**Technical Support – Work Order Specification**

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| **Title: Provision of Technical Support to the UK HPR1000 GDA Step 4 Internal Hazards Assessment** |
| 1. Background to the project

ONR formally commenced the Generic Design Assessment (GDA) of the UK Hua-Long Pressurised-water Reactor 1000 (UK HPR1000) in January 2017. The GDA process is a step-wise assessment of a Requesting Party's (RP) safety submissions, with the assessments increasing in detail as the project progresses. General Nuclear System LTD (GNS) is a UK-registered company that was established to implement the GDA on the UK HPR1000 reactor on behalf of three joint requesting parties comprising China General Nuclear Power Corporation (CGN), EDF Energy and General Nuclear International (GNI).Background information on the UK HPR1000 GDA can be found on the RPs and ONR websites.* http://www.ukhpr1000.co.uk
* http://www.onr.org.uk/new-reactors/uk-hpr1000/index.htm

ONR formally commenced the Step 3 GDA assessment in November 2018. The current Step 3 work is to assess the safety arguments of the Internal Hazards safety case submissions, which support the existing safety claims. The Step 3 assessment completed in mid-February 2020, with the project then continuing into Step 4. During Step 4, ONR will undertake a detailed assessment of the Internal Hazards safety case submissions by conducting both broad and deep assessments, on a sampling basis. The aim of this sampling is to confirm that the claims and arguments made by the RP are underpinned by robust evidence. This will include:* + Consideration of issues identified in GDA Steps 2 and 3;
	+ Judge whether key claims, arguments and evidence relating to Internal Hazards that underpin the safety of the UK HPR1000 design are complete and reasonable.
	+ Judge the design against relevant good practice (RGP) including the ONR Safety Assessment Principles (SAPs)[[1]](#footnote-1) and determine whether the internal hazards aspects design reduces risks as low as reasonably practicable (ALARP);
	+ Perform an independent verification of the analyses performed by the RP;
	+ Establish whether the requirements of the identified Internal Hazards protection measure’s performance criteria, safety classification and reliability are adequate, and where appropriate substantiated by evidence through liaising with the requesting party and relevant ONR specialist assessors;
	+ Assess proposed resolution of identified nuclear safety issues, or identify paths for resolution.

Internal Hazards interface with other discipline areas, such as External Hazards and Civil Engineering, and will continue to interface with specialist assessors in these disciplines during GDA Step 4.The Technical Support Contractor (TSC) shall provide a proposal to undertake the work described herein, comprising an independent technical review of the RP’s Internal Hazards safety case. If the proposal is accepted, the work will be conducted under the terms and conditions of the existing ONR TSC Framework Agreement. |
| 1. SCOPE OF THE SERVICES REQUIRED

The scope of work involves supporting ONR internal Hazards assessment team during the UK HPR1000 Step 4 assessment by providing an independent technical review of the UK HPR1000 Internal Hazards safety case. This Includes:* Familiarisation with the extant safety case as submitted by the RP during Step 3, ONRs Step 3 assessment note, any findings made and existing regulatory queries (RQs). The list of documents for this review is listed in Appendix 1.
* An independent, detailed, technical review of the RP’s internal hazards Step 4 submissions in accordance with ONRs expectations given in the guidance for requesting parties[[2]](#footnote-2), and with reference to relevant good practice and modern standards[[3]](#footnote-3).
* The technical areas identified for technical review are listed below. A full list of the planned submission dates[[4]](#footnote-4) and documents is listed in Appendix 2:
	+ Internal Fire
	+ Internal Explosion
	+ Internal Missiles
	+ Combined Hazards (The contribution of the above subjects into the ONR assessment of combined hazards)

