenance). Where appropriate the intersystem CCFs should be included explicitly in the model.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-PSA-025	The licensee shall ensure that the use of global CCF parameters in the PSA model are reviewed and where appropriate that the parameters are replaced with available system or component specific values.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-026	The licensee shall ensure that CCF uncertainty is included in the PSA post GDA.	Fuel load
AF-UKEPR-PSA-028	The licensee shall ensure that the dependency between a LOOP and extreme weather events is taken into account and if necessary the PSA amended.	Fuel load
AF-UKEPR-PSA-031	The licensee shall ensure that hazards such as internal explosion, turbine missiles and animal infestation are considered and if necessary included in the PSA model.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-033	The licensee shall consolidate the assumptions made in the existing PCSR internal fire analysis in one location, and provide appropriate justification, reference, discussion of the effect of each assumption on the analysis and consider them as potential input to the full scope fire PSA to be carried out post GDA.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-034	The licensee shall develop a full scope, internal fire PSA as the detailed design evolves (e.g. systematic inclusion of fire fighting system fault trees, inclusion of all individual buildings and compartments).	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-035	The licensee shall consolidate the assumptions made in the existing PCSR internal flooding analysis in one location, and provide appropriate justification, reference, discussion of the effect of each assumption on the analysis and consider them as potential input to the full scope flooding PSA to be carried out post GDA.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-036	The licensee shall develop a full scope internal flooding PSA as the detailed design evolves.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-037	The licensee shall provide a seismic PSA for the site. The seismic analysis should take account of consequential hazards that might be caused by a seismic event, such as fire or flooding, and if appropriate include them in the PSA.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-PSA-038	The licensee shall ensure that the impact of seismic faults during shutdown is addressed in a consistent manner with other contributions to the risk during shutdown.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-PSA-039	The licensee shall ensure that the actual RCS water inventories for shutdown POS need is established and if necessary the analysis repeated to inform appropriate operating restrictions.	Fuel load
AF-UKEPR-PSA-040	The licensee shall ensure that full consideration of parametric uncertainty is included the PSA.	Fuel load
AF-UKEPR-PSA-041	The licensee shall ensure that long term faults should be properly incorporated into the overall PSA as the detailed design evolves so that the importance of long term recovery measures, (such as repair of Diesel Generators and supporting the emergency feed water system with fire fighting water) are captured and taken into account in future procedures and decision making.	Fuel load
AF-UKEPR-PSA-042	The licensee should ensure that a UK-EPR specific containment structural analysis is performed which addresses all potential modes of containment failure, including penetration and leakage failures.	Containment pressure test
AF-UKEPR-PSA-043	The licensee shall update the Level 2 PSA model to ensure consistency with the current Safety Injection Severe Accident Management Strategy.	Fuel load
AF-UKEPR-PSA-044	The licensee should ensure that the Level 3 PSA is developed to modern standards, in particular by placing less reliance on design basis dose assessments and by fully incorporating probabilistic factors such as weather. For each new plant the Site-specific Level 3 PSA will need to incorporate site specific source term and release frequency analyses together with site specific dispersion and consequence modelling parameters (such as weather data and distribution of population and agriculture) for all releases.	Fuel load
AF-UKEPR-RC-001	The Licensee shall specify the normal operating chemistry regimes for the primary, secondary and auxiliary circuits of UKEPR. The specifications should be comprehensive and incorporate evidence for all modes of operation. The regimes should be consistent with the plant safety case, particularly the limits and conditions required by AF-UKEPR-RC-02.	Cold Ops
AF-UKEPR-RC-004	The Licensee shall generate a detailed risk analysis, fully justifying the boron strategy to be applied. This should include commissioning, the fuel management and chemistry requirements, necessary control actions and effects from evaporation on radioactivity and impurity accumulation.	Fuel on-site
AF-UKEPR-RC-010	The Licensee shall keep the specification of secondary neutron sources under review and consider suitable alternatives.	Initial criticality

