



UK EPR	UK EPR GDA PROJECT			
	Title: Resolution Plan for GI-UKEPR-RC02			
	RP unique number: GI-UKEPR-RC02-RP	Revision No.: 1	Effective Date: 01/07/2011	Page No.: 1 of 8
Approved for EDF by: A. PETIT Name/Initials  Date 01/07/2011		Approved for AREVA by: C. WOOLDRIDGE Name/Initials  Date 01/07/2011		

Resolution Plan Revision History

Rev.	Description of update	Date issued
0	Initial Issuance	23/06/2011
1	Incorporation of ARG comments into Section 3.1.1.2	01/07/2011

1.0 GDA ISSUE

GDA Issue Title	Main Assessment Area	Related Assessment Area
Control and Minimisation of Ex-core Radiation	Reactor Chemistry	Fuel Design Radiation Protection Radwaste and Decommissioning

GDA Issue	Evidence to demonstrate that ex-core radiation levels in UK EPR are minimised so far as is reasonably practicable and can be controlled.
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2.0 OVERVIEW OF SCOPE OF WORK

As part of the GDA Step 4 assessment of Reactor Chemistry of UK EPR the regulators have assessed if the design of UK EPR is adequate to minimise and control mobile radioactive sources throughout the Nuclear Island, in both the short and long term.

It is expected that EDF and AREVA provide evidence to demonstrate that radioactivity and its accumulation in the Nuclear Island, to be as low as reasonably practicable. RO-UKEPR-74 requested evidence to demonstrate that the UK EPR was capable of controlling radioactivity in the various ex-core Nuclear Island systems. This RO requested evidence particularly for tritium (Action 1), fuel crud (Action 2) and other radioactivity (Action 3) respectively. Action 1, which addressed tritium, provided confidence that tritium could be adequately controlled in UK EPR. This action has been fully responded to within GDA; however, some residual questions remain and will be addressed during site licensing. Actions 2 and 3 have not been completed and are to be provided to address this GDA issue.

Accordingly, EDF and AREVA are to provide the remaining deliverables committed as part of the RO-UKEPR-74 response plan delineated in Letter ND(NII) EPR00546N.

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3.0 GDA ISSUE ACTIONS AND RESOLUTION PLAN DELIVERABLES

3.1 Action GI-UKEPR-RC02.A1

Action I/D	Action Description
GI-UKEPR-RC02.A1	<p>EDF and AREVA to provide calculations, or alternative evidence agreed by the regulator, which demonstrate that the control of corrosion products (fuel crud) and other radioactivity (excluding tritium) in safety systems in the UK EPR and outside of the primary reactor cooling circuit are minimised so far as is reasonable practicable and are controlled.</p> <p>The safety systems considered should include all of those inside the Nuclear Island which are routinely expected to handle radioactive materials, including the Spent Fuel Pool, In-containment Refuelling Water Storage Tank and the Residual Heat Removal System.</p> <p>Activation of the reactor vessel itself need not be included in the response.</p> <p>Such evidence should be based upon the expected plant operating procedures, particularly relating to shutdown, head-lift criteria and operation of the boron recycle system and should be compatible with the expected plant limits and conditions.</p> <p>With agreement from the Regulator this action may be completed by alternative means.</p>

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3.1.1 Planned submissions in response to GI-UKEPR-RC02.A1

3.1.1.1 Description of Scope of Work

EDF and AREVA are to provide the remaining deliverables to RO-UKEPR-74 which will satisfactorily address the questions raised by this GDA issue. Additionally, EDF and AREVA will support the ONR assessment of the associated engineering documentation and justifications.

3.1.1.2 Description of Methodology to be employed

EDF and AREVA will complete the response to existing RO-UKEPR-74 Actions 2 and 3, specifically items (b) and (c), in accordance with the methodology delineated in EDF and AREVA Letter ND(NII) EPR00546N and as described in detail in engineering report ECEF102664, "Activity Management Methodology Applied to UK EPR" (RO-UKEPR-74 Actions 2 and 3, Item (a) deliverable). These remaining tasks are described below.

<p>Task 1 [existing RO-UKEPR-74.A2&A3, Item (b)] (see Note 1)</p>	<p>Report providing the estimation and monitoring of primary coolant activity and its impact on fuel:</p> <ul style="list-style-type: none"> • RCS source term estimation • RCS crud estimation • RCS source term characterisation • Crud characterisation • Action control parameters
<p>Task 2 [existing RO-UKEPR-74.A2&A3, Item (c)] (see Note 1)</p>	<p>Report providing estimations, monitoring and impact of activity in auxiliary systems and other fields (radioprotection, safety, environment, material integrity):</p> <ul style="list-style-type: none"> • Estimation of source term in auxiliary systems • Impact assessment

Note:

- 1 Estimation of RCS source term is detailed in dedicated reports provided through RO-UKEPR-73. EDF and AREVA will take into account discussions held with the Radiation Protection Topic Group during GDA and integrate accordingly into the response to ensure consistency between topic groups.

