

WESTINGHOUSE AP1000® GENERIC DESIGN ASSESSMENT
GDA ISSUE
SUCCESS CRITERIA FOR THE PROBABILISTIC SAFETY ANALYSIS (PSA)
GI-AP1000-PSA-01 REVISION 0

Technical Area		PROBABILISTIC SAFETY ASSESSMENT	
Related Technical Areas		Fault Studies	
GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A1
GDA Issue	<p>The AP1000 PSA should be supported by design specific analysis of sufficient detail and scope and fully traceable.</p> <p>During our assessment we have compiled evidence that the Success Criteria for the AP1000 PSA does not meet our expectations. Deficiencies have been found in the following areas:</p> <ul style="list-style-type: none"> • Demonstration of overall success of sequences. • Use of AP600 analysis without visible justification or sufficient evidence of applicability. • Coverage of faults. • Justification of time windows for operator actions. • Traceability of the analysis. 		
GDA Issue Action	<p>Westinghouse should provide the procedure (Guidebook) established to guide the development of success criteria for the AP1000 PSA.</p> <p>The guidebook should provide clear information on:</p> <ul style="list-style-type: none"> • The methods to be used for the derivation of the success criteria. • The code/s to be used for derivation of the success criteria including how the analysis should deal with the limitations of the code/s. • Clear definition of the meaning of “success”. • How the operator time windows will be evaluated. • How the success criteria analyses will be documented. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A2
GDA Issue Action	Westinghouse should provide the AP1000 Input deck/s (parameter file/s) for the code/s to be used. With agreement from the Regulator this action may be completed by alternative means.		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A3
GDA Issue Action	<p>Westinghouse should provide a complete list of Initiating Events (IEs) correctly grouped, details of the success sequences & event tree headings to be evaluated including a demonstration that the analysis (both thermal-hydraulic and neutronics) is sufficient to support the success criteria for all the accident sequences in the AP1000 PSA.</p> <p>The review of the AP1000 PSA conducted in GDA identified a number of Initiating Events missing from the PSA and a number of IEs incorrectly grouped. In addition, the Risk Gap Analysis undertaken by ONR's PSA team in the framework of GDA has concluded that the missing IEs could have an important contribution to the AP1000 risk. In order to properly address the success criteria GDA Issue and to ensure completeness, Westinghouse should include in the success criteria evaluations the missing initiating events as appropriate and should also show that the IE grouping is correct for the purpose of success criteria evaluation.</p> <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A4
GDA Issue Action	<p>Westinghouse should provide the success criteria analyses and results for Loss of Coolant Accidents (LOCA).</p> <ul style="list-style-type: none"> • The sequence assumptions should be justified and clearly documented. • Time-lines should be provided with clear link to relevant procedures, clues for operator actuation etc. • A demonstration should be included that sufficient analysis has been performed to cover all the variety of LOCAs in the PSA (ie, LOCAs of different sizes and in different locations). • The delineation of time windows for operator actuation has to be clearly documented. • The minimum equipment requirement and performance for success should be clearly documented. • Any conservatisms in the analysis should be described together with a justification that they are not important enough to bias the results of the analysis. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A5
GDA Issue Action	<p>Westinghouse should provide the success criteria analyses and results for Transients.</p> <ul style="list-style-type: none"> • The sequence assumptions should be justified and clearly documented. • Time-lines should be provided with clear link to relevant procedures, clues for operator actuation etc. • A demonstration should be included that sufficient analysis has been performed to cover all the variety of (intact primary and secondary circuit) transients in the PSA including the transients currently missing from the PSA which were identified during ONR's GDA review. • The delineation of time windows for operator actuation has to be clearly documented. • The minimum equipment requirement and performance for success should be clearly documented. • Any conservatisms in the analysis should be described together with a justification that they are not important enough to bias the results of the analysis. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A6
GDA Issue Action	<p>Westinghouse should provide the success criteria analyses and results for Steam Line Breaks.</p> <ul style="list-style-type: none"> • The sequence assumptions should be justified and clearly documented. • Time-lines should be provided with clear link to relevant procedures, clues for operator actuation etc. • A demonstration should be included that sufficient analysis (both thermal-hydraulic and neutronics) has been performed to cover all the variety of steam line breaks in the PSA (eg, steam line breaks downstream of the MSIVs, upstream of the MSIVs both inside and outside containment, spurious opening of valves in the secondary circuit, double steam line breaks in the containment, feed water line breaks grouped together with steam line breaks in the PSA, feed water line breaks occurring as a consequence of steam line breaks, etc). • The delineation of time windows for operator actuation has to be clearly documented. • The minimum equipment requirement and performance for success should be clearly documented. • Any conservatisms in the analysis should be described together with a justification that they are not important enough to bias the results of the analysis. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A7
GDA Issue Action	<p>Westinghouse should provide the success criteria analyses and results for Steam Generator Tube Ruptures (SGTR).</p> <ul style="list-style-type: none"> • The sequence assumptions should be justified and clearly documented. • Time-lines should be provided with clear link to relevant procedures, clues for operator actuation etc. • A demonstration should be included that sufficient analysis (both thermal-hydraulic and neutronics) has been performed to cover all the variety of SGTRs in the PSA (including consequential SGTRs). • The delineation of time windows for operator actuation has to be clearly documented. • The minimum equipment requirement and performance for success should be clearly documented. • Any conservatisms in the analysis should be described together with a justification that they are not important enough to bias the results of the analysis. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A8
GDA Issue Action	<p>Westinghouse should provide the success criteria analyses and results for Anticipated Transients Without SCRAM (ATWS).</p> <ul style="list-style-type: none"> • The sequence assumptions should be justified and clearly documented. • Time-lines should be provided with clear link to relevant procedures, clues for operator actuation etc. • A demonstration should be included that sufficient analysis (both thermal-hydraulic and neutronics) has been performed to cover all the variety of ATWS in the PSA. • The delineation of time windows for operator actuation has to be clearly documented. • The minimum equipment requirement and performance for success should be clearly documented. • Any conservatisms in the analysis should be described together with a justification that they are not important enough to bias the results of the analysis. <p>With agreement from the Regulator this action may be completed by alternative means.</p>		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A9
GDA Issue Action	Westinghouse should develop a Gap Analysis to evaluate the implications of the new analysis on the AP1000 Core Damage Frequency (CDF) and Large Release Frequency (LRF) (including development and quantification of new and modified event trees as necessary). With agreement from the Regulator this action may be completed by alternative means.		

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GDA Issue Reference	GI-AP1000-PSA-01	GDA Issue Action Reference	GI-AP1000-PSA-01.A10
GDA Issue Action	Westinghouse should complete the documentation and provide a stand alone document compiling all the PSA Success Criteria Analysis and Gap Analysis performed accompanied by the supporting references. With agreement from the Regulator this action may be completed by alternative means.		