



UK EPR GDA PROJECT				
UK EPR	Title: Resolution Plan for GI-UKEPR-IH-02			
	RP unique number: GI-UKEPR-IH-02-RP	Revision No.: 0	Effective Date: 30/06/2011	Page No.: 1 of 16
Approved for EDF by: A. PETIT		Approved for AREVA by: C. WOOLDRIDGE		
Name/Initials	Date	29/06/2011	Name/Initials	Date
				29/06/2011

Resolution Plan Revision History

Rev.	Description of update	Date issued
0	First Issue	30/06/2011

1.0 GDA ISSUE

GDA Issue Title	Main Assessment Area	Related Assessment Area
Internal hazards – Verification and Validation	Internal Hazards	Structural Integrity Civil Engineering Fault Studies PSA

GDA Issue	Outstanding Verification and Validation for internal flooding, cable routing, high energy line break and missiles forms part of the requisite evidence and will be required in order to demonstrate an adequate internal hazards safety case.
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2.0 OVERVIEW OF SCOPE OF WORK

During the GDA assessment, in order to support the internal hazards safety case, EDF/AREVA have transmitted technical reports from the Flamanville 3 EPR studies. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies are applicable to the UK EPR.

As some documents were not available within step 4, the ONR expects the transmission of some additional evidence to support the Internal Flooding, Fire, High Energy Line Break and Missiles safety cases.

The expected evidence will be transmitted from the relevant Flamanville 3 EPR studies before the end of 2011 (see the resolution plan actions for more details on the dates). The UK EPR dedicated internal hazards safety cases will be issued during the NSL phase.

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3.0 GDA ISSUE ACTIONS AND RESOLUTION PLAN DELIVERABLES

3.1 Action GI-UKEPR-IH-02.A1

Action I/D	Action Description
GI-UKEPR-IH-02.A1	<p>Provide the requisite evidence in the form of the detailed Flamanville 3 verification and validation analysis and/or other supporting documentation in support of the claims and arguments presented within Chapter 13.2 of the PCSR associated with internal flooding. The response should include analysis that supports the claims and arguments relating to:</p> <ul style="list-style-type: none"> • Civil structures (including surface coatings) claimed as flood barriers. • Watertight doors and penetrations including qualification data. • Drains and sumps claimed to prevent damage to nuclear significant SSCs. • Calculations in place to support any claims made on potential water volumes. • Any further defence in depth and ALARP measures that could be implemented into the design. • Any identified design changes and their implementation within the PCSR. <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-02.A1

None

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3.1.2 Planned submissions in response to GI-UKEPR-IH-02.A1

3.1.2.1 Description of Scope of Work

EDF/AREVA will transmit documents from the Flamanville 3 EPR studies to support the Internal Flooding case. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies are applicable to the UK EPR. The dedicated UK EPR internal flooding case will be provided during the NSL phase.

3.1.2.2 Description of Methodology to be employed

Task for GI-UKEPR-IH-02.A1: Transmit relevant documentation from Flamanville 3 EPR internal flooding analysis

EDF/AREVA will transmit documentation to support the claims and arguments presented within Chapter 13.2 of the PCSR associated with internal flooding. The technical reports provided will consider the following aspects :

- Civil structures (including surface coatings) claimed as flood barriers.
- Calculations performed to identify the potential water volumes.
- Drains and sumps claimed to prevent damage to nuclear significant SSCs.
- Watertight doors and penetrations.
- Identified design changes and ALARP measures implemented in the design

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3.1.2.3 Deliverable description