The deliverables associated with this resolution plan are in progress. Provided below is a general technical overview of how these documents have been organized based on the commitments made as part of EDF and AREVA Letter ND(NII) EPR00546N.

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Task 1 of GI-UKEPR-RC02.A1 – UK EPR Activity Estimation and Characterization

This report will discuss the source term selection and quantification for the reactor coolant system (RCS) of the UK EPR. A description of the nuclides taken into account for the primary coolant in order to manage and control the radioactivity in the Nuclear Island will be provided. Quantification of the RCS source term, based on calculations, will be provided in order to show the consistency of the nuclide source term specified by EDF and AREVA in the PCSR. Additionally, specific materials and chemistry conditions of UK EPR will be taken into account as part of this quantification.

The specification and characterization of the radionuclides will be described as well as the radioactivity control parameters that are monitored during normal power operation and transients. The ensemble of the abovementioned elements will provide the necessary evidence for justifying the selection of criteria and monitoring and measurement equipment for the UK EPR.

Furthermore, the table of contents of this engineering report will be provided to ONR for early visibility of the document structure and technical topics addressed therein.

Task 2 of GI-UKEPR-RC02.A1 – UK EPR Auxiliary Systems Activity Estimation and Monitoring

This report will discuss the management of activity in auxiliary systems. It will provide a description of the activity pathway through the following main auxiliary systems: RCV [CVCS], RIS-RA [RHRS], TEP [BRS], IRWST, REA [RBWMS], PTR-BK [FPCS], HVAC, and TEG [GWPS].

The main results of a parametrical study of activity deposition in the circuit will be provided. The activity management is and will be based on the performance of purification means used in the auxiliary systems (i.e., filters, resins, flowrates, etc.). The role of the different auxiliary systems which relate to activity management will be described, along with important equipment and the associated operating conditions.

The principles and main criteria associated with activity management during normal power operation and transients will also be described. This report will confirm that the expected plant limits and conditions are consistent with the activity management.

Furthermore, the table of contents of this engineering report will be provided to ONR for early visibility of the document structure and technical topics addressed therein.

The intent of these engineering reports (Tasks 1 and 2) is to provide justification for the acceptability of the chosen operating limits and conditions for the UK EPR. However, should the results require changes in the operating limits and conditions, the appropriate UK EPR GDA processes will be followed to ensure any necessary changes are properly captured and carried forward.

The engineering reports which will be provided will require review by ONR. This review is anticipated to require at least one (1) face-to-face meeting and no more than five (5) teleconferences to facilitate resolution of any residual questions and/or offer clarifications.

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Calculation codes and software are expected to be used for resolution of this GDA Issue Action and will be identified in the associated engineering reports. The base codes and software which will be utilized have been previously identified and provided in engineering report ECEF102664, "Activity Management Methodology Applied to UK EPR" (RO-UKEPR-74 Actions 2 and 3, Item (a) deliverable).

Task 3 of GI-UKEPR-RC02.A1 – PCSR Update

An update to PCSR Sub-Chapter 5.5 (References) is expected since the documentation provided in response to this resolution plan will need to be reflected in the reference section.

Note that the PCER relies on technical information contained in PCSR Sub-Chapter 5.5. As part of updating the PCSR Sub-Chapter 5.5, a review of the PCER will be performed simultaneously to ensure that information contained in it is not invalidated by any potential PCSR changes made in response to this GDA issue action.

3.1.1.3 Deliverable description

Submission date to HSE/EA

Report on UK EPR Activity Estimation and Characterization

08/07/2011

This report will discuss the source term selection and quantification for the reactor coolant system (RCS) of the UK EPR. A description of the nuclides taken into account for the primary coolant and a quantification of the RCS source term will be provided in order to show the consistency of the nuclide source term specified by AREVA/EDF in the PCSR.

Report on UK EPR Auxiliary Systems Activity Estimation and Monitoring

30/11/2011

This report will discuss the management of activity in auxiliary systems. A description of the activity pathway through the following main auxiliary systems will be provided: RCV [CVCS], RIS-RA [RHRS], TEP [BRS], IRWST, REA [RBWMS], PTR-BK [FPCS], HVAC, and TEG [GWPS].

PCSR Sub-Chapter 5.5 – Reactor Chemistry

30/11/2011
(Advance Version)

The update to the PCSR will incorporate, where appropriate, pertinent text and update the reference section of this sub-chapter.