The technical reviews should confirm that the effects of internal hazards have been eliminated/ minimised or mitigated such that they do not adversely affect the reliability of safety systems designed to perform essential safety functions and that potential common cause failures caused by the materialisation of internal hazards have been adequately addressed. To meet these objectives the assessment will require confirmation that:* The associated relevant claims as defined in the Pre-Construction Safety Report (PCSR) and supporting documents are supported by robust evidence in line with ONR expectations.
* All relevant internal hazards have been adequately identified (individual or combined) and analysed through a comprehensive and systematic approach in line with national and international relevant good practice and any conclusions drawn are adequately substantiated.
* All internal hazard loads have been adequately characterised, including unmitigated analysis to determine appropriate requirements for engineering safety measures.
* All data/models and codes used to define the internal hazards are demonstrably conservative (where appropriate) and that appropriate studies have been performed to determine the sensitivity of analytical results to the assumptions made, data used and methods of calculation.
* All safety related SSCs and engineered safety measures are appropriately identified, classified and their performance assessed under the relevant hazard loading conditions.
* Adequate defence in depth approaches have been adopted.
* Plant layout has been optimised so far as is reasonably practicable to eliminate/mitigate the effects of internal hazards.

Due to the wide scope of internal hazards a sampling approach is required to be adopted for assessment. To ensure a meaningful assessment the key arguments and substantive evidence of the internal hazards safety case will be undertaken, with deep dives focusing on areas of highest risk, these areas are nominally the exception to segregation areas and were high integrity components are located. The hazard analysis approach by the requesting party can be broadly split into three categories:* Hazards with Divisional Claims (Based on massive and passive civil barriers) - In this category the principle claim will be all consequences as a result of an internal hazard will be contained within a single division/zone, with identified redundant SSCs providing defence in depth to maintain the principle safety function. The RP intends to group all hazard initiators (Inc Combined) under the relevant bounding hazard.
* Hazards in Exception to segregation areas - In this category all hazard initiators (Inc Combined) will be assessed by the requesting party on an individual basis to ensure that under hazard conditions the fundamental functions are maintained, adequate safety measures are in place and the risks to SSCs in these areas are ALARP.
* High integrity components - In this category all hazard initiators (Inc Combined) that could affect those plant items designated a high integrity component will all be assessed by the requesting party on an individual basis to ensure the claims made are appropriately substantiated.

Throughout the assessment it is expected that the TSC will interface with other ONR specialist assessors (Via telephone, e-mail or meetings as appropriate) to determine the adequacy of the safety case and ensure consistency with the internal hazards assessment including but not limited to:* Civil Engineering: TSC to ensure appropriate load conditions are being applied to determine withstand of identified barriers.
* Structural Engineering: TSC to ensure the appropriate hazards are identified and hazard loading conditions derived to determine withstand of high integrity components.
* Fault studies & PSA: TSC to ensure that appropriate safety measures are identified, with adequate redundancy and links between fault schedule and hazard schedule are consistent.
* Mechanical Engineering: TSC to ensure claims made on engineering safety measures are adequately substantiated (within the scope of GDA).