Reference	Assessment Finding	Milestone
AF-UKEPR-RC-011	The licensee shall define a surveillance programme for control rods and secondary neutron sources. The programme shall prevent the release of materials such as tritium or silver before there is significant contamination of vessels or pipework.	Initial criticality
AF-UKEPR-RC-013	The Licensee shall conduct sensitivity analysis for fuel crud formation in UKEPR. This should be used to demonstrate that levels of crud can be controlled and reduced So Far As Is Reasonably Practicable (SFAIRP) in UKEPR and should be based upon the detailed operating chemistry and core design for the UKEPR reactor. These calculations should provide balanced predictions of activity levels that allow the assessment of control measures including boiling patterns and Stellite™ replacements, as well as the management of significant chemicals and radionuclides. The licensee shall conduct analyses of sensitivity to factors such as pH, zinc, boiling and dissolved corrosion products on crud build-up. The analysis should be used to justify related limits, conditions and criteria.	Initial criticality
AF-UKEPR-RC-015	The Licensee shall generate evidence for the optimum band for hydrogen concentration in a reactor with Inconel 690 steam generators. Such reactors normally operate within a narrower band of about 30 to 40 cc kg-1 and there appears to be little data to justify concentrations below around 25 cc kg-1. The analysis should include a fuller analysis of the effects of hydrogen levels on Inconel 690 and stainless steels in UKEPR specifically.	Hot Ops
AF-UKEPR-RC-020	The Licensee shall review whether to add zinc or not during Hot Functional Testing (HFT) and generate evidence to justify this decision.	Hot Ops
AF-UKEPR-RC-021	The Licensee shall specify suitable procedures for Hot Functional Testing (HFT), building upon the evidence presented for GDA and including further knowledge and experience particularly from other EPR units commissioned prior to any UK new build. The documentation should justify the controls during HFT of UKEPR, particularly related to hold points, chemistry measurements and target levels, together with their justification.	Hot Ops
AF-UKEPR-RC-024	The Licensee shall review the surface finish to be applied to areas of the spent fuel pool (SFP) subject to level oscillations and generate evidence for the suitability of the surface finish chosen.	Fuel on-site

Reference	Assessment Finding	Milestone
AF-UKEPR-RC-027	The Licensee shall conduct a design review, justification and analysis for the secondary circuit considering the operating regime, material choices, corrosion threats and plant design amongst others. This will input into the secondary chemistry optimisation. This should consider all of the major secondary circuit systems, including many of those not included within the GDA scope.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-RC-031	The Licensee shall review and justify the plant specific technical strategy for the Steam Generator Blowdown System ion exchange resin beds, in conjunction with the plant specific chemistry optimisation and analysis.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-RC-033	The Licensee shall generate evidence that the monitoring and surveillance programme for flow accelerated corrosion around the secondary circuit will be adequate.	Hot Ops
AF-UKEPR-RC-034	The Licensee shall review the case for using a different material for the Nuclear Island (NI) sections of the feedwater piping and generate evidence for the suitability of the material used.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island
AF-UKEPR-RC-037	The Licensee shall generate a justification for limits and conditions associated with activity in the Gaseous Waste Processing System (GWPS). This should consider all forms of activity and associated maintenance and testing of the GWPS.	Initial criticality
AF-UKEPR-RC-038	The Licensee shall generate further details and evidence to support the operation of the Liquid Waste Processing System (LWPS) evaporator, including consideration of chemical effects in operation, such as boron crystallisation, activity accumulation or precipitate generation, as noted in this assessment report.	Initial criticality
AF-UKEPR-RC-040	The Licensee shall update the safety analysis for Steam Generator Tube Rupture (SGTR) events presented in the safety case to be a clear and consistent safety justification for such events, based upon a single set of underlying assumptions. The chemistry aspects of the safety analysis should be consistent with current experimental data and knowledge on iodine chemistry. The assumptions used should be clearly linked to the supporting transient analysis and the behaviour of the plant systems and where bounding assumptions are used these should be demonstrably so.	Initial criticality
AF-UKEPR-RC-041	The Licensee shall consider the impact of the proposed design change (CMF22) on the Steam Generator Tube Rupture (SGTR) chemistry assumptions used in the safety analysis presented in the safety case.	Initial criticality