28/02/2012
(Final Version)

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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
SSER sub-chapters			
PCSR Sub-Chapter 5.5 – Reactor Chemistry	U	GI-UKEPR-RC02.A1	30/11/2011 (Adv. Vers.) 28/02/2012 (Final Vers.)
GDA reference design documents (SDM in UKEPR-I-002)		N/A	N/A
Not Applicable			
Other GDA submission supporting documents			
Report on UK EPR Activity Estimation and Characterization	C	GI-UKEPR-RC02.A1	08/07/2011
Report on UK EPR Auxiliary Systems Activity Estimation and Monitoring	C	GI-UKEPR-RC02.A1	30/11/2011

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5.0 JUSTIFICATION OF ADEQUACY

EDF and AREVA will provide the remaining deliverables to RO-UKEPR-74 which have been structured to satisfactorily address the questions raised by this GDA issue. Specifically, the Task 1 report will discuss the source term selection and quantification for the reactor coolant system (RCS) of the UK EPR. A description of the nuclides taken into account for the primary coolant and a quantification of the RCS source term will be provided in order to show the consistency of the nuclide source term specified by AREVA/EDF in the PCSR. Secondly, the Task 2 report will discuss the management of activity in auxiliary systems and the pathway of activity through these systems. Both of these Tasks utilize detailed analyses and/or quantifications to thoroughly evaluate corrosion products and activity in the Nuclear Island.

EDF and AREVA will support the ONR assessment of the associated engineering documentation and justifications.

As described in the write-up of GDA Issue GI-UKEPR-RC02, ONR has stated that based on initial submittals they are not expecting there to be any issues with the UK EPR being able to control radioactivity; however, the remaining suitable evidence is still needed. Accordingly, there is a high degree of confidence that the remaining deliverables will provide the remaining evidence necessary for a robust safety case and adequately addressing this GDA Issue.

The engineering documentation which makes up the totality of the response to this GDA Issue support the following relevant ONR SAPs: ENM1 to ENM7, RP6, ECV2, ECV3, and ECV6.

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6.0 TIMETABLE AND MILESTONE PROGRAMME LEADING TO THE DELIVERABLES

Consult the following pages for the associated timetable and milestone programme.

ID	Task Name	Duration	Start	Finish	Qtr 2, 2011			Qtr 3, 2011			Qtr 4, 2011			Qtr 1, 2012		
					Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Action 1 of GI-UKEPR-RC02	217 days	Mon May 2, '11	Tue Feb 28, '12												
2	Task 1 - UK EPR Activity Estimation and Characterization	155 days	Mon May 2, '11	Fri Dec 2, '11												
3	Draft Table of Contents Issued to ONR	0 days	Fri Jun 17, '11	Fri Jun 17, '11												
4	Report and Analysis Preparation	45 days	Mon May 2, '11	Fri Jul 1, '11												
5	Issuance to ONR	5 days	Mon Jul 4, '11	Fri Jul 8, '11												
6	ONR Assessment	40 days	Mon Aug 1, '11	Fri Sep 23, '11												
7	Resolution of ONR Assessment Comments (if applicable)	40 days	Mon Sep 26, '11	Fri Nov 18, '11												
8	Issuance of Updated Documentation (if applicable)	10 days	Mon Nov 21, '11	Fri Dec 2, '11												
9	Task 2 - UK EPR Auxiliary Systems Activity Estimation and Monitoring	213 days	Mon May 2, '11	Wed Feb 22, '12												
10	Draft Table of Contents Issued to ONR	0 days	Fri Jun 17, '11	Fri Jun 17, '11												
11	Report and Analysis Preparation	148 days	Mon May 2, '11	Wed Nov 23, '11												
12	Issuance to ONR	5 days	Thu Nov 24, '11	Wed Nov 30, '11												
13	ONR Assessment	30 days	Thu Dec 1, '11	Wed Jan 11, '12												
14	Resolution of ONR Assessment Comments (if applicable)	20 days	Thu Jan 12, '12	Wed Feb 8, '12												
15	Issuance of Updated Documentation (if applicable)	10 days	Thu Feb 9, '12	Wed Feb 22, '12												
16	Task 3 - PCSR Update - Sub-chapter 5.5	99 days	Thu Oct 13, '11	Tue Feb 28, '12												
17	PCSR Update Preparation (Advance Version)	30 days	Thu Oct 13, '11	Wed Nov 23, '11												
18	Issuance to ONR	5 days	Thu Nov 24, '11	Wed Nov 30, '11												
19	ONR Assessment	44 days	Thu Dec 1, '11	Tue Jan 31, '12												
20	Resolution of ONR Assessment Comments (if applicable)	10 days	Wed Feb 1, '12	Tue Feb 14, '12												
21	Issuance of Updated Documentation	10 days	Wed Feb 15, '12	Tue Feb 28, '12												

Project: GI-UKEPR-RC02 Schedule
Date: Fri Jul 1, '11

Task		Progress		Summary		External Tasks	
Split		Milestone		Project Summary		External Milestone	