

**Westinghouse UK**  
**AP1000® GENERIC DESIGN ASSESSMENT**  
**Resolution Plan for GI-AP1000-HF1**  
**Completeness of the Human Factors Safety Case**

MAIN ASSESSMENT AREA	RELATED ASSESSMENT AREA(S)	RESOLUTION PLAN REVISION	GDA ISSUE REVISION
Human Factors	-	3	0

<b>GDA ISSUE:</b>	Completeness of the Human Factors Safety Case, specifically in the areas of human error mechanisms, operator misdiagnosis potential and violation potential.
<b>ACTION: GI-AP1000-HF-01.A1</b>	<p>Westinghouse submitted a significant volume of important HF analysis towards the end of GDA Step 4 relating to human error mechanisms, operator misdiagnosis and violation potential. ONR undertook a very high review of the submission to gain confidence in the approach, but was unable to undertake a detailed and thorough assessment within the Step 4 timescales. In addressing this GDA Issue, Westinghouse shall demonstrate that the risks presented by human error mechanisms, operator misdiagnosis and violation potential are ALARP.</p> <p>This GDA Issue Action requires:</p> <ul style="list-style-type: none"> <li>• Westinghouse to provide support to ONR’s assessment of the <b>AP1000</b> Human Factors Safety Case, including responses to questions raised from ONR assessment of documents and analyses submitted as “Other Documentation” during Step 4 and participation in relevant meetings and discussions.</li> <li>• The Office of Nuclear Regulation to review the detailed Westinghouse Human Factors analysis submissions in light of the Human Factors Safety Case illustrated in UKP-GW-GL-793, revision 0 and as identified as “Other Documentation”. Included within this review shall be participation in relevant meetings and discussions.</li> </ul> <p>With agreement from the Regulator this action may be completed by alternative means.</p>

## RELEVANT REFERENCE DOCUMENTATION RELATED TO GDA ISSUE

### Technical Queries

TQ and Subject	Response Date	Status
TQ-AP1000-1278 - Changes made to the Human Factors Safety Case since issue of Revision A of the PCSR	4 Feb 2011	Closed - Full Response Sent
TQ-AP1000-1177 - HF issue tracking and resolution (TQ-AP1000-908 follow on)	16 Dec 2010	Closed - Full Response Sent
TQ-AP1000-1163-Fire arrangements	26 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1144-Queries relating to Supplemental Submission 'Potential Improvements as proposed in the ALARP analysis'	13 Dec 2010	Closed - Full Response Sent
TQ-AP1000-1143-Overarching ALARP approach	10 Dec 2010	Closed - Full Response Sent
TQ-AP1000-1133 - Aligning CVS to aux spray	15 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1131 - Computer formats	26 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1129 - Temperatures and atmospheric conditions	17 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1128 - Local-to-Plant Controls	30 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1126 - Maintenance task target times	15 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1112 - Maintenance - Adjunct/Peripheral Systems	23 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1111 - Maintainability Guidelines	24 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1110 - Maintenance consideration in OEF reviews	24 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1096 - FLISM Operator Action time	28 Oct 2010	Closed - Full Response Sent
TQ-AP1000-1095 - Changes to EOP E-3, APP-GW-GJP-204	15 Oct 2010	Closed - Full Response Sent
TQ-AP1000-1084 - SQUIB Valve HF Issues	17 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1083 - Normal and passive RHR issues	28 Oct 2010	Closed - Full Response Sent
TQ-AP1000-1082 - Relative humidity information	2 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1081 - Deterioration of lighting levels	5 Nov 2010	Closed - Full Response Sent
TQ-AP1000-1080 - Operator action times	15 Oct 2010	Closed - Full Response Sent
TQ-AP1000-1004 - Anthropometric Data	30 Oct 2010	Closed - Full Response Sent
TQ-AP1000-908 - HF Issues List	15 Oct 2010	Closed - Full Response Sent
TQ-EPR-901 - Dissemination of Human Factors guidance to suppliers	8 Oct 2010	Closed - Full Response Sent
TQ-AP1000-900 - Human Factors organisation	8 Oct 2010	Closed - Full Response Sent
TQ-AP1000-660 - Tailoring AP1000 to UK national requirements	22 Nov 2010	Closed - Full Response Sent

### Regulatory Observations

RO-AP1000-90  
RO-AP1000-96  
RO-AP1000-97

### Other Documentation

Document Identification	Date	Title	Subject Matter
UN REG WEC 000464	30 December 2010	Westinghouse <b>AP1000</b> Human Factors Document Submission	UKP-GW-GL-075, Revision 0; "United Kingdom <b>AP1000</b> Supplemental Information for the UK <b>AP1000</b> Human Factors Safety Case – Additional UK Fault Schedule Faults"
UN REG WEC 000453	17 December 2010	Westinghouse Response to Regulatory Observations RO-AP1000-90, RO-AP1000-96, and RO-AP1000-97	UKP-GW-GL-076, revision 0; "United Kingdom <b>AP1000</b> Supplemental Information for the UK <b>AP1000</b> Human Factors Safety Case – Operator Error Mechanisms"