Reference	Assessment Finding	Milestone
AF-UKEPR-RC-042	The Licensee shall undertake UKEPR specific analysis to support the Combustible Gas Control System design for UKEPR. This analysis should adequately cover all phenomena that may occur during such accident sequences. This analysis should cover the effects of B4C control rods in the UKEPR design and include demonstration of the long-term plant behaviour post accident.	Fuel load
AF-UKEPR-RC-043	The Licensee shall review and document the examination, maintenance, inspection and testing arrangements for the (Passive Autocatalytic Recombiners) PARs. This should include consideration of Operational Experience Feedback and the protection requirements during non-power operations.	Fuel load
AF-UKEPR-RC-044	The Licensee shall demonstrate that the experimental testing of the PARs matches the boundary conditions used in the safety analysis, including under representative severe accident conditions.	Fuel load
AF-UKEPR-RC-045	The Licensee shall review the influence of CO and CO <sub>2</sub> on fast deflagration and DDT (Deflagration to Detonation Transition) combustion analysis in terms of the most recent experimental work and incorporate this into the plant analysis as appropriate.	Fuel load
AF-UKEPR-RC-046	The Licensee shall demonstrate that the release fractions for plutonium and strontium in a severe accident, and their longer-term consequences are appropriate for the UKEPR.	Fuel load
AF-UKEPR-RC-047	The Licensee shall quantify the proportions of gaseous elements contributing to the public consequences in the acute and longer timescales of an accident, so that evidence for the proportion of organic iodine can be generated if significant. An alternative analysis may be agreed with the regulator.	Fuel load
AF-UKEPR-RC-048	The Licensee shall demonstrate that the source term takes account of other sources, such as plant rooms, painted surfaces and the spreading compartment, at different times and examine the sensitivity of their existing analyses to re-release of captured iodine.	Fuel load
AF-UKEPR-RC-049	The Licensee shall ensure that equilibrium levels of airborne fission-products within the containment are calculated and verified both for prolonged transients and events over longer timescales.	Fuel load

Reference	Assessment Finding	Milestone
AF-UKEPR-RC-050	The Licensee shall estimate the quantities of all possible chemical species that could degrade the performance of the IRWST and analyse their downstream effects on cooling and radioactive release. Possible sources from different events include; acidic fumes from radiolysis or pyrolysis, working materials introduced during shutdowns and leaching from solid materials trapped in the strainers. Each of these could reduce the quality of the water in the IRWST and impair heat transfer or iodine retention.	Fuel load
AF-UKEPR-RC-051	The Licensee shall generate evidence for the relative timings of the melt ejection and concrete ablation/plug failure (i.e. the factors affecting the retention time in the pit).	Fuel load
AF-UKEPR-RC-055	The Licensee shall compare the results from equivalent analyses generated by the MAAP and COSACO computer codes to confirm the bounding results have been used to examine the consequences of severe accident, over the period where their scope overlaps.	Fuel load
AF-UKEPR-RC-028	The Licensee shall generate an assessment of the consequences of introducing Emergency Feedwater into the SG with elevated dissolved oxygen levels.	Hot Ops
AF-UKEPR-RC-56	The licensee shall complete and document, as part of the site specific analysis, a: <ul style="list-style-type: none"> <li>Y Verification and validation of the codes used to support the safety case for combustible gas control, including a comparison of the analysis to relevant good practice guidelines for CFD use.</li> <li>Y Review of inter-code comparisons where the analysis procedure calculates the same data in different codes.</li> </ul>	Fuel load
AF-UKEPR-RC-57	The licensee shall demonstrate the adequacy of the CFD codes discretisation as part of the site specific analysis, especially for those phenomena where high spatial or temporal accuracy is required.	Fuel load
AF-UKEPR-RC-58	The licensee shall include a demonstration of the impacts of allowing unreacted combustible gases to exit the PARs as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-59	The licensee shall demonstrate that the use of a simplified algebraic turbulence model is adequate as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-61	The licensee shall demonstrate as part of the site specific analysis that the GASFLOW results are adequate to bound the temperature loads predicted during combustion, in terms of the amount of hydrogen burnt.	Fuel load



Reference	Assessment Finding	Milestone
AF-UKEPR-RC-62	The licensee shall provide additional evidence to support the claims made on the avoidance of detrimental flame acceleration as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-63	The licensee shall justify the scenario selection for the ex-vessel phases of a severe accident, including consideration of combustion risks at the local scale, as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-64	The licensee shall demonstrate that the assumption that carbon monoxide is treated as hydrogen does not negatively impact on the flammability of the gas mixture as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-65	The licensee shall quantify the temperatures loads from ex-vessel hydrogen combustion as part of the site specific analysis. This should demonstrate the effects of combustion in standing flames on thermal loads.	Fuel load
AF-UKEPR-RC-66	The licensee shall demonstrate the impact of operation of the containment spray system on the combustible gas risks as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-67	The licensee shall provide a justification for the effects of reduced PAR performance on combustion risks at the local scale as part of the site specific analysis.	Fuel load
AF-UKEPR-RC-68	The licensee shall provide site specific analysis for the radiological consequence of accidents involving core melting, including IRWST evaporation and uncertainties in the reactions of iodine.	Initial criticality
AF-UKEPR-RC-69	The licensee shall continue to refine the estimated performance of UK EPR™, in terms of the production, transport and accumulation of radioactivity in the primary circuit and connected systems, during the site specific phase. This should include taking account of operating experience feedback from other EPR™ plants, the aim being to move towards quantitative estimates so far as is reasonably practicable.	Initial criticality
AF-UKEPR-RP-001	Source Terms: The licensee shall provide procurement procedures that require a review of materials associated with the primary coolant before purchase of those materials from their supplier in order to identify if there are any improvements in reductions in levels of cobalt or any other elements in materials which might lead to further reductions in radiation exposure of workers, and which would not compromise the functionality of those materials.	Start of First Bulk Mechanical Electrical and HVAC activity in the Nuclear Island

