Office for Nuclear Regulation

New Reactor Division – Generic Design Assessment

Step 2 Assessment of the Conventional Health and Safety of UK HPR1000 Reactor

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EXECUTIVE SUMMARY

This report presents the results of my Conventional Health and Safety assessment of the UK HPR1000 undertaken as part of Step 2 of the Office for Nuclear Regulation's (ONR) Generic Design Assessment (GDA).

The GDA process calls for a step-wise assessment of the Requesting Party's (RP) safety submission with the assessments increasing in detail as the project progresses. Step 2 of GDA is an overview of the acceptability, in accordance with the regulatory regime of Great Britain, of the design fundamentals, including ONR's review of key nuclear safety and nuclear security claims (or assertions). The aim is to identify any fundamental safety or security shortfalls that could prevent ONR from permitting the construction of a power station based on the design.

During GDA Step 2 my work has focused on the assessment of the Conventional Health and Safety aspects within the UK HPR1000 Preliminary Safety Report (PSR), and a number of supporting references and supplementary documents submitted by the RP, focusing on design concepts and claims.

The standards I have used to judge the adequacy of the RP's submissions in the area of Conventional Health and Safety have been primarily UK health and safety legislation, including Approved Codes of Practice (which provide practical advice on how to comply with the law), and technical standards and guidance, including publications by the Health and Safety Executive, standards-making organisations, industry groups and trade associations.

My GDA Step 2 assessment work has involved regular engagement with the RP in the form of technical exchange workshops and progress meetings, including meetings with the plant designers.

The UK HPR1000 PSR is primarily based on the Reference Design, Fangchenggang Unit 3 (FCG3), which is currently under construction in China. Key aspects of the UK HPR1000 preliminary safety case related to Conventional Health and Safety, as presented in the PSR, its supporting references and the supplementary documents submitted by the RP, can be summarised as follows:

- Confirmation of understanding in the preparation of the design of the UK HPR1000, that foreseeable Conventional Health and Safety risks should, so far as is reasonably practicable, be eliminated, or reduced, or controlled, to protect persons affected by the construction or operation of a nuclear power station based on the proposed design.
- Acknowledgement of the effect of the design on risks to health and safety of any person across the life cycle of the nuclear power station, including: construction, operation, maintenance and decommissioning.
- Appreciation by the RP of the need to identify by gap analysis early in GDA the potential legal differences between Chinese industrial safety and UK Conventional Health and Safety regulatory approaches, so they may be understood and addressed in the design of the UK HPR1000.
- Recognition of the Conventional Health and Safety interface with nuclear and environment design across GDA topic specialisms via appropriate cross-Chapter reference.

During my GDA Step 2 assessment of the UK HPR1000 aspects of the safety case related to Conventional Health and Safety I have identified the following areas of strength:

- The RP will adopt recognised Conventional Health and Safety standards in the design of the UK HPR1000 applying general principles of prevention to ensure compliance with UK relevant statutory provisions.

- The Construction Design Management Strategy, outlines how the RP determines that the UK HPR1000 GDA project will meet the key requirements of the Construction (Design and Management) Regulations 2015 (CDM 2015), and provides an essential and specific GDA reference basis to support CDM 2015 compliance.
- The Construction Design Management Strategy clarifies roles, functions and responsibilities, with supporting arrangements to identify, eliminate, reduce or control foreseeable health and safety risks in design.
- The Construction Design Management Strategy outlines a design methodology approach, coordinating and monitoring the identification and assessment of health and safety risks, referencing risk assurance processes. The RP acknowledges that all GDA project designers must have an understanding of the UK context.