UN REG WEC 000476	16 December 2010	Submittal of UKP-GW-GL-144 Revision 1	UKP-GW-GL-144, Rev. 1; "AP1000 UK Safety Categorization and Classification of Systems, Structures, and Components"
UN REG WEC 000475	16 December 2010	Revised C&I GDA Scope	High-level scope statement for the GDA for the AP1000 C&I application and platforms
UN REG WEC 000438	2 December 2010	Westinghouse AP1000 Human Factors Document Submission	UKP-GW-GL-074, Rev 0; "Supplemental Information for the UK AP1000 Human Factors Safety Case - AP1000 Maintainability"
UN REG WEC 000418,	4 November 2010	Westinghouse AP1000 Human Factors Document Submission	UKP-GW-GL-069, Revision 0; "United Kingdom AP1000 Supplemental Information for the UK AP1000 Human Factors Safety Case as Reflecting the UK AP1000 PRA Update"
UN REG WEC 000377	1 October 2010	Westinghouse AP1000 Human Factors Document Submission: "AP1000 Local Panels and Maintainability HFE Assessment"	APP-OCS-JCR-001, Rev A; AP1000 Local Panels and Maintainability HFE Assessment"
UN REG WEC 000150	26 February 2010	Westinghouse AP1000 Human Factors Safety Case Submission	UKP-GW-GL-042, Rev. 1; "AP1000 Human Factors Program and Assessment for the United Kingdom"

**Scope of Work:**

In acknowledgement of ONR's continuing assessment of the **AP1000** Human Factors Safety Case, the scope of work associated with this Resolution Plan is defined as Westinghouse's facilitation of the ONR review through delivery of a Human Factors Safety Case roadmap, appropriate and timely responses to Regulatory Queries, attendance at meetings, and provision of requested supporting documentation.

Additionally, in support of substantiation of actions important to safety, Westinghouse shall conduct the following actions:

1. Perform a systematic assessment of human factors integration across the remaining 50 GDA Issues.
2. Perform a human factors review of approved Class I and selected Class II **AP1000**

Design Change Proposals as consistent with the **AP1000** Design Reference Point for the UK GDA, revision 6. This review shall focus on identification of human actions created as part of the design changes approved by Westinghouse since the Reference Date of 16 September 2010. Upon identification, each new human action shall be documented and assessed. Claims and arguments on plant personnel, impact on human error identification, and modeling assumptions shall be modified as appropriate.

3. Assure human error identification completeness and assess the potential use of optimistic claims through:
  - a. Review, and revision as required, of existing **AP1000** Human Factors Safety Case supplemental documents to UKP-GW-GL-042, revision 0.
  - b. Use of a sampling plan approach for the review of claims on operator actions; substantiating the claims where possible and identifying assumptions. Where substantiation of claims is not possible, qualitatively reassess the action consequences.

Incorporate assessment, results, and findings from these efforts into subsequent revisions to the **AP1000** PCSR, UKP-GW-GL-793.

**Description of Work:**

See the Scope of Work.

The results of Westinghouse's actions, as identified within the Scope of Work, shall be communicated to the ONR and documented in a referenced format(s) to be retained within the Westinghouse EDMS. These documents shall be suitable for referencing within the **AP1000** Human Factors safety case.

Additionally, Westinghouse shall formally respond to ONR-supplied Regulatory Queries as documented through the normal GDA processes, actively participate in subject meetings and telephone conferences, and provide relevant supporting technical documentation.

**Schedule / Programme Milestones:**

The schedule for this Scope of Work shall be in accordance with the Westinghouse-ONR agreed upon Integrated Schedule

#	Activity Name	2015												2016												2017
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	<b>UK Generic Design Assessment (GDA) Resolution Plans (51) **LIVE**</b>																									
2	<b>HUMAN FACTORS</b>																									
3	<b>HF.01 Completeness of Human Factors Safety Case</b>																									
4	<b>HF.01 Summary HF Roadmap</b>																									
5	Summary Roadmap Revision 0 - Submit to ONR for Review																									
6	Summary Roadmap Revision 0 - ONR Review of Submittal																									
7	<b>HF.01 Systematic Assessment of HF Integration Across GDA Issues</b>																									
8	Systematic Assessment Rev 0 - Submit to ONR for Review																									
9	Systematic Assessment Rev 0 - ONR Review of Submittal																									
10	<b>HF.01 HF Review of DCPs</b>																									
11	HF Review of DCPs, Rev 0 - Submit to ONR for Review																									
12	HF Review of DCPs, Rev 0 - ONR Review of Submittals																									
13	<b>HF.01 Human Error Completeness</b>																									
14	Human Error Completeness, Rev 0 - Submit to ONR for Review																									
15	Human Error Completeness, Rev 0 - ONR Review of Submittal																									
16	<b>HF.01 Human Factor Safety Case Update</b>																									
17	Human Factor Safety Case, Rev 1 - Submit to ONR for Review																									
18	Human Factor Safety Case, Rev 1 - ONR Review of Submittal																									

**Methodology:**

ONR review activities shall be based on existing claims, arguments and evidence of the Westinghouse Human Factors Safety Case. Westinghouse responses to ONR Regulatory Queries and provision of supporting documents shall be based on relevant technical information and in accordance with the existing GDA processes. Further, meetings and conferences shall be held on a Level 4 basis as defined by existing GDA processes.

**Justification of Adequacy:**

The previously supplied body of supporting information to the **AP1000** Human Factors Safety Case was designed and developed to augment the original Safety Case submission. This information is contained within the latest **AP1000** PCSR, UKP-GW-GL-793, revision 0.

As such, this information reflected Westinghouse's response to the relevant Regulatory Observations as identified above. The scope of work identified herein provides the same level of support to the ONR assessment as during the Step 4 GDA activities.

**Impact Assessment:**

As the Safety Case augmentation to be reviewed addresses each of the Regulatory Observations, minimal impact to the existing **AP1000** Human Factors Safety Case is expected.