Reference	Assessment Finding	Milestone
AF-UKEPR-RP-003	Shielding: The licensee shall provide a report to identify areas where temporary shielding will be required for specific work activities and ensure there is adequate space for storage of such shielding when not in use, ideally in low dose rate areas near to the location where the work activities will be undertaken.	Fuel on-site
AF-UKEPR-RP-005	PRMS: The licensee shall provide a report to demonstrate that the control and instrumentation aspects of the installed radiation monitoring equipment of the KRC and KRT systems of the PRMS are adequate.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-RP-006	PRMS: The licensee shall provide a report to demonstrate that the planned location of the installed radiation monitoring equipment of the KRC and KRT systems of the PRMS are appropriate and take account of the final radiological zoning classification scheme with regard to ensuring that radiation exposures received by workers whilst taking measurements or maintaining or testing such equipment are ALARP.	Mechanical, Electrical and C&I Safety Systems - Before inactive commissioning
AF-UKEPR-RP-007	Decontamination: The licensee shall provide a report to demonstrate its site-specific strategies, systems and techniques for decontamination during operations and maintenance, and during POCO and decommissioning, whilst taking account of the contamination zoning of the NPP.	Fuel on-site
AF-UKEPR-RP-009	Optimisation for work activities: The licensee shall provide an ALARP justification (regarding structural integrity) for carrying out ultrasonic testing of secondary system component welds on only one SG during an outage (rather than on all four SGs), and for not carrying out eddy current tube inspections during ROOs.	During Operational phase
AF-UKEPR-RP-010	Optimisation for work activities: The licensee shall provide an ALARP justification (regarding radiological protection) to demonstrate worker dose optimisation for SG ultrasonic testing of secondary system compartment welds if more than one SG is inspected during an outage, and for SG eddy current tube inspections if they are carried out during ROOs.	During Operational phase
AF-UKEPR-RP-011	Optimisation for work activities: The licensee shall provide an ALARP justification for the use (or not) of robotics in SG maintenance and testing based on optimisation studies that identify specific tasks that should be carried out by specific robots. These tasks and robots shall be identified following a review of robots' capabilities for undertaking tasks that yield quantifiable benefits in terms of dose reductions for workers.	During Operational phase

Reference	Assessment Finding	Milestone
AF-UKEPR-RP-012	Optimisation for work activities: The licensee shall provide an ALARP justification for fitting and removing insulation in cramped areas, and in particular, for fitting insulation in the safety injection system rooms (known as banana rooms) and at the bottom of the pressuriser. Any additional cramped areas where fitting insulation is challenging shall be identified following a review of cramped areas and their insulation requirements, and in cases where fitting insulation is challenging, those areas shall also be included in the safety case.	During Operational phase
AF-UKEPR-RP-013	Optimisation for work activities: The licensee shall provide an ALARP justification for fitting and removing insulation where Interim insulation removal is required for inspection and maintenance. The locations where Interim insulation removal is required shall be identified following a review of work activities where complete removal of insulation would not be necessary for those work activities to take place, and of pieces of equipment where the insulation would be most often removed and replaced.	During Operational phase
AF-UKEPR-RP-014	Persons on site during accident conditions: The licensee shall provide a safety case that demonstrates that the on site specific radiological consequences analyses for design basis events (including hazards) are ALARP and have taken due cognisance of usual UK methodology assumptions and have explicitly compared the results of those analyses against NT.1 Target 4 in ND's SAPs regarding the predicted initiating fault frequency versus dose to individuals on the site.	Fuel on-site
AF-UKEPR-RP-015	Persons on site during accident conditions: The licensee shall provide a safety case that demonstrates that the on site specific radiological consequences analyses for accidents (including hazards) are ALARP and have taken due cognisance of usual UK methodology assumptions and have explicitly compared the results of those analyses against NT.1 Target 5 in ND's SAPs regarding the risk impact to individuals from all the facilities on the site, and against NT.1 Target 6 in ND's SAPs regarding the predicted single accident frequency versus dose to individuals on the site.	Fuel on-site
AF-UKEPR-RP-016	Persons on site during accident conditions: The licensee shall provide an ALARP justification for occupancy of the main control room immediately post accident if the ventilation system has failed.	Fuel on-site