During my GDA Step 2 assessment of the UK HPR1000 aspects of the safety case related to Conventional Health and Safety I have identified the following areas that require follow-up:

- Chapter 25 of the PSR recognises the significant regulatory difference between Chinese and UK regulatory systems. RP gap analysis of conventional health and safety law and standards commenced in Step 2 and is on-going. ONR acknowledge the essential gap analysis progressed by the China based RP (CGN) of Chinese and UK conventional health and safety legislative requirements and outcomes to be achieved. During Steps 3 and 4 ONR will sample UK accuracy in the detail of difference in key design topic areas.
- ONR to seek assurance that UK HPR1000 designers, including the RP as CDM Principal Designer and as Designer, demonstrate the necessary UK statutory understanding to ensure in either their preparation or modification of the UK HPR1000 design the elimination, as far as reasonably practicable, of foreseeable risks; and where this not possible the reduction or control of conventional health and safety risks, so far as is reasonably practicable, in accordance with UK statutory requirements. Further, that management of significant and foreseeable risks is effectively coordinated throughout the design process, and, as necessary, supported by UK conventional health and safety skilled, knowledgeable and experienced persons.
- ONR will pursue confirmation that UK HPR1000 design preparation or modification appropriately records design information arising from gap analysis design review, including information about significant risks that cannot be eliminated, in a format that may be accessed and understood by those who will be implementing the design.

During my GDA Step 2 assessment, I have not identified any fundamental safety shortfalls in the area of Conventional Health and Safety that might prevent the issue of a Design Acceptance Confirmation (DAC) for the UK HPR1000 design.

LIST OF ABBREVIATIONS

ALARP	As Low As Reasonably Practicable
BAT	Best Available Technique
BMS	Business Management System
CDM	Construction (Design and Management) Regulations 2015
CGN	China General Nuclear Power Corporation
DAC	Design Acceptance Confirmation
EA	Environment Agency
EDF	Électricité de France
GNI	General Nuclear International
GNS	Generic Nuclear System Ltd
IAEA	International Atomic Energy Agency
JPO	(Regulators') Joint Programme Office
NPP	Nuclear Power Plant
ONR	Office for Nuclear Regulation
PCSR	Pre-construction Safety Report
PCER	Pre-construction Environmental Report
PSR	Preliminary Safety Report (includes security and environment)
RGP	Relevant Good Practice
RI	Regulatory Issue
RIA	Regulatory Issue Action
RO	Regulatory Observation
ROA	Regulatory Observation Action
RP	Requesting Party
RQ	Regulatory Query
SFAIRP	So far as is reasonably practicable
TSC	Technical Support Contractor
WENRA	Western European Nuclear Regulators' Association

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1 INTRODUCTION

1. The Office for Nuclear Regulation's (ONR) Generic Design Assessment (GDA) process calls for a step-wise assessment of the Requesting Party's (RP) safety submission with the assessments increasing in detail as the project progresses. General Nuclear System Ltd (GNS) has been established to act on behalf of the three joint requesting parties (China General Nuclear Power Corporation (CGN), Électricité de France (EDF) and General Nuclear International (GNI)) to implement the GDA of the UK HPR1000 reactor. For practical purposes GNS is referred to as the 'UK HPR1000 GDA Requesting Party'.

2. During Step 1 of GDA, which is the preparatory part of the design assessment process, the RP established its project management and technical teams and made arrangements for the GDA of the UK HPR1000 reactor. Also, during Step 1 the RP prepared submissions to be assessed by ONR and the Environment Agency (EA) during Step 2.

3. Step 2 commenced in November 2017. Step 2 of GDA is an overview of the acceptability, in accordance with the regulatory regime of Great Britain, of the design fundamentals, including ONR's assessment of key nuclear safety and nuclear security claims (or assertions). The aim is to identify any fundamental safety or security shortfalls that could prevent ONR permitting the construction of a power station based on the design.

4. My assessment has followed my GDA Step 2 Assessment Plan for Conventional Health and Safety (Ref. 1), prepared in October 2017, and shared with the RP to maximise openness and transparency.

5. This report presents the results of my Conventional Health and Safety assessment of the UK HPR1000 as presented in the UK HPR1000 Preliminary Safety Report (PSR) (Ref. 2) and its supporting documentation, including the RP's Construction Design Management Strategy (Ref. 3).