The following Bullets provide more detail on the scope of work, and provide planning assumptions to inform tender submissions:* Familiarisation with the available baseline information (Appendix 1) and independently assess the relevant Step 4 submissions delivered as outlined in Appendix 2. For planning purposes the following assumptions should be made for each document:
	+ For tendering purposes.it should be assumed that for each document in Appendix 2 an additional two supporting references will be requested for an approximate total of **36** documents for review by the TSC.
	+ Assume for tendering purposes that a Pre-Construction Safety Case Report chapter is up to 170 pages long and supporting safety analysis documents approximately 100 pages.
* Identify shortfalls in the internal hazards case and highlight these to the ONR internal hazards assessor for consideration.
* Recommend potential ‘deep-dive’ sampling areas to the ONR internal hazards assessor for consideration based on the findings of the independent technical review and experience of PWR technologies.
* Identify any necessary UK HPR1000 information from the RP including a review of the available Fangchenggang (FCG) 3 reference design documentation (which will be provided to the winning tenderer). ONR will formally submit these requests to the RP as RQs, but the contractor is expected to identify the information required.
* Assess RP submissions and where necessary prepare a RQ for ONR to formally submit to the RP. The TSC would then review the adequacy of the RP’s responses.
	+ For tendering purposes it should be assumed that a RQ will be raised for each report assessed.
* Provision of support to the ONR internal hazards assessor during technical meetings with the RP. For tendering purposes assume the following meetings (See Appendix 3 for further details):
	+ Attendance in support of the ONR inspectors at two (2) overseas workshops with the RP in Shenzhen (China). The workshop is expected to be held over 3 to 4 days.
	+ Attendance in support of the ONR inspectors at one (1) UK workshops with the RP in Cheltenham or London which will be held over 3 to 4 days. Note a flexible approach will need to be applied by the TSC as the location of these workshops may change.
	+ Attendance at least six (6) half day meetings to discuss assessment progress and emerging issues in line with assessment work (assume either Liverpool or London).
	+ Attendance at the weekly 1 hour internal hazards keep in touch (KIT) meeting to discuss assessment progress, issues and arrange any meetings with internal ONR specialists. This can be done by phone (4 Days total budget for whole GDA period).
* During the assessment ONR may require access to specialist advice in one or all Internal Hazards. A provision of fifteen (15) days (**non-committed**) is requested to enable support with additional meetings, presentations and support to enable ONR to respond to emerging assessment issues.
* Provision of call-off support to the ONR project officer following submission of contractor report (See deliverable 2)
	+ For tendering purposes assume a total of two (2**)** days per month from April 2021 to January 2022.

There are a wide range of internal hazards considered in the GDA PCSR. Adequacy of the GDA PCSR depends on both the quality of the underpinning hazard analyses and the way in which this information is used to support design basis analysis, cliff edge effects, interfaces with beyond design basis analysis, fault analysis and PSA. While the objective of this work is firmly focussed on the internal hazards aspects, the contractor must be able to demonstrate a familiarity with the use of such information in both deterministic and probabilistic safety analyses of the plant. The TSC must also have a good understanding of the significance of internal hazards relevant to PWR technologies.The TSC is expected, where applicable, to incorporate any work performed by other ONR assessors into their review and provide a technical review of the relevant internal hazards. It is therefore important that the TSC has familiarity with nuclear safety case construction and documentation, not just the underpinning technical analysis work. Familiarity with the claims, evidence and argument approach to safety case construction is expected.  Documents for Review* Internal hazards safety case documentation for familiarisation is given in Appendix 1.
* Internal hazards safety case documentation to be submitted by the RP and assessed during Step 4 is presented in Appendix 2. It should be noted that during the assessment process the RP may be required to produce additional documentation during the step to address ONR queries.
* The safety case is supported by design documentation for the Fangchenggang 3 reference plant. These documents are categorised as Tier 3b and are likely to require translation of the RQ (The estimation for translations are 6 weeks, therefore this needs to accounted for within planning the assessment). ONR will request Tier 3b documentation from the RP where necessary to support its deep-dive sampling. The TSC would be expected as part of their independent technical review to identify documents required for sampling.

TasksThe following tasks are to be completed as part of the project:* **Task1**: Familiarisation with the extant safety case, the ONRs Step 3 internal hazards assessment note (including the findings, recommendations and relevant RQs and ROs) and key safety case documentation already submitted to ONR as defined in Appendix 1. The TSC is also expected to highlight other potential areas for sampling and to identify relevant documentation required to support the step 4 assessments.
* **Task 2:** Support the ONR internal hazards assessment by providing an independent technical review of the UKHPR1000 PCSR submissions and supporting documentation that form the internal hazards safety case, and advise the ONR internal hazards assessor of their technical adequacy.
* **Task 3:** Support the ONR internal hazards assessors at technical meetings with the RP and interface with other ONR specialists as required.
* **Task 4**: To provide to the ONR internal hazards project officer, a list (in addition to those supporting tasks 1 to 3) of identified Suitably qualified and experienced specialists, covering the scope of all internal hazards, to provide additional support as and when required within the provision of 15 days (non-committed) to support any additional meetings, presentations and technical support enabling ONR to respond to emerging assessment issues.
* **Task 5**: Provision of call-off support to the ONR project officer following submission of contractor report (See deliverable 2)