Reference	Assessment Finding	Milestone
AF-UKEPR-RP-017	Persons on site during accident conditions: The licensee shall provide a safety case to identify access requirements to specific components / pieces of equipment that will require maintenance / repair during the post-accident phase, and to identify potential doses to workers carrying out those maintenance / repair activities and to demonstrate that they are ALARP.	Fuel on-site
AF-UKEPR-RP-018	Criticality control: The licensee shall take steps at the construction stage to assure the presence of borated stainless steel in the fuel pond storage racks in accordance with the design intent.	Fuel on-site
AF-UKEPR-RP-019	Criticality control: The licensee shall establish systems to monitor the borated stainless steel in the fuel pond storage racks over the lifetime of the plant so as to identify and quantify any degradation.	Fuel on-site
AF-UKEPR-RP-020	Criticality control: The licensee shall establish systems to control and verify the enrichment of the boron used in the fuel pond and its continued presence in the fuel pond during its operation.	Fuel on-site
AF-UKEPR-RW-004	The licensee shall optimise the operation of the chemical volume control system and the liquid, gaseous and solid waste management processes to ensure that the risks associated with their operation and the management of the resulting wastes are as low as reasonably practicable.	Fuel load
AF-UKEPR-RW-005	The licensee shall identify the evidence necessary to underpin their ILW storage and disposal strategy, the activities needed to secure this evidence and the time needed for these activities. The provision of this evidence and associated activities will be detailed on a plan that will link the evidence needed with the construction activities for all on site facilities required to manage the ILW over its lifetime.	Cold Ops
AF-UKEPR-RW-010	The licensee shall produce a safety report for the long-term storage of spent fuel. The report will contain information at least equivalent to that of a Preliminary Safety Case as defined in Guidance on the Purpose, Scope and Content of Nuclear Safety Cases, (Ref. 60).	Fuel load
AF-UKEPR-SEC-006	The long term back up power supplies for the security infrastructure are not detailed in the CSA.	Install RPV
AF-UKEPR-SEC-009	Doors will need to meet the appropriate protection levels, and if necessary the locking system will need to meet the appropriate class, as detailed in the TRD.	Install RPV
AF-UKEPR-SEC-010	General features of the access control system is contained within the CSA.	Install RPV

<b>Reference</b>	<b>Assessment Finding</b>	<b>Milestone</b>
AF-UKEPR-SEC-011	Security screening at the specific areas of the plant is required.	Install RPV
AF-UKEPR-SEC-012	Security arrangements for access to the containment under all plant conditions will need to be developed by the Licensee.	Fuel on-site
AF-UKEPR-SI-001	The Licensee shall undertake fracture assessments on a wider range of weld locations on the High Integrity Components (HIC) in order to demonstrate that the limiting locations have been assessed. The Licensee shall also undertake fracture assessments on the vulnerable areas of the parent forgings in order to demonstrate that the limiting locations have been assessed.	Install RPV
AF-UKEPR-SI-002	The Licensee shall undertake fatigue crack growth assessments at the limiting locations on the highest reliability components post GDA as part of the demonstration of avoidance of fracture.	Install RPV
AF-UKEPR-SI-003	The Licensee shall undertake scoping fatigue crack growth assessments in advance of the manufacturing inspections in order to show that fatigue crack growth will not affect existing assumptions with regard to qualified defect sizes.	Install RPV
AF-UKEPR-SI-005	The Licensee shall provide a robust justification for the use of a 0 MPa residual stress for the inner surface of the carbon manganese steam lines if this value is to be adopted in the post GDA fracture assessments for the main steam line welds.	Install RPV
AF-UKEPR-SI-007	The Licensee shall provide evidence that the capability of the NDT procedures applied during manufacture of safety-related components (but not subject to inspection qualification) is adequate for the purpose.	Install RPV
AF-UKEPR-SI-008	The Licensee shall ensure that procedures exist to take appropriate action if any planar defects are detected in forgings for the HICs since this may indicative of manufacturing problems.	Install RPV
AF-UKEPR-SI-009	The Licensee shall ensure that the Qualification Body has the necessary independence and that it provides a robust oversight of the overall qualification process.	Install RPV
AF-UKEPR-SI-012	The Licensee shall ensure that an adequate level of repeat inspection is proposed to assure the quality of all qualified manual ultrasonic inspections on the HICs.	Install RPV