Submission date to HSE/EA

HN flooding analysis: PF2009EN0001 "Flooding Safety Analysis for Nuclear Auxiliary Building HNX"	15/06/2011
SAB flooding analysis: EZT2009EN0005 "Flooding event – Analysis of the Safeguard Building"	15/06/2011
HK flooding analysis – Translation of the document EYRT2009FR0008 « Analyse d'inondation interne du bâtiment combustible de l'EPR FA3 »	15/12/2011
HD flooding analysis : Translation of the document EYRT2009FR0032 « Etude d'inondation interne dans le bâtiment diesel de l'EPR de Flamanville (FA3) »	15/12/2011
HR flooding analysis: Translation of the document EYRT2009FR0076 « Etude préliminaire d'inondation interne dans le bâtiment réacteur de l'EPR FA3 »	15/12/2011
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

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3.2 Action GI-UKEPR-IH-02.A2

Action I/D	Action Description
GI-UKEPR-IH-02.A2	<p>Provide the requisite evidence in the form of the detailed Flamanville 3 verification and validation analysis and/or other supporting documentation in support of the claims and arguments presented within Chapter 13.2 of the PCSR associated with the routing and the fire protection of electrical cable trays within the EPR design.</p> <p>The response should include analysis that supports the claims and arguments relating to:</p> <ul style="list-style-type: none"> • The routing and identification of protected cable trays. • Justification of claims and arguments made relating to geographical separation. • The provision of passive protection applied to cables and cable trays specifically. • Any further defence in depth and ALARP measures that could be implemented into the design. • Any identified design changes and their implementation within the PCSR. <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>

3.2.1 Deliverables already submitted to HSE/EA in response to GI-UKEPR-IH-02.A2

None

3.2.2 Planned submissions in response to GI-UKEPR-IH-02.A2

3.2.2.1 Description of Scope of Work

To support the fire hazard case, EDF/AREVA will transmit a document from the Flamanville 3 EPR studies that will detail the routing of cable trays, identify foreign division cable trays and give details on cable trays protected against fire. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies are applicable to the UK EPR. The dedicated UK EPR fire hazard case will be provided during the NSL phase.

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3.2.2.2 Description of Methodology to be employed

Task for GI-UKEPR-IH-02.A2 - Send the Flamanville 3 EPR study related to the identification of fire protected cable trays

EDF/AREVA will transmit a document from the Flamanville 3 EPR project that will consider the following aspects :

- The routing of cable trays.
- The identification of foreign division cable trays.
- The provision of passive fire protection applied to cable trays.
- Any identified design changes and ALARP measures implemented into the design.

3.2.2.3 Deliverable description

**Submission
date to
HSE/EA**

Translation of the document "EYRT2010FR0042 – Localisation des chemins de câbles de l'îlot nucléaire de l'EPR FA3"	15/12/2011
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

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3.3 Action GI-UKEPR-IH-02.A3

Action I/D	Action Description
GI-UKEPR-IH-02.A3	<p>Provide the requisite evidence in the form of the detailed Flamanville 3 verification and validation analysis, specifically, the FA3 1st Stage Pipe Break Analysis and/or other supporting documentation in support of the claims and arguments presented within Chapter 13.2 of the PCSR associated with high energy line break (HELB) within the EPR design. The response should include analysis that supports the claims and arguments relating to:</p> <ul style="list-style-type: none"> • Consequence analysis, where applicable. • Break preclusion. • Identification and qualification of physical restraints, barriers and doors. • Identification and qualification of pressure relief panels/routes. • Any further defence in depth and ALARP measures that could be implemented into the design. • Any identified design changes and their implementation within the PCSR. <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>

3.3.1 Deliverables already submitted to HSE/EA in response to GI-UKEPR-IH-02.A3

	Date of submission
ECEF092040 - 1 st stage analysis report on the consequences of a high-energy line break – Reactor Building	21/06/2010
ECEF092041 - Stage 1 analysis: consequences of high-energy line breaks in fuel building	21/04/2010
ECEF092042 - 1 st stage analysis : consequences of high energy line breaks – safeguard auxiliary and electrical buildings	21/06/2010

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3.3.2 Planned submissions in response to GI-UKEPR-IH-02.A3

3.3.2.1 Description of Scope of Work

EDF/AREVA will transmit additional documents from the Flamanville 3 EPR project to support the High Energy Line Break case. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies are applicable to the UK EPR. The dedicated UK EPR high energy line break case will be provided during the NSL phase.