DeliverablesThe following deliverables are required:* **Deliverable 1:** Based on familiarisation with the internal hazards safety case submissions in Task 1 the TSC would provide a short proposal identifying potential sampling areas and reference documentation needed to support independent technical review.
* **Deliverable 2:** A written report (or reports) presenting the work undertaken for task 2 on the adequacy of the internal hazards safety case and any findings/ recommendations to be considered by the ONR internal hazards assessors.
* **Deliverable 3:** Meeting notes/presentations as required for the meetings as listed in Appendix 3.
* **Deliverable 4**: A list of suitably qualified and experience personnel who have been identified to provide additional support to address ONR emerging queries as defined in Task 4.
* **Deliverable 5:** Monthly progress report and invoice for the duration of the contract.

TimescalesThe following timescales are to be met for the project:* Project commences – April 2020
* Review period - March 2020 - January 2021
* Final GDA submissions - January 2021
* Draft TSC reports delivered to ONR - March 2021
* Final TSC reports delivered to ONR - April 2021
* Call off support ONR - April 2021 - January 2022
* End GDA - January 2022
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| 1. OBJECTIVES

Objectives for each work package are as follows:* **Objective 1:** Independent technical review of the HPR1000 GDA PCSR safety case submissions relevant to internal hazards as described in the above work packages, to determine the adequacy of the Internal Hazards safety case.
* **Objective 2:** To provide expert technical support to the ONR internal hazards with their assessment of the internal hazards safety case.
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| 1. CONSTRAINTS

Demonstration of SQEPThe TSC should demonstrate that they have expert knowledge and experience in the assessment of internal hazards in a UK nuclear regulatory context. The TSC should provide a team with appropriate knowledge and experience in internal hazards for the pressurised water reactor technologies used in the UK HPR1000. In addition to the above the TSC should demonstrate:* How they will draw upon their experience, resources and publicly available information to perform this work.
* The TSCs undertaking the work will be expected to have demonstrable experience in assessment of **GDA** in relation to the scope of this contract.
* Awareness, and preferably experience of delivering assessments in the context of the **ONR** regulatory regime and good knowledge of the UK regulatory expectations on **internal hazards**.
* Knowledge and application of **ONR** Safety assessment principles, technical assessment guides, IAEA guidance, WENRA reference levels and nuclear industry standards associated with **Internal Hazards** analysis.
* Competency in the production of technical reports to a high standard.
* Awareness, and preferably experience of the ONR **Generic Design Assessment** process.
* Experience and knowledge of **PWR** designs and associated technical systems and assessment of internal hazards within them.

Step 4 commenced in February 2020, with the first planned internal hazard documents to be submitted to ONR for assessment in March 2020. The assessment review period is to be undertaken from March 2020 to January 2021.The work is expected to start and conclude in accordance with the overall timescales given below, and a project programme will be agreed with the contractor upon contract award. The Internal Hazards work package is assumed to be approximately 23 months in duration. This will be agreed and fixed when the contract is awarded, as will key project milestones and delivery dates for the various reports. Assumed dates for GDA Step 4 are provided below.* Start of GDA Step 4: February 2020.
* TSC proposals received: March 2020.
* TSC selection and approvals process: April 2020
* Contract awarded: April 2020.
* Kick-off meeting between ONR and TSC: within 10 working days of award of contract.
* TSC’s Step 4 reports are required before 17 April 2021 (this is to inform authoring of ONR reports which are required by 16 July 2021).
* End of GDA Step 4: January 2022.