2 ASSESSMENT STRATEGY

6. This section presents my strategy for the GDA Step 2 assessment of the Conventional Health and Safety aspects of the UK HPR1000. It also includes the scope of the assessment and the standards and criteria I have applied.

2.1 Scope of the Step 2 Conventional Health and Safety Assessment

7. The objective of my GDA Step 2 assessment was to assess relevant design concepts and claims made by the RP related to Conventional Health and Safety. In particular, my assessment has focussed on the following:

- Familiarisation with the HPR1000 Reference Design, Fangchenggang Unit 3 (FCG3).
- Reviewing the RP's safety submissions to confirm understanding by the RP of GB's health and safety regulatory requirements and approach applicable to the UK HPR1000 design process.
- Reviewing the RP's high level claims that GB health and safety standards can be met via the design principles, review and modification processes relevant to the design of the UK HPR1000. Further, that the design approach will incorporate the elimination, reduction or control of risks, so far as is reasonably practicable, in the construction, maintenance and use of the plant.
- Raising Regulatory Queries to request of the RP clarification and additional information, in accordance with the ONR Guidance to Requesting Parties (Ref. 4).

8. During GDA Step 2 I have also evaluated whether the health and safety claims related to Conventional Health and Safety are supported by a body of technical documentation sufficient to allow me to proceed with GDA work beyond Step 2.

9. Finally, during Step 2 I have undertaken the following preparatory work for my Step 3 assessment:

- During technical workshops I have provided the RP with an outline of ONR's Step 3 Conventional Health and Safety approach, with particular focus on the selection of key risk topic areas.
- The RP has been advised that submissions demonstrating their arguments in support of non-nuclear health and safety design claims encompass examples applicable to construction (including decommissioning), maintenance and plant operation.
- I have improved my technical understanding of the HPR1000 Reference Design, including visits to Fangchenggang Units 1 and 3 (the latter is currently under construction).

2.2 Standards and Criteria

10. For ONR, the primary goal of the GDA Step 2 assessment is to reach an independent and informed judgment on the adequacy of a preliminary nuclear safety and security case for the reactor technology being assessed. Assessment was undertaken in accordance with the requirements of the Office for Nuclear Regulation (ONR) How2 Business Management System (BMS) guide NS-PER-GD-014 (Ref. 5). The standards applied in Conventional Health and Safety assessment were UK legislative requirements, specifically, the Health and Safety at Work etc. Act, (Ref. 6) being the primary piece of GB occupational health and safety legislation, and the duties imposed by regulations; publications on how to comply with the law, including Approved Codes of Practice (ACOPs); and advisory guidance providing explanations of specific legal requirements and technical information.

11. Furthermore, ONR is a member of the Western European Nuclear Regulators Association (WENRA). WENRA has developed Reference Levels, which represent good practices for existing nuclear power plants, and Safety Objectives for new reactors.

2.2.1 National and International Standards and Guidance

12. The following national and international standards and guidance have been considered as part of this assessment:

- UK legislative requirements, including (Refs. 6 to 16)
  - Health and Safety at Work (etc.) Act 1974
  - Management of Health and Safety at Work Regulations 1999
  - Construction (Design and Management) Regulations 2015
  - Lifting Operations and Lifting Equipment Regulations 1998
  - Provision and Use of Work Equipment Regulations 1998
  - Control of Substances Hazardous to Health Regulations 2002 (as amended)
  - Confined Spaces Regulations 1997
  - Dangerous Substances and Explosive Atmospheres Regulations 2002
  - Control of Major Accident Hazards Regulations 2015
  - Manual Handling Operations Regulations 1992
  - The Work at Height Regulations 2005
- HSE published guidance and codes of practice available at www.hse.gov.uk , including (Refs.17 to 21) :
  - Safe use of lifting equipment: Lifting Operations and Lifting Equipment Regulations 1998: Approved Code of Practice and guidance L113
  - Safe work in Confined Spaces: Approved Code of Practice and guidance, L101.
  - Managing health and safety in construction : Construction (Design and Management) Regulations 2015: Guidance on Regulations L153
  - The Control of Major Accident Hazards Regulations: Guidance on Regulations L111
  - Manual handling: Manual Handling Operations Regulations 1992: Guidance on Regulations L23
- Other national and international standards, including (Refs. 22 to 25):
  - Reference to be made to the British Standards Institution, the national body responsible for the development of British Standards: www.bsigroup.com . British Standards have a continuing importance as a form of guidance in promoting health and safety, including:
    - BS 5975: 2008 Code of practice for temporary works procedures and the permissible stress design of falsework.
    - BS 7121-1:2016 Code of practice for safe use of cranes.
    - PAS 1192-6:2018 Specification for collaborative sharing and use of structured Health and Safety information using BIM.
  - European Union regulation concerning the Registration, Evaluation, Authorisation and restriction of Chemicals (REACH).