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-015	The Licensee shall ensure that details of the qualification procedure such as the number and types of defects in test pieces is defined on the basis of a good understanding of the likely weaknesses in the techniques derived from a draft Technical Justification.	Install RPV
AF-UKEPR-SI-016	The Licensee shall produce a comprehensive material data set for use during the design and assessment process, and also to support through life operation. This will need to cover all relevant data including the basic design data and the confirmatory batch and weld specific test data from the complementary fracture toughness testing programme (Section 4.2.5.3). It will need to be clearly presented such that the pedigree of the data can be traced following the literature trail with comparison to other international data sets where possible and will need to be updated through life following developments in the field and in the light of through life testing of materials subject degradation mechanisms.	Hot Ops
AF-UKEPR-SI-017	The Licensee shall ensure that the fracture testing undertaken to support tearing resistance values assumed for the main steam line welds is representative of both the main steam line thicknesses and the direction of crack propagation.	Install RPV
AF-UKEPR-SI-019	The Licensee shall extend the testing which is proposed at 330°C to a lower temperature of say 50°C to confirm the upper shelf toughness at the lower end of the temperature range on those RPV forgings which will be subject to irradiation damage. This shall also apply to the welds in these regions.	Install RPV
AF-UKEPR-SI-020	The Licensee shall provide evidence that results from a previous test of a thermally aged specimen of pipework weld is representative of the narrow gap TIG welds used on the pipe to pipe welds and the narrow gap GTAW welds used between the pipework and reactor coolant pump bowl. If this is not the case, tests will need to be carried out on representative welds. In addition evidence shall be provided that thermal ageing is not a concern for the dissimilar metal weld on the main coolant loop otherwise it may be necessary to test thermally aged specimens of the weld.	Install RPV

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-021	The Licensee's detailed proposals on the fracture toughness testing needed to underpin the toughness values assumed in the fracture assessments shall address the potential for batch to batch variability in the weld consumables affecting the toughness properties. Either a justification will be needed based on an understanding of the batch to batch variability of the properties supported by the testing of representative weld mock ups or testing on each batch of weld consumables.	Hot Ops
AF-UKEPR-SI-022	Where the safety case relies on stable tearing, the Licensee shall perform testing to support both the initiation value and tearing resistance values.	Install RPV
AF-UKEPR-SI-023	The Licensee shall check the competence of steelmaker(s) to comply with the RCC-M M140 qualification requirements for specific components before placing contracts for forgings.	Receipt of first major NSSS shipment to site
AF-UKEPR-SI-024	The Licensee shall ensure that, since the RCC-M Part Procurement Specifications for the main vessel forgings do not provide an adequate control on the composition for all elements, additional limits on composition are specified and justified which take account of the relevant precedents specified in Tables 4 and 5 of this report.	Receipt of first major NSSS shipment to site
AF-UKEPR-SI-025	The licensee shall ensure that the maximum value of nickel content in beltline welds is restricted, either by setting an upper limit not exceeding 0.85% Ni or by setting a target value with a rigorous process for reviewing the acceptability of the Ni value should the actual value be above 0.85%. This shall be completed before the generic milestone of RPV installation, although in practice it will need to be completed earlier to suit the programme for manufacture of the vessels.	Install RPV
AF-UKEPR-SI-026	The Licensee shall ensure that sample ultrasonic inspections for underclad cracking are performed during manufacture of the RPV, SGs and PZR. This shall be completed before the generic milestone of RPV installation, although in practice it will need to be completed earlier to suit the programme for manufacture of the vessels.	Install RPV
AF-UKEPR-SI-027	The licensee shall ensure that the maximum value of nickel content in 20MND5 is restricted, either by setting an upper limit not exceeding 0.8% Ni or by setting a target value with a rigorous process for reviewing the acceptability of the Ni value should the actual value be above 0.8%.	Receipt of first major NSSS shipment to site