Other ConstraintsSecurity and information managementThe contractor will be required to work in accordance with ONR’s Export Control Instruction in order to facilitate engagement with the GDA RP[[5]](#footnote-5).The contractor will need to provide assurances that it has all necessary export control licences to exchange information with ONR.The contractor may be asked to sign Export Control End User Undertakings (EUU) to receive controlled technology.Work cannot commence until the required security clearances of individuals working on the project have been established and the TSC’s IT systems have been demonstrated to be suitable for the protective marking applied to the information. The transmittal of all documents between ONR and the contractor will be through ONR's Joint Programme Office (JPO). This will use the egress system, regardless of the security marking (unless the documents are publicly available on the internet). The contractor shall not utilise any additional third party support not named in the bid documentation without ONR’s prior written consent.All information received from the RP will need to be treated in accordance with the ONR Technical Support Contact Framework agreement and non-disclosure agreement. The information or a certificate of destruction will need to be returned to ONR at the end of the contract.Information in this contract may possibly contain protectively marked information and if so, will need to be handled accordingly. Most information will contain proprietary markings.Information in this contract may possibly contain Sensitive Nuclear Information (SNI).ONR will provide the latest versions of relevant documentation submitted by the RP. Further information will need to be identified and requested by the contractor through regulatory queries (via ONR). The timescales for both of these processes are largely outside of ONR’s direct control and therefore delays to the receipt of information may occur. The TSC should also be aware that in some limited cases, the information requested may only be available in Chinese and translation into English (undertaken by the RP) may be required. Similarly, the quality of any response cannot be guaranteed. A pragmatic and flexible approach will need to be adopted by the contractor to deal with these circumstances, both technically and contractually, should they arise.Conflict of InterestAny conflict of interest should be declared. The TSC should either not have previously supported the RP (directly or indirectly), in developing or reviewing the UK or Chinese HPR1000 Internal Hazard safety case or should be capable of demonstrating that there is sufficient separation between the proposed project team and those working for the RP that there is no conflict of interest. Where a potential conflict exists, the contractor should describe how this will be managed by completion and submission of the Potential Conflicts of Interest Declaration form attached at Schedule C.GeneralThe aim of this work package is to inform and advise ONR. However, it is ONR’s intention to brief the RP on the conclusions of the work. The RP will be provided with copies of any reports produced for information and will be invited to comment on their factual accuracy. It is not ONR's intention to publish the reports produced through this contract. However, it is likely they will be referenced in publicly available reports and therefore subject to freedom of information requests. This should not constrain or limit the produced reports but should be taken into account with the style and format.The contractor shall ensure they have the relevant permissions for all codes, standards, technology, software and/or information required to deliver the scope of work. The contractor should identify any constraints that may impact delivery of the intended scope of work. ONR expects that the TSC will be required to attend a number of level 4 meetings with the RP (e.g. those meetings outlined in Section 2). A pragmatic and flexible approach will need to be adopted by the TSC to deal with the project needs in terms of meeting dates, attendance and attendees.The contractor is responsible for making all arrangements required to support meetings in China. However, ONR will facilitate the provision of Invitation letters. |
| 1. CONTRACT MANAGEMENT

On award of the contract the TSC will be expected to obtain ONR acceptance of the technical review scope, supporting programme and project costs. This will occur during the project kick-off meeting. Following acceptance the TSC will be expected to deliver the defined scope as set out in the programme and to the project cost.ONR will require to be kept updated about progress and delivery of the required work via monthly meetings, to include a contract start-up meeting at ONR’s offices in Cheltenham or the contractors premises. Subsequent progress meeting should be arranged with the ONR Project Officer and can be held at ONR’s offices, or the contractor’s premises.As part of the project the TSC will be expected to routinely review the programme scope, deliverables, milestones, timeframes, project costs and indicative invoice forecast via monthly reporting. |
| **TECHNICAL RESPONSE** |
| 1. Response