2.3 Use of Technical Support Contractors

13. During Step 2 I have not engaged Technical Support Contractors (TSCs) to support my assessment of Conventional Health and Safety for the UK HPR1000.

2.4 Integration with Other Assessment Topics

14. Early in GDA, I recognised the importance of working closely with other ONR inspectors and Environment Agency's assessors as part of the Conventional Health and Safety assessment process. Similarly, other ONR inspectors and Environment Agency assessors sought input from my assessment of Conventional Health and Safety for the UK HPR1000. I consider these interactions are key to the success of the project in order to prevent or mitigate any potential areas of conflict, gaps, duplications or inconsistencies in ONR's assessment. From the start of the project, I have endeavoured to identify potential interactions between Conventional Health and Safety and other technical areas, with the understanding that this position will evolve throughout the UK HPR1000 GDA.

15. The key interactions I have identified are listed below. Given the nature of my Step 2 assessment and current progress made by the RP these formal interactions have not commenced during GDA Step 2, but will be important during later Steps.

- The Civil Engineering assessment provides input to the building design and constructability aspects of the Conventional Health and Safety assessment. This work will be led by Conventional Health and Safety in coordination with the Civil Engineering Inspector.
- The Mechanical Engineering assessment provides input to mechanical hazards, including lifting operations, relevant to areas of Conventional Health and Safety assessment. I will lead this work in coordination with the Mechanical Engineering Inspector.
- The Conventional Health and Safety assessment provides input to the COMAH aspects of the Environment Agency assessment. This work will be led by the Environment Agency.
- The Decommissioning assessment provides input to the CDM 2015 design aspects of the Conventional Health and Safety assessment. I will lead this work in coordination with the Decommissioning Inspector.
- The Human Factors assessment will have a design interface with Conventional Health and Safety. This work will be led by the Human Factors Inspector.

3 REQUESTING PARTY'S SAFETY CASE

16. During Step 2 of GDA the RP submitted a PSR and other supporting references, which outline a preliminary nuclear safety case for the UK HPR1000. This section presents a summary of the RP's preliminary safety case in the area of Conventional Health and Safety. It also identifies the documents submitted by the RP which have formed the basis of my Conventional Health and Safety assessment of the UK HPR1000 during GDA Step 2.

3.1 Summary of the RP's Preliminary Safety Case in the Area of Conventional Health and Safety

17. The aspects covered by the UK HPR1000 preliminary safety case in the area of Conventional Health and Safety can be broadly grouped under several headings which can be summarised as follows:

- Acknowledgement of the relevance of conventional, non-nuclear, health and safety in its approach to the UK HPR1000 project in GDA, with demonstration of clear understanding of the UK requirement to control and reduce risks so far as is reasonably practicable.
- The elimination, control or reduction of Conventional Health and Safety risks to health and safety across project design, to include construction work, operation, maintenance and decommissioning.
- Gap analysis to identify key differences between UK and relevant Chinese legislation and standards as applied to the design of the HPR1000 Fangchenggang 3 (FCG3) to ensure the early recognition of areas for review and modification as design preparation of the UK HPR1000 develops.
- Confirmation of relevant Conventional Health and Safety design interface with nuclear and environment specialist topic areas.
- In the absence of UK HPR1000 design detail an overview of HPR1000 (FCG3) design Conventional Health and Safety hazard classification with some reference to hazard identification and mitigation principles.
- High level Conventional Health and Safety claims regarding an ALARP UK HPR1000 design are outlined in the PSR, accurately reflecting relevant UK statutory provisions.