3.3.2.2 Description of Methodology to be employed

Task for GI-UKEPR-IH-02.A3 - Transmit additional documentation from Flamanville 3 EPR High Energy Line Break case

EDF/AREVA will transmit additional documentation to support the claims and arguments presented within Chapter 13.2 of the PCSR associated with High Energy Line Breaks. The technical reports provided will consider the following aspects :

- Break preclusion.
- Consequence analysis, where applicable.
- Identification and qualification requirements of physical restraints, barriers and doors.
- Identification and qualification requirement of pressure relief panels/routes.
- Any identified design changes and ALARP measures implemented into the design.

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3.3.2.3 Deliverable description

Submission date to HSE/EA

Translation of the document ECEIG091393 - Application de la MTE175 "Ruptures de tuyauteries Haute Energie chargement induit sur les charpentes métalliques"	15/06/2011
HK building HELB case – Translation of the document ECEF101595 "Compléments à la note d'analyse 1 ^{er} stade des conséquences des ruptures de tuyauteries haute énergie – bâtiment combustible"	15/06/2011
SAB building HELB case – Translation of the document ECEF101596 "Compléments à la note d'analyse 1 ^{er} stade des conséquences des ruptures de tuyauteries haute énergie – bâtiments des auxiliaires de sauvegarde"	15/06/2011
PCSR – Sub-chapter 13.2 – Internal Hazards Protection – Update (Advance copy)	30/12/2011
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3.4 Action GI-UKEPR-IH-02.A4

Action I/D	Action Description
GI-UKEPR-IH-02.A4	<p>. Provide the requisite evidence in the form of the detailed Flamanville 3 verification and validation analysis and/or other supporting documentation in support of the claims and arguments presented within Chapter 13.2 of the PCSR associated with internal missiles. The response should include analysis that supports the claims and arguments relating to:</p> <ul style="list-style-type: none"> • Identification of all potential sources of internal missile which could result in a threat to nuclear safety significant SSCs. • Consequence analysis, where applicable. • Break preclusion. • Identification and qualification of physical restraints, barriers and doors. • Any further defence in depth and ALARP measures that could be implemented into the design. • Any identified design changes and their implementation within the PCSR <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>

3.4.1 Deliverables already submitted to HSE/EA in response to GI-UKEPR-IH-02.A4

	Date of submission
TQ-EPR-1375, "Nuclear safety claims associated with internal missiles"	22/03/2011

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3.4.2 Planned submissions in response to GI-UKEPR-IH-02.A4

3.4.2.1 Description of Scope of Work

EDF/AREVA will transmit a document from the Flamanville 3 EPR project to support the Internal Missile case. This case is based on the claim that RCC-M components are not potential sources of missiles. The content of the transmitted case is based on the detailed analysis of the non-RCCM components. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies on non-RCC-M components are applicable to the UK EPR. The dedicated UK EPR internal missile case on these components will be provided during the NSL phase.

A dedicated internal missile case on some RCC-M components which are not identified as High Integrity Components (HIC) will be developed in the frame of the resolution of the GDA issue GI-UKEPR-IH-04.

3.4.2.2 Description of Methodology to be employed

Task for GI-UKEPR-IH-02.A4 - Transmit additional documentation from Flamanville 3 EPR Internal Missile case

EDF/AREVA will transmit documentation to support the claims and arguments presented within Chapter 13.2 of the PCSR associated with Internal Missiles. This study is based on the claim that RCC-M components are not potential sources of missiles. The content of the transmitted case is based on the detailed analysis of the non-RCCM components. The technical report provided will consider the following aspects :

- Identification of all potential sources of internal missile which could result in a threat to nuclear safety significant SSCs
- Break preclusion.
- Consequence analysis, where applicable.
- Identification and qualification of physical restraints, barriers and doors.
- Any identified design changes and ALARP measures implemented into the design.