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-028	The Licensee shall ensure that sample ultrasonic inspections for underclad cracking are performed during manufacture on all 20MND5 components which are clad. The sample should take account of the relative lack of evidence on avoidance of underclad cracking with this material. This shall be completed before the generic milestone of RPV installation, although in practice it will need to be completed earlier to suit the programme for manufacture of the vessels.	Install RPV
AF-UKEPR-SI-030	The Licensee shall define the Operational Limits to ensure the operating pressure and temperature for the reactor pressure vessel are always separated from the P-T limit curve by a significant margin at all temperatures.	Hot Ops
AF-UKEPR-SI-032	The Licensee shall ensure that more detailed guidance on the use of the RCC-M procedure is provided to support earthquake design of pipework.	Install RPV
AF-UKEPR-SI-033	The Licensee shall ensure that if a welding procedure qualification is performed against the requirements of earlier versions of the code a competent welding engineer reviews whether this is adequate and documents the review.	Install RPV
AF-UKEPR-SI-034	The Licensee shall carry out additional tests during weld procedure qualification of the dissimilar metal welds to evaluate the degree of sensitisation and embrittlement occurring in the safe end material during the final PWHT.	Install RPV
AF-UKEPR-SI-035	The Licensee shall undertake a fatigue design evaluation for locations in austenitic stainless steel and ferritic components that are in contact with the wetted environment to ensure that the effects of environment have been properly accounted for in the fatigue design analysis.	Hot Ops
AF-UKEPR-SI-036	The Licensee will need to demonstrate that, for each stage of the procurement and manufacturing and construction process, the hierarchy of documents relevant to that stage is in place before the work commences.	Install RPV
AF-UKEPR-SI-037	The Licensee shall ensure that the site specific "Stress reports" confirm the adequacy of the design.	Install RPV
AF-UKEPR-SI-038	The Licensee shall ensure that the safety cases for component internals include an analysis of the consequences of all the potential modes of failure. Alternatively the components should be added to the list of Highest Integrity Components and a case be developed accordingly.	Install RPV



Reference	Assessment Finding	Milestone
AF-UKEPR-SI-039	The Licensee shall provide more explicit evidence to demonstrate that failure of the core barrel during normal or upset conditions would not lead to unacceptable fuel damage as a result of flow diversion which was not recognised and caused the reactor control system to increase power as a response.	Install RPV
AF-UKEPR-SI-040	The Licensee shall ensure that arrangements for operational monitoring of the Break Preclusion pipework are appropriately planned, implemented and recorded in the safety case.	Hot Ops
AF-UKEPR-SI-041	The Licensee shall demonstrate that the manufacturing arrangements for the penetration welds in the RPV head are such that the welds will be of consistently high quality and will not require repair.	Install RPV
AF-UKEPR-SI-42	The licensee shall develop an in-service surveillance scheme which takes account of the differences in neutron energy spectra between the RPV wall and the location of the surveillance capsules.	Install RPV
AF-UKEPR-SI-43	The Licensee shall undertake validation studies to confirm that the methodology used to calculate the limiting defect size for the RPV outlet nozzle dissimilar metal weld is appropriate.	Install RPV
AF-UKEPR-SI-44	The Licensee shall establish the limiting defect size for all High Integrity Components, including situations where cracked body finite element analyses are used to determine the limiting defect size.	Install RPV
AF-UKEPR-SI-45	The Licensee shall use material toughness properties for the fracture mechanics analyses that bound both the weld material and the HAZ material, and the base material if potentially limiting.	Install RPV
AF-UKEPR-SI-46	The Licensee shall explicitly identify the full thermal ageing shift in the HAZ material of the low alloy steel welds and any enhanced start of life properties required of the HAZ material in the materials data handbook used to support the UK EPR™. Any enhanced start of life properties for the HAZ should be demonstrated in the complementary fracture toughness testing.	Install RPV

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-49	Should the Licensee adopt the RSE-M Appendix 5.4 fracture assessment procedure, the Licensee shall ensure that there is a capability to undertake assessment to RSE-M Appendix 5.4 independently of the company supplying the reactor design in order to support the ongoing operation of the reactor. The availability of technical support organisations to allow the UK Nuclear Regulator (ONR) to commission such assessment work independently should also be considered.	Install RPV
AF-UKEPR-SI-50	Should the Licensee adopt the RSE-M Appendix 5.4 fracture assessment procedure, the Licensee shall ensure that the UK methodology for undertaking the fracture assessments based on RSE-M Appendix 5.4 is suitable and sufficient to define the methodology in relation to RSE-M, and to explain and justify departures from RSE-M.	Install RPV
AF-UKEPR-SI-51	The Licensee shall review the upper shelf fracture toughness values used for areas affected by irradiation damage to ensure that they are consistent with the worldwide experience on the effect of irradiation damage on upper-shelf toughness and ensure that the surveillance scheme is adequate to confirm the assumptions made at the design stage.	Install RPV
AF-UKEPR-SI-52	The Licensee shall confirm through appropriate analyses and assessment that the detailed redesign of the MCL pipework to increase counterbore lengths and to lower the cross-over leg does not have any unacceptable safety detriments.	Install RPV
AF-UKEPR-SI-53	The Licensee shall demonstrate that the materials properties of the MCL forgings are adequately specified and controlled. This demonstration should include evidence that the M140 and shop qualifications for the MCL pipework remain valid for the modified design, and that the grain size is such that a reliable ultrasonic inspection of the parent material and associated welds can be achieved both during manufacture and in-service.	Install RPV
AF-UKEPR-SI-54	The Licensee shall ensure that the surface profile of the MCL pipework is adequately specified and controlled for all those surfaces on which ultrasonic transducers are scanned or from which ultrasonic beams may be reflected. This should include the effects of any local features such as overlay welding to compensate for welding distortions or profile variations caused by the counterbore cutting machine.	Install RPV