3.2 Basis of Assessment: RP's Documentation

18. The RP's documentation that has formed the basis for my GDA Step 2 assessment of the safety claims related to the Conventional Health and Safety aspects of the UK HPR1000 is presented below.

19. The PSR is a critical submission, intended to provide sufficient information for ONR's Step 2 assessment, including a description of the RP's approach to demonstrate UK HPR1000 design UK statutory compliance. Chapter 25 is dedicated to Conventional Safety. The PSR makes wider reference to health and safety risk elimination and reduction in aligned topic area Chapters, including Human Factors (Chapter 15) and Civil Works and Structures (Chapter 16).

20. The Construction Design Management Strategy details the RP's arrangements for compliance with the requirements of the UK Construction (Design and Management) Regulations 2015 (CDM) during GDA (and beyond). This document is highly relevant in confirming detail of the working relationship between key CDM duty-holders in, so far as is reasonably practicable the elimination, reduction or control of health and safety risks in the preparation or modification of the design for the UK HPR1000 in regard to risks arising from its future construction, operation as a workplace, and decommissioning.

21. In addition, during April 2018 the RP submitted to ONR, for information, an advance copy of the UK HPR1000 Pre-Construction Safety Report (PCSR). Chapter 25 (Ref. 26) addresses Conventional Safety and Fire Safety. Having early visibility of the scope and content of this chapter has been useful in the planning and preparation of my GDA Step 3 assessment work.

4 ONR ASSESSMENT

22. This assessment has been carried out undertaken in accordance with How2 guide NS-PER-GD-014, Purpose and Scope of Permissioning.

23. My Step 2 assessment work has involved regular engagement with the RP's Conventional Health and Safety specialists, including one technical exchange Workshop (in China) and a number of progress meetings. I have also visited:

- Fangchenggang Unit 3 construction site, and Reference Design Site, where I could tour the whole facility including the Reactor Building (following the Containment Building dome lift placement and installation) - date of visit 30 May 2018.
- Fangchenggang Unit 1 operational site, including a tour of the Steam Turbine Generator Building - date of visit 31 May 2018.

24. During my GDA Step 2 assessment, I have identified some gaps in the documentation formally submitted to ONR. Consistent with ONR's Guidance to Requesting Parties (Ref. 4), these normally lead to Regulatory Queries (RQs) being issued. At the time of writing my assessment report, in Conventional Health and Safety, during Step 2, I have raised 2 RQs to facilitate my assessment: RQ-UKHPR1000-0150 and RQ-UKHPR1000-0151 (Ref. 27).

25. Details of my GDA Step 2 assessment of the UK HPR1000 preliminary safety case in the area of Conventional Health and Safety, including the conclusions I have reached, are presented in the following sub-sections of the report. This includes the areas of strength I have identified, as well as the items that require follow-up during subsequent Steps of the GDA of UK HPR1000.

4.1 Conventional Health and Safety

4.1.1 Assessment

26. In my approach to the assessment of Conventional Health and Safety I have sought assurance that UK safety standards are understood by the RP for application in the proposed design of the UK HPR1000; that conventional health and safety risks are being appropriately identified during design; and where reasonably practicable that risks are eliminated, or if this is not possible, reduced or controlled. Further, I have sought confirmation of the understanding that, risks arising throughout the lifetime of the facility are being taken into account, from construction through to decommissioning. In the absence of detailed UK HPR1000 design information the GDA starting point has been the HPR1000, as represented by the FCG3 Reference Design.

27. My assessment of this topic has focussed upon the high level claims stated in Chapter 25 of the RP's PSR. In addition I have considered the claims in the RP's Construction Design Management Strategy, which outlines how relevant requirements of CDM will be met during GDA. Limited reference has been made to the Draft PCSR due to its lack of authorisation at this stage.