The Technical Response should demonstrate a clear understanding of the work required.Please provide * A description of how you will deliver the scope of work (methodology);
* The proposed delivery team you will use including CV’s, clearly signposting to relevant sections within your Capability Prospectus where appropriate/relevant. A statement of suitability for each individual should be provided that justifies why they are competent for their proposed project role;
* a description of proposed deliverables and/or outputs;
* an outline of anticipated engagement (project meetings & management;
* Details of proposed cost and associated effort assumptions for the internal hazards work described in the work packages listed above;
* a project delivery plan showing activities and milestones;
* a planned invoice schedule;
* An outline of anticipated engagements and those who will support the engagements (project meetings and management);
* Arrangements for managing delivery of the work and dealing with disputes (including details of the project manager, who will act as point of contact with the ONR project officer);
* a demonstration of a proven track record of undertaking similar internal hazards work for ONR;
* knowledge and experience of the ONR Generic Design Assessment process;
* demonstrable knowledge of PWR technology and;
* details of any assumptions or constraints

One of the means used by ONR to select the TSC will be by evaluation of submitted CVs. Tenderers for this work should submit the CVs of the specialist personnel who shall be employed on the review work together with the charge rate applicable to the specialist(s). Specialists whose CVs are submitted at tender shall only be substituted by prior agreement with ONR. Similarly, any changes in role / responsibility during the project should be discussed and agreed with the ONR project officer. Please note that ONR may decide to undertake interviews of key team members to ensure that the identified persons exhibit the required skills and expertise to support ONR in the assessment of the UK HPR1000 safety case.  |

