

Office for Nuclear Regulation

An agency of HSE

Redgrave Court Merton Road Bootle Merseyside L20 7HS
Tel: 0151 951 4000 www.hse.gov.uk/nuclear

Mr M Tynan

Vice President and Managing Director UK,
Middle East and Egypt
Westmarch House
42 Eaton Avenue
Buckshaw Village
Chorley
Lancashire
PR7 7NA
United Kingdom

Mr K Allars

Director for Nuclear New Build
Office for Nuclear Regulation
Redgrave Court
Merton Road
Bootle
Merseyside
L20 7HS

Tel: +44 (0)151 951 4000
Fax: +44 (0)151 951 3732
Email: new.reactor.build@hse.gsi.gov.uk

Our Ref: 2011/606827
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Your Ref:
Unique No:

14 December 2011

Dear Mike,

New nuclear power stations: Generic Design Assessment

Interim Design Acceptance Confirmation for the AP1000® Reactor

The Office for Nuclear Regulation (ONR) – an agency of the Health and Safety Executive (HSE) – has undertaken a Generic Design Assessment (GDA) of the Westinghouse Electric Company LLC (Westinghouse) AP1000 nuclear reactor during the period July 2007 to December 2011 in accordance with the process identified in the documents *New nuclear power stations: Generic Design Assessment: Guidance to Requesting Parties*¹, *Office of Civil Nuclear Security Guidance document for Generic Design Assessment activities*², and *Guidance on the Management of GDA Outcomes*.³

The findings of the ONR(HSE) assessment are summarised in the Step 4 Report for the AP1000 nuclear reactor entitled *New nuclear reactors: Generic Design Assessment. Westinghouse Electric Company LLC AP1000® nuclear reactor. Summary of the detailed design assessment of the Westinghouse Electric Company LLC AP1000® nuclear reactor (Step 4 of the Generic Design Assessment process) 14 December 2011* and which has been published on the ONR(HSE) website www.hse.gov.uk/newreactors.

There remain issues relating to the safety of the design which must be resolved before ONR(HSE) could consider granting a Final Design Acceptance Confirmation (Final DAC). On the basis of the resolution plans that you, Westinghouse, have submitted, ONR(HSE) believe that all of these remaining issues can be resolved. ONR(HSE) is therefore content to issue an Interim Design Acceptance Confirmation for the AP1000 nuclear reactor.

The Interim Design Acceptance Confirmation (ONR-GDA-iDAC-11-002 Issue 1) is attached and remains valid for a period of ten years from the date of issue.

Office for Nuclear Regulation

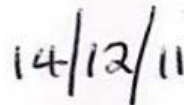
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Any organisation wishing to build and operate a nuclear installation in Great Britain must obtain from ONR(HSE) a site-specific Nuclear Site Licence, and any necessary Consents for construction of that installation granted under the Conditions attached to that Licence. It is ONR(HSE)'s current intent that it will not grant Consent for nuclear island safety-related construction for a power station based on the AP1000 reactor generic design before the unresolved GDA Issues identified in Annex 2 to the attached Interim Design Acceptance Confirmation have been addressed to the satisfaction of ONR(HSE) and a Final Design Acceptance Confirmation has been provided. The issuing of a Final Design Acceptance Confirmation would signal the end of GDA for that generic design of the AP1000 reactor.

Signed

Dated



Kevin Allars

*Director for Nuclear New Build
Office for Nuclear Regulation
An agency of the Health and Safety Executive*

References

- 1 *Nuclear power station generic design assessment – guidance to requesting parties* Version 3 HSE August 2008 www.hse.gov.uk/newreactors/ngn03.pdf
- 2 *Guidance document for generic design assessment activities* (Version 2) Office for Civil Nuclear Security 201206 January 2007 www.hse.gov.uk/nuclear/ocns/ocnsdesign.pdf
- 3 *New nuclear power stations. Generic Design Assessment. Guidance on the management of GDA outcomes* Version 1 HSE June 2010 www.hse.gov.uk/newreactors/reports/management-gda-outcomes.pdf

GENERIC DESIGN ASSESSMENT OF WESTINGHOUSE AP1000®* NUCLEAR REACTOR
INTERIM DESIGN ACCEPTANCE CONFIRMATION
FOR THE WESTINGHOUSE AP1000 NUCLEAR REACTOR

The Office for Nuclear Regulation (ONR), an agency of the Health and Safety Executive (HSE), in accordance with the document *Guidance on the Management of GDA Outcomes Version 1, 23 June 2010*, hereby gives the Westinghouse Electric Company LLC (Westinghouse) an Interim Design Acceptance Confirmation (iDAC) for the AP1000 nuclear reactor.

