Office for Nuclear Regulation

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Tel: 0151 951 4000 www.hse.gov.uk/nuclear

EDF AND AREVA UK EPR GENERIC DESIGN ASSESSMENT

GDA ISSUE

COMBUSTIBLE GAS CONTROL SYSTEMS

GI-UKEPR-RC-01 REVISION 1

Technical Area	**REACTOR CHEMISTRY**		
Related Technical Areas	Severe Accident		
GDA Issue Reference	**GI-UKEPR-RC-01**	**GDA Issue Action Reference**	**GI-UKEPR-RC-01.A1**
GDA Issue	Impact of Passive Autocatalytic Recombiners during accidents		
GDA Issue Action	EDF and AREVA to provide a sensitivity analysis, or alternative means agreed by the regulator, to demonstrate the operation of the UK EPR Combustible Gas Control System (CGCS) with reduced performance of the Passive Autocatalytic Recombiners (PARs) . In the current UK EPR safety case the PARs are assumed to work at 100% "efficiency" throughout an accident (i.e. the flow is adjusted so that 100% of the inlet hydrogen is removed). Information has been provided on the derivation of the performance characteristics of individual PAR units. EDF and AREVA claim that their effectiveness is bounded by the current analyses including one analysis with removal of selective complete PARs (6 equipment room PARs and 1 dome recombiner) as a surrogate for reduced PAR efficiency. While this provides a degree of comfort in the CGCS, it does not demonstrate how the system would behave following an overall "efficiency" reduction in all recombiners, as opposed to selective removal of a few entire units. In addition, it has not been demonstrated that adequate consideration has been given to local flows when modelling the UK EPR (i.e. convective flows in the containment acting in the opposite direction to the flow through the PAR). As above, this effect too could result in reduced PAR performance and should be analysed given that this cannot be ruled out. With agreement from the Regulator this action may be completed by alternative means.		

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Technical Area		**REACTOR CHEMISTRY**	
Related Technical Areas		Severe Accident	
GDA Issue Reference	**GI-UKEPR-RC-01**	**GDA Issue Action Reference**	**GI-UKEPR-RC-01.A2**
GDA Issue Action	EDF and AREVA to provide a sensitivity analysis, or alternative means agreed by the regulator, to demonstrate the performance of the UK EPR Combustible Gas Control System (CGCS) in case of a bounding accident scenario. An important input to the assessment of any accident mitigation system is the source term in terms of the rate and mass of combustible gases released into containment. The CGCS in UK EPR will have a limited overall depletion rate based upon the installed equipment (i.e. number and size of PAR units). EDF and AREVA have described the analysis using "representative" and "bounding" scenarios with the latter oxidising around 75% of the available fuel cladding and the former predicting lower levels. While this provides a degree of comfort that the analysis uses best estimate source terms, a detailed analysis including bounding conditions has to be supplied to demonstrate the adequacy of the system design. With agreement from the Regulator this action may be completed by alternative means.		

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GI-UKEPR-RC-01 REVISION 1

Technical Area		**REACTOR CHEMISTRY**	
Related Technical Areas		Severe Accident	
GDA Issue Reference	**GI-UKEPR-RC-01**	**GDA Issue Action Reference**	**GI-UKEPR-RC-01.A3**
GDA Issue Action	EDF and AREVA to provide a sensitivity analysis, or alternative means agreed by the regulator, to demonstrate the potential impact of operation of the UK EPR CGCS on iodine volatility in containment. With agreement from the Regulator this action may be completed by alternative means.		