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-55	The Licensee shall ensure that during the design, manufacture and installation of all MSL components there are explicit checks on the detailed geometry near welds and other regions which require qualified NDT. These checks should ensure that the local component geometry (e.g. any component thickness changes or tapers) and the resultant surface profiles (both inside and outside the component) are such that an adequate inspection capability is achievable.	Install RPV
AF-UKEPR-SI-56	The Licensee shall ensure that the qualified volumetric inspections of welded repairs on the RCP bowl have the capability to reliably detect defects of the target size (i.e. defects smaller than the calculated limiting defect size by a margin of typically 2). The scope of these qualified inspections should include all repairs down to a size comparable with the target defect size and significantly smaller (typically by a margin of 2) than the limiting defect size.	Install RPV
AF-UKEPR-SI-57	The Licensee shall ensure that the inspection qualification of the radiographic and ultrasonic procedures for the RCP bowl and potential repairs takes account of the wide variation in the characteristics of potential defects and the need to demonstrate reliable detection and characterisation.	Install RPV
AF-UKEPR-SI-58	The Licensee shall ensure that when specifying the target values for chemical composition of the RCP pump bowls, the desirability of achieving a Type A macrostructure is taken into account.	Install RPV
AF-UKEPR-SI-59	The Licensee shall demonstrate that the assessments of capability of the manufacturing NDT procedures for the flywheel (PT and UT) take account of the HIC nature of the component and the full range of defect types which might occur and that the inspections will provide adequate capability to detect these defects.	Install RPV
AF-UKEPR-SI-60	The Licensee shall ensure that, once the details of the in-service inspections of the flywheel have been specified, the inspection capability is justified and the need for inspection qualification is considered.	Install RPV
AF-UKEPR-SI-61	The Licensee shall demonstrate that the parameters of the austenitic cladding applied to each HIC component, especially near welds, are adequately controlled and understood so that any potential adverse effects on the inspection capability are tolerable.	Install RPV
AF-UKEPR-SI-62	The Licensee shall review their site specific safety case during each significant upgrade to ensure that the list of components requiring an HIC claim is complete.	Initial criticality

Reference	Assessment Finding	Milestone
AF-UKEPR-SI-63	The Licensee shall review the fracture toughness values assumed for the fracture analysis of the MSIV pressure boundary to ensure that they are conservative and are likely to be achieved in practice.	Install RPV
AF-UKEPR-SI-64	The Licensee shall ensure that the castings used in the fracture toughness test programme for the MSIV body/bonnet and weld repairs will be suitable for establishing data that is fully applicable to the valve bodies and bonnets installed on a UK EPR™.	Install RPV
AF-UKEPR-SI-65	The Licensee shall undertake an MSIV specific fracture mechanics analysis to determine the limiting defect size for the MSIV. The analysis should cover the valve body, bonnet, weld repairs and the connection between the valve body and bonnet. It should postulate defects in all limiting locations taking into account all significant loadings applied to the MSIV including thermal shock and mechanical loads including those from the adjoining pipework.	Install RPV
AF-UKEPR-SI-66	The Licensee shall ensure that the volumetric NDT techniques selected for the MSIV body, bonnet and any potential repairs have the capability to reliably detect flaws of the target defect size (i.e. defects smaller than the calculated limiting defect size by a margin of typically 2). The scope of the inspections should cover the full volume of the component and include all repairs down to a size comparable with the target defect size. The Licensee shall also justify the level of qualification to be applied to the technique(s) selected for this high integrity component.	Install RPV
AF-UKEPR-SI-67	The Licensee shall ensure that the requirements for all non-destructive inspections of the MSIV body and bonnet (and any potential repairs) are fully specified and taken into account at the design stage. For example, it might be necessary for some inspections to be performed before final machining and weld repairs should be designed so that inspection requirements are satisfied.	Install RPV