28. The RP elaborates in Chapter 25 of the PSR on providing a summary of the conventional safety processes and procedures to be followed for the UK HPR1000 design, based upon the approach at FCG3.

29. Critical to UK statutory understanding has been recognition by the RP of the difference in expectation between the goal setting UK regulatory framework and the more prescriptive nature of Chinese regulation. Reflecting upon the significance of this difference the RP states in the PSR that it considers it inappropriate to present UK

HPR1000 claims in Chapter 25: the RP commits to gap analysis to determine the difference. Preliminary gap analysis on selected topic areas has been undertaken by the RP.

30. I am reassured by the commitment expressed by the RP in Chapter 25 further to the undertaking of UK and Chinese conventional health and safety regulatory gap analysis, to ensure potential differences are understood early and addressed.

31. The RP's Construction Design Management Strategy confirms a commitment to fulfilment of the key CDM roles of Client and Principal Designer, and details appropriate expectations of Designers, including those overseas. Clear reference is made to the appropriate assessment of key parties UK relevant skills, knowledge, experience and, where appropriate, organisational capability. Confirmation is given within the Strategy document to expected standards of health and safety in design, meeting UK regulatory and good practice expectations.

32. I have reiterated throughout Step 2 my support for UK conventional health and safety specialist assistance to the RP in their design assessment of conventional matters.

33. In my Step 2 assessment of the UK HPR1000 I have referenced relevant UK conventional health and safety statutory requirements, Approved Codes of Practice, guidance, British and European Standards.

4.1.2 Strengths

34. During my GDA Step 2 assessment I have noted the following areas of strength.

- Appreciation and acknowledgement of the importance and relevance of Conventional Health and Safety control measures to be addressed in UK HPR1000 project design, and of the hierarchy of measures applicable to eliminate, control and reduce risks so far as is reasonably practicable.
- Acknowledgement of the CDM requirement to eliminate foreseeable risks in the preparation or modification of a design to the health and safety of any person carrying out or liable to be affected by construction work, including decommissioning; maintenance or cleaning of a structure; and its use as a workplace.
- The RP's undertaking of gap analysis to explore and differences between Chinese and UK regulatory requirements, standards and guidance.
- The RP's commitment to address identified differences arising from gap analysis of UK and Chinese conventional health and safety regulatory and standards.
- Inclusion of Conventional Health and Safety in multi-disciplinary PSR content, supported by a commitment for appropriate interaction with such areas as Civil and Mechanical Engineering in GDA Step 3 and 4.
- The PSR inclusion of HPR1000 (FCG3) Conventional Health and Safety hazard classifications and the broad relevance of topic references and content.
- High level Conventional Health and Safety claims regarding an ALARP UK HPR1000 design are outlined in the PSR, reflecting relevant UK statutory provisions.

4.1.3 Items that Require Follow-up

35. During my GDA Step 2 assessment of Conventional Health and Safety I have not identified any specific shortfalls.

36. During my GDA Step 2 assessment of Conventional Health and Safety I have identified the following additional potential shortfalls that I will follow-up during Step 3 of GDA:

- Assurance of accurate UK HPR1000 detail of difference outcomes from gap analysis in key design topic areas, and confirmation of UK compliant Conventional Health and Safety design modifications arising.
- Assurance that UK HPR1000 designers, including the RP as CDM Principal Designer and other overseas designers, appointed to carry out design work through the course of the GDA, demonstrate the necessary skills, knowledge, experience and (if an organisation) organisational capability to carry out this work which must be UK compliant.
- Assessment of the need for UK specialist support with the necessary skills, knowledge and experience, or organisational capability to provide guidance to UK HPR1000 Conventional Health and Safety gap analysis and preparation or modification of the design.

37. During my GDA Step 2 assessment of Conventional Health and Safety I have not identified any areas that may require research to be undertaken by the RP in order to underpin the safety claims.