**Appendix 1 - List of Step 3 Reports and RP submissions**

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| **Internal Hazards Step 3 Assessment Note** - File Ref: 2019/293364 |
| **Step 3 Project Assessment Report** - http://www.onr.org.uk/new-reactors/uk-hpr1000/reports.htm |
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| **PCSR Chapters** |
| Chapter 19 - Internal Hazards - http://www.ukhpr1000.co.uk/wp-content/uploads/2020/02/HPR-GDA-PCSR-0019-Pre-Construction-Safety-Report-Chapter-19-Internal-Hazards-Rev-001.pdf |
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| **Hazard Methodologies** | **Related RQs**  |
| GHX00100051DOZJ03GN - **ALARP** Methodology - 31 May 2018, File Ref: 2018/181415 |  |
| GHX00100022DOZJ03GN - **Internal** **Fire** Analysis Methodology - Rev C - 09 January 2019, File Ref: 2019/9334 | RQ-189 - CM9 2019/95965 |
| GDA-REC-CGN-003702 - **Internal** **Explosion** Safety Evaluation Methodology Report - 30 January 2019, File Ref: 2019/27623 | RQ-0305 - CM9 2019/189163 |
| GHX00100041DOZJ03GN - **Internal** **Missiles** Safety Evaluation Methodology Report - Rev C - 22 June 2018, File Ref: 2018/207313 |  |
| GHX00100067DOZJ03GN - **Combined Hazards** Safety Evaluation Methodology Report - 9 October 2018, Rev A, File Ref: 2018/325476 |  |
| GHX00600249DRAF02GN - **Guideline** for **Thermal Response** Analysis of Sub-Compartments - Rev A - 11 December 2018, File Ref: 2018/399282 |  |
| GHX00100037DOZJ03GN - The **Identification and Screening** Process of Internal and External Hazards - Rev D - 16 November 2018, File Ref: 2018/373240 |  |
| GHX00100028DOZJ03GN - The G**eneral Requirements of Protection** Design Against Internal and External Hazards - Rev D - 16 November 2018, File Ref: 2018/373238 |  |
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| **Assessment Reports Hazard Characterisation - Based on Bounding Cases** | **Related RQs** |
| GHX84200004DOZJ03GN - **Internal** **Fire** Safety Assessment Report for Safeguard Building (Based on Bounding Cases) - Rev B - 27 February 2019, File Ref: 2019/60920 | RQ-0264 - CM9 2019/198849 |
| GHX84200005DOZJ03GN - **Internal Missile**s Safety Assessment Report for Safeguard Building (Based on Bounding Cases) (Part 1) - Rev A - 29 March 2019, File Ref: 2019/93645 | RQ-0296 - CM9 2019/208418 |
| GHX84200008DOZJ03GN - **Internal Missiles** Safety Assessment Report for Safeguard Building Based on Selected Bounding Cases (Part 2) - Rev A - 30 May 2019, File Ref: 2019/156196 | RQ-0332 - CM9 2019/250740 |
| GHX84200007DOZJ03GN - **Internal** **Explosion** Safety Assessment Report for Safeguard Building Based on Selected Bounding Cases - Rev A - 30 May 2019, File Ref: 2019/156172 | RQ-0275 - CM9 2019/219635 |
| GHX84200017DOZJ03GN - **Internal Missiles** Safety Assessment Report for Fuel Building (Based on Bounding Cases) (Part 1) - Rev A - 30 August 2019, File Ref: 2019/253012 | RQ-0492 - CM9 2019/334314 |
| GHX84200022DOZJ03GN - **Internal Missiles** Safety Assessment Report for Fuel Building (Based on Bounding Cases) (Part 2) - Rev A - 3 October 2019, File Ref: 2019/285920 | RQ-0492 - CM9 2019/334314 |
| GHX84200021DOZJ03GN - **Internal Explosion** Safety Assessment Report for Fuel Building (Based on Bounding Cases) - Rev A - 3 October 2019, File Ref: 2019/285916 | RQ-0496 - CM9 2019/343036 |
| GHX84200020DOZJO3GN - **Internal Fire** Safety Assessment Report for Fuel Building (Based on Bounding Cases) - Rev A - 31 July 2019, File Ref: 2019/230436 | RQ-0483 - CM9 2019/379087 |
| GHX8420001DOZJ03GN - **Internal Fire** Safety Assessment Report for Reactor Building (Based on Bounding Cases) - Rev A - 28 June 2019, File Ref: 2019/185248 | RQ-0408 - CM9 2019/304119 |
| GHX84200014DOZJ03GN - **Internal Missiles** Safety Assessment Report for Reactor Building (Based on Bounding Cases) - Rev A - 30 August 2019, File Ref: 2019/252999 | RQ-0492 - CM9 2019/334314 |
| GHX84200013DOZJ03GN - **Internal Explosion** Safety Assessment Report for Reactor Building (Based on Bounding Cases) - Rev A - 30 August 2019, File Ref: 2019/252980 | RQ-0496 - CM9 2019/343036 |
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| **Validation and verification of Hazard analysis software** |  |
| GHX40300023DOZJ03GN - Verification and Validation of MOFIS-Z - Rev A - 28 August 2018, File Ref: 2018/282406 | RQ-0200 - CM9 2019/117975 |
| GHX40300022DOZJ03GN - Verification and Validation of MOFIS-C - Rev A - 28 August 2018, File Ref: 2018/282400 |  |
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| **ALARP Assessment** |  |
| GHX00100062KPGB03GN - ALARP Demonstration Report for Internal Hazards - Rev B - 30 October 2019, File Ref: 2019/318524 |  |

