



UK EPR	UK EPR GDA PROJECT			
	Title: Resolution Plan for GI-UKEPR-IH-03			
	RP unique number: GI-UKEPR-IH-03-RP	Revision No.: 1	Effective Date: 05/07/2011	Page No.: 1 of 7
Approved for EDF by: A. PETIT		Approved for AREVA by: C. WOOLDRIDGE		
Name/Initials	Date	Name/Initials	Date	
	05/07/2011		05/07/2011	

Resolution Plan Revision History

Rev.	Description of update	Date issued
0	First Issue	30/06/2011
1	Update of 'Overview of Scope of Work' following ARG comments	05/07/2011

1.0 GDA ISSUE

GDA Issue Title	Main Assessment Area	Related Assessment Area
Internal flooding safety case	Internal Hazards	Human Factors Civil Engineering Environment Agency

GDA Issue	The internal flooding claims stated within the PCSR appear inconsistent with the deterministic approach to the analysis of potential sources of internal flooding.
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2.0 OVERVIEW OF SCOPE OF WORK

Following discussions with ONR on the Internal Flooding methodology proposed by EDF/AREVA for the UK EPR, EDF/AREVA understand that:

- 1) ONR expects, as a base assumption, that internal flooding events are not mitigated by a manual action. The consequences of an event should first be evaluated on that basis.
- 2) If the consequences are unacceptable in terms of safety, then the potential options to mitigate the event should be identified and an ALARP study should be performed. ALARP options could be the following:
 - a. Enhance the hazard barriers
 - b. Design an engineering solution (e.g. automatic closure of a valve following break detection)
 - c. Achieve an operator action: the feasibility and risk associated to the action should be considered.
- 3) A detailed safety case for the Internal Flooding events should be completed on the basis of points 1) and 2) above.

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In order to meet these expectations, EDF/AREVA will perform dedicated studies for the UK EPR.

3.0 GDA ISSUE ACTIONS AND RESOLUTION PLAN DELIVERABLES

3.1 Action GI-UKEPR-IH-03.A1

Action I/D	Action Description
GI-UKEPR-IH-03.A1	<p>Please provide adequate substantiation of the internal flooding safety case through a deterministic analysis that either assumes an unmitigated flood source or the construction of a multi-legged argument that may include consideration of the following aspects:</p> <ul style="list-style-type: none"> • Potential failure mechanisms of water based systems, • Civil engineering aspects including barriers and drainage, • Systems (both engineered and administrative) to ensure that the effects of an internal flooding event are limited to loss of one division. • Any further defence in depth and ALARP measures that could be implemented into the design. • The impact of the changes made to the PCSR relating to the outcome of this substantiation on other safety case submissions such as civil engineering and human factors. <p>The list above should not be considered to be exhaustive and the items detailed above are provided as a means to inform EDF and AREVA of my expectations.</p> <p>With agreement from the Regulator this action may be completed by alternative means.</p>

3.1.1 Deliverables already submitted to HSE/EA in response to GI-UKEPR-IH-03.A1

None

3.1.2 Planned submissions in response to GI-UKEPR-IH-03.A1

3.1.2.1 Description of Scope of Work

EDF/AREVA will provide a dedicated internal flooding safety case based on a deterministic analysis that assumes an unmitigated flood source.

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3.1.2.2 Description of Methodology to be employed

Task 1 of GI-UKEPR-IH-03.A1 - Bounding cases: Leak volumes and retention volumes

In accordance with information submitted in GDA Step 4, the walls in the interface and periphery of the Nuclear Island buildings have been designed to withstand a 10.00 metre water column under the 0.00m Level.

A document will be produced as part of Task 1 to identify the main flooding initiator(s) in each safety classified building of the Nuclear Island, assuming that the flooding event is not mitigated by a manual action. Based on the reference design layout, each associated bounding leak volume will then be compared with the water volume for which the considered safety division in the building has been sized.

If the flooding event demonstrates that the volume of water retention of the affected building is not sufficient, then the consequences will be considered as unacceptable as the event could endanger another safety division. The mitigation options for such events will be analysed in Task 2.

Task 2 of GI-UKEPR-IH-03.A1 - Bounding cases: Mitigation measures

Mitigation measures for all critical cases identified in Task 1 will be elaborated in an ALARP study using the following solutions:

- a. Enhance the hazard barriers
- b. Design an engineering solution (e.g. automatic closure of a valve following break detection)
- c. Achieve an operator action: the feasibility and risk associated to the action should be considered.

The result of this study will be summarised in a report to support the safety case for internal flooding.