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3.4.2.3 Deliverable description

**Submission
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FA3 Internal Missile safety case : Translation of the document "ECEIG091634 – EPR – Missiles internes – note d’analyse de risque sur le génie civil et l’installation"	15/06/2011
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

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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
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SSER sub-chapters

PCSR Sub-Chapter 13.2 – Internal Hazards Protection (Final)	U	GI-UKEPR-IH-02.A1 to A4	28/02/2012
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GDA reference design documents (SDM in UKEPR-I-002)

None

Other GDA submission supporting documents

SAB Flooding Analysis: EZT2009EN0005 "Flooding event – Analysis of the Safeguard Building	C	GI-UKEPR-IH-02.A1	15/06/2011
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HN flooding analysis: PF2009EN0001 "Flooding Safety Analysis for Nuclear Auxiliary Building HNX"	C	GI-UKEPR-IH-02.A1	15/06/2011
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HK flooding analysis – Translation of the document EYRT2009FR0008 "Analyse d'inondation interne du bâtiment combustible de l'EPR FA3"	C	GI-UKEPR-IH-02.A1	15/12/2011
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HD flooding analysis – Translation of the document EYRT2009FR0032 "Etude d'inondation interne dans le bâtiment diesel de l'EPR de Flamanville (FA3)"	C	GI-UKEPR-IH-02.A1	15/12/2011
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HR flooding analysis – Translation of the document EYRT2009FR0076 "Etude préliminaire d'inondation interne dans le bâtiment réacteur de l'EPR FA3"	C	GI-UKEPR-IH-02.A1	15/12/2011
Translation of the document EYRT2010FR0042 "Localisation des chemins de câbles de l'îlot nucléaire de l'EPR FA3"	C	GI-UKEPR-IH-02.A2	15/12/2011
Translation of the document ECEIG091393 "Application de la MTE175 "Ruptures de tuyauteries Haute Energie chargement induit sur les charpentes métalliques"	C	GI-UKEPR-IH-02.A3	15/06/2011
Translation of the document ECEF101595 "Compléments à la note d'analyse 1 ^{er} stade des conséquences des ruptures de tuyauteries haute énergie – bâtiment combustible"	C	GI-UKEPR-IH-02.A3	15/06/2011
Translation of the document ECEF101596 "Compléments à la note d'analyse 1 ^{er} stade des conséquences des ruptures de tuyauteries haute énergie – bâtiments des auxiliaires de sauvegarde"	C	GI-UKEPR-IH-02.A3	15/06/2011
Translation of the document ECEIG091634 "EPR – Missiles internes – note d'analyse de risque sur le génie civil et l'installation"	C	GI-UKEPR-IH-02.A4	15/06/2011

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

Document

None

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5.0 JUSTIFICATION OF ADEQUACY

During the GDA assessment, EDF/AREVA have transmitted a large selection of technical reports from the Flamanville 3 EPR studies. As they form the basis of the UK EPR design, the Flamanville 3 EPR studies are applicable to the UK EPR and their content is considered to be in line with the ONR expectations.

The documents which will be transmitted in the frame of the resolution of this GDA issue are additional evidence from the Flamanville 3 EPR studies. They will support the claims and arguments of the internal flooding, high energy line break, fire hazard and internal missile cases.

A dedicated internal missile case on RCC-M components which are not identified as High Integrity Components (HIC) will be also developed in the frame of the resolution of the GDA issue GI-UKEPR-IH-04.

The dedicated UK EPR internal hazards cases will be provided during the NSL phase.

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6.0 TIMETABLE AND MILESTONE PROGRAMME LEADING TO THE DELIVERABLES

Resolution Plan Schedule for GI-UKEPR-IH-02.