**Appendix 2 - Internal hazards Step 4 RP submission schedule (Subject to change)**

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| **Safeguard Building** | GHX84200035DOZJ03GN - **Internal fire** safety assessment report for Safeguard Building - Revision A | 30 March 2020 |
|  | GHX84200036DOZJ03GN - **Internal missiles** safety assessment report for Safeguard Building - Revision A | 30 April 2020 |
|  | GHX84200038DOZJ03GN - **Internal explosion** safety assessment report for Safeguard Building - Revision A | 30 April 2020 |
| **Reactor Building** | GHX84200041DOZJ03GN - **Internal fire** safety assessment report for Reactor Building - Revision A | 30 May 2020 |
|  | GHX84200042DOZJ03GN - **Internal explosion** safety assessment report for Reactor Building - Revision A | 30 June 2020 |
|  | GHX84200043DOZJ03GN - **Internal missiles** safety assessment report for Reactor Building - Revision A | 30 June 2020 |
| **Fuel Building** | GHX84200046DOZJ03GN - **Internal missiles** safety assessment report for Fuel Building - Revision A | 30 August 2020 |
|  | GHX84200049DOZJ03GN - **Internal fire** safety assessment report for Fuel Building - Revision A | 30 July 2020 |
|  | GHX84200050DOZJ03GN - **Internal explosion** safety assessment report for Fuel Building - Revision A | 30 August 2020 |
| **External Buildings** | GHX84200030DOZJ03GN - The Internal Hazards Safety Assessment Report for Buildings Important to Safety within GDA Scope (other than BSX/BRX/BFX) | 30 September 2020 |
| **Combined Hazards** | GHX84200031DOZJ03GN - **Combined Hazards** Safety Assessment Report, Rev A | 30 September 2020 |
| **HAZARD Schedule**  | Internal Hazards Schedule Report Rev A (Note this is a summary document) | 30 June 2020 |

**Appendix 3 - Proposed Meeting Schedule (Subject to change)**

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| **Date** | **Meeting Description** | **Meeting Duration** | **TSC Attendance** | **Location** |
| 13th February 2020 | MAY & April Deliverables - Review of Submissions During planned February Workshops 202 | 0.5 day | N | Liverpool |
| 28th February 2020 | 0.5 Day | N | Liverpool |
| 17th March 2020 | 0.5 Day | N | Liverpool |
| 18th March 2020 | 0.5 Day | N | Liverpool |
| 19th March 2020 | 0.5 Day | N | Liverpool |
| 24th March 2020 | 0.5 Day | N | Liverpool |
| 25th March 2020 | L4 Workshops in March 2020 For April & May | 0.5 Day | N | Liverpool |
| 26th March 2020 | 0.5 Day | N | Liverpool |
| 19th to 22nd May 2020 | Workshop for all June Submissions | 4 Days | Y | Possible China visit |
| 25th June 2020 | Workshop for August submissions | 0.5 Day | Y | Liverpool |
| 1st & 2nd July 2020 | Workshop for September submissions | Currently planned for 4 0.5 Day meetings however, potential for a 4 Day workshop. | Y | Either UK Liverpool or potential China visit. |
| 28th & 29th July 2020 | Workshop for September submissions | Y |
| 26th August 2020 | Workshop for October submissions | 0.5 Day | Y | Liverpool |
| 15th September 2020 | Workshop for December submissions | 0.5 Day | Y | Liverpool |
| 20th October 2020  | Progress review & Technical queries  | 0.5 Day | Y | Liverpool |
| 17th November 2020 | Progress review & Technical queries | 0.5 Day | Y | Liverpool |
| 17th December 2020 | Progress review & Technical queries | 0.5 Day  | Y | Liverpool |
| 12th to 14th January 2021 | Assessment feedback & technical issue resolution | 2/3 Days | Y | London |

1. ONR, Safety Assessment Principles for Nuclear Facilities, 2014 Edition Revision 0. http://www.onr.org.uk/saps/saps2014.pdf [↑](#footnote-ref-1)
2. ONR, New nuclear reactors: Generic Design Assessment Guidance to Requesting Parties for the UK HPR1000, ONR-GDA-GD-001 Revision 4, October 2019 [↑](#footnote-ref-2)
3. This includes, but is not limited to IAEA guidance, WENRA Issue T, and the ONR Safety Assessment Principles and technical assessment guide for internal hazards NS-TAST-GD-014 Revision 5 [↑](#footnote-ref-3)
4. Planned submission dates maybe subject to change; therefore flexibility is required in the planning. [↑](#footnote-ref-4)
5. ONR Instruction, Export control arrangements for the GDA of UK HPR1000, ONR-GEN-IN-020 Rev 1, September 2019, File Ref: 2019/218899 [↑](#footnote-ref-5)