3.1.2.3 Deliverable description

**Submission
date to
HSE/EA**

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Bounding cases – Leak volume and retention volumes - Report	10/06/2011
Bounding cases – Mitigation measures - Report	31/10/2011
PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Advance copy)	30/12/2011
PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Final)	28/02/2012

4.0 SUMMARY OF IMPACT ON GDA SUBMISSION DOCUMENTATION

4.1 GDA submission documents impacted by GDA Issue and scheduled to be created (C) or updated (U) within GDA

GDA Submission Documents	C/U	Related GDA Issue Action(s)	Submission Date to HSE/EA
SSER sub-chapters			
PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Final)	U	GI-UKEPR-IH-03.A1	28/02/2012

GDA reference design documents (SDM in UKEPR-I-002)

None

Other GDA submission supporting documents

Bounding cases – Leak volume and retention volumes - Report	C	GI-UKEPR-IH-03.A1	10/06/2011
Bounding cases – Mitigation measures - Report	C	GI-UKEPR-IH-03.A1	31/10/2011

4.2 GDA submission documents impacted by GDA Issue and scheduled to be updated post GDA

Document

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None

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5.0 JUSTIFICATION OF ADEQUACY

EDF/AREVA will provide a dedicated internal flooding safety case based on a deterministic analysis that assumes an unmitigated flood source.

A first document will be produced to identify the main flooding initiator(s) in each safety classified building of the Nuclear Island, assuming that the flooding event is not mitigated by a manual action. Based on the reference design layout, each associated bounding leak volume will be then compared with the water volume for which the considered safety division in the building has been sized.

Mitigation measures for all critical cases identified the first document will be elaborated in an ALARP study using the following solutions:

- a. Enhance the hazard barriers
- b. Design an engineering solution (e.g. automatic closure of a valve following break detection)
- c. Achieve an operator action: the feasibility and risk associated to the action should be considered.

The result of this study will be summarised in a report to support the safety case for internal flooding. The content of the overall study is considered to be in line with the ONR expectations.

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6.0 TIMETABLE AND MILESTONE PROGRAMME LEADING TO THE DELIVERABLES

See Annex 1 - Resolution Plan Schedule for GI-UKEPR-IH-03

N°	Task Name	Durée	Début	Fin	11	Avr 11	Mai 11	Jui 11	Jul 11	Aoû 11	Sep 11	Oct 11	Nov 11	Déc 11	Jan 12	Fév 12	Mar 12
					1	2	0	1	1	2	0	0	1	2	3	0	1
1	GI-UKEPR-IH03 - Internal flooding safety case	239 jours?	Ven 01/04/11	Mar 28/02/12													
2	Task 1 for GI-UKEPR-IH-03.A1	111 jours?	Ven 01/04/11	Ven 02/09/11													
3	Bounding cases – Leak volume and retention volumes - Report	51 jours	Ven 01/04/11	Ven 10/06/11													
4	Transmission to ONR	0 jour	Ven 10/06/11	Ven 10/06/11													
5	ONR Assessment	18 jours?	Lun 18/07/11	Mer 10/08/11													
6	Update following resolution of ONR comments (if applicable)	17 jours?	Jeu 11/08/11	Ven 02/09/11													
7	Submission of finalised report (if applicable)	0 jour	Ven 02/09/11	Ven 02/09/11													
8	Task 2 for GI-UKEPR-IH-03.A1	143 jours?	Jeu 02/06/11	Ven 16/12/11													
9	Bounding cases – Mitigation measures - Report	109 jours	Jeu 02/06/11	Lun 31/10/11													
10	Transmission to ONR	0 jour	Lun 31/10/11	Lun 31/10/11													
11	ONR Assessment	17 jours?	Mar 01/11/11	Mer 23/11/11													
12	Update following resolution of ONR comments (if applicable)	17 jours?	Jeu 24/11/11	Ven 16/12/11													
13	Submission of finalised report (if applicable)	0 jour	Ven 16/12/11	Ven 16/12/11													
14	SSER sub-chapters	64 jours?	Jeu 01/12/11	Mar 28/02/12													
15	PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Advanced copy)	22 jours	Jeu 01/12/11	Ven 30/12/11													
16	Transmission to ONR	0 jour	Ven 30/12/11	Ven 30/12/11													
17	ONR Assessment	21 jours?	Mar 03/01/12	Mar 31/01/12													
18	Update following resolution of ONR comments (if applicable)	20 jours?	Mer 01/02/12	Mar 28/02/12													
19	PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Final)	0 jour	Mar 28/02/12	Mar 28/02/12													

Project: Template - GDAI Resolution P
Date: Mar 28/06/11

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			