4.1.4 Conclusions

38. Based on the outcome of my Step 2 assessment of Conventional Health and Safety, I have concluded that the RP has demonstrated that they are able to meet ONR expectations and I have confidence that the RP will be able to provide evidence to support this later in GDA.

4.2 ALARP Considerations

39. I have no Conventional Health and Safety comments to make regarding the RP's 'ALARP Methodology' submission. I will be considering the information in the submission as part of my assessment during Step 3. I refer to comments in the ONR survey Report. (Ref. 28)

4.3 Out of Scope Items

40. The following items have been left outside the scope of my GDA Step 2 assessment of the UK HPR1000 Conventional Health and Safety.

- My Step 2 assessment has not pursued the detailed outcome of gap analysis being undertaken by the RP to map out Chinese differences from UK statutory requirements, standards and guidance. The reason for leaving this matter out of the scope of my GDA Step 2 assessment is the lack of UK HPR1000 detailed design information to enable outcome sampling.
- My Step 2 assessment has not considered CDM roles outside the scope of GDA at this time. My focus has been on the GDA relevant CDM roles of Client, Designer and Principal Designer.

41. It should be noted that the above omissions do not invalidate the conclusions from my GDA Step 2 assessment. During my GDA Step 3 assessment I will follow-up the above out-of-scope items as appropriate; I will capture this within my GDA Step 3 Assessment Plan.

4.4 Comparison with Standards, Guidance and Relevant Good Practice

42. I referenced relevant standards and assessment criteria in Section 2 of this Report. In view of the high level approach to my Conventional Health and Safety assessment in

Step 2 there has been minimal reference to UK relevant standards and criteria. I would expect further design detail to be provided as GDA progresses with associated consideration of relevant UK standards, guidance and relevant good practice. I am content with what the RP has provided during Step 2 in this regard, and have confidence that further evidence will be provided in later GDA Steps.

4.5 Interactions with Other Regulators

43. I have interacted with the Environment Agency to confirm the outline approach to the assessment of COMAH regulatory matters to be taken forward in GDA Step 3 and to be led in principle by the EA.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

44. During Step 2 of GDA the RP submitted a PSR and other supporting references, which outline a preliminary nuclear safety case for the UK HPR1000. These documents have been formally assessed by ONR. The PSR together with its supporting references present at a high level the claims in the area of Conventional Health and Safety that underpin the safety of the UK HPR1000.

45. During Step 2 of GDA I have targeted my assessment at the content of the PSR and its references that is of most relevance to the area of Conventional Health and Safety; against the expectations of ONR's SAPs and TAGs and other guidance which ONR regards as Relevant Good Practice. From the UK HPR1000 assessment done so far, I conclude the following:

- I believe the claims made with regard to Conventional Health and Safety are reasonable, albeit at a high level. The RP understands the nature of the UK regulatory approach and the key requirements under CDM applicable to GDA.
- I have identified a number of potential shortfalls that I will follow up in Step 3. My understanding of the technology is high level at the moment and is commensurate with the level of detail required for Step 2, but it will be necessary to understand the Conventional Health and Safety elements of the design, its method of construction, maintenance and operation in use as GDA progresses.
- I have confidence the RP will provide additional evidence in Steps 3 and 4 to support high level claims made in Step 2.

46. Overall, during my GDA Step 2 assessment, I have not identified any fundamental health and safety shortfalls in the area of Conventional Health and Safety that might prevent the issue of a Design Acceptance Confirmation (DAC) for the UK HPR1000 design.

5.2 Recommendations

47. My recommendations are as follows.

- Recommendation 1: ONR should consider the findings of my assessment in deciding whether to proceed to Step 3 of GDA for the UK HPR1000.
- Recommendation 2: All the items identified in Step 2 as important to be followed up should be included in ONR's GDA Step 3 Conventional Health and Safety Assessment Plan for the UK HPR1000.
- Recommendation 3: All the relevant out-of-scope items identified in sub-section 4.3 of this report should be included in ONR's GDA Step 3 Conventional Health and Safety Assessment Plan for the UK HPR1000.

6 REFERENCES

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