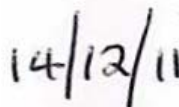

This iDAC is given following the assessment of the material included in the GDA Submission described in Annex 1.

The GDA Issues which must be resolved by Westinghouse in connection with the AP1000 nuclear reactor design before ONR(HSE) will consider issuing a Final Design Acceptance Confirmation (“unresolved GDA Issues”) are identified in Annex 2 of this iDAC.

This iDAC is valid for a period of ten years beginning on the date on which it is issued.

Signed

Date of Issue



Kevin Allars

Director for Nuclear New Build

Office for Nuclear Regulation

An agency of the Health and Safety Executive

* AP1000 is a registered trademark of Westinghouse Electric Company LLC in the United Kingdom and may be used or registered in other countries

Annex 1 to the Interim Design Acceptance Confirmation for the AP1000 nuclear reactor

GDA Submissions

For the purposes of the iDAC, the generic design of the AP1000 reactor and the generic safety and security provisions are described in the following submissions:

- 1 *AP1000® Design Reference Point for UK GDA Reference date: 16 September 2010.* Document UKP-GW-GL-060 Revision 5. 1 November 2011. Westinghouse Electric Company LLC.
- 2 *AP1000 Pre-construction Safety Report.* Document UKP-GW-GL-732 Revision 2. December 2009. Westinghouse Electric Company LLC.[†]
- 3 The documents identified in *The Master Submission List: Maintaining the Configuration of the United Kingdom Generic Design Assessment of the European AP1000 Design, 2007-2011.* Document UKP-GW-GLX-001 Revision 1. 1 October 2011. Westinghouse Electric Company LLC.

Other than the aspects of the submissions agreed with ONR(HSE) as being out of scope for GDA. The issues which are out of scope are defined by Westinghouse in its letter *GDA Out of Scope Items*, UN REG WEC00728, dated 7 November 2011.

[†] Our assessment was based on this Pre-construction Safety Report (PCSR) plus additional supporting information provided in responses to our regulatory questions. Westinghouse provided an updated version of the PCSR in March 2011 with the intention of capturing the additional supporting information, but we have not yet fully confirmed this by assessment. This confirmation will be undertaken as part of the close-out assessment in respect of GDA Issue GI-AP1000-CC-02 (see Annex 2)

Annex 2 to the Interim Design Acceptance Confirmation for the AP1000 nuclear reactor

GDA Issues

GDA Issue	GDA Issue Reference
Internal Hazards	
Internal Fire Safety Case Substantiation	GI-AP1000-IH-01 GDA Issue, Revision 0
Internal Flooding Safety Case	GI-AP1000-IH-02 GDA Issue, Revision 0
Pressure Part Failure	GI-AP1000-IH-03 GDA Issue, Revision 0
Internal Explosion Safety Case Substantiation	GI-AP1000-IH-04 GDA Issue, Revision 0
Internal Missile Safety Case	GI-AP1000-IH-05 GDA Issue, Revision 0
Substantiation and Analysis of the Consequences of Dropped Loads and Impact from Lifting Equipment Included Within the AP1000 Design	GI-AP1000-IH-06 GDA Issue, Revision 0
Civil Engineering	
Justification of Novel Form of Structure for the Steel / Concrete Composite Walls and Floors Known as CA Modules	GI-AP1000-CE-01 GDA Issue, Revision 0
Further Justification of Novel Form of Structure for Steel / Concrete Composite Wall to the Enhanced Shield Building	GI-AP1000-CE-02 GDA Issue, Revision 1
AP1000 Material Standards and Material Specifications	GI-AP1000-CE-03 GDA Issue, Revision 0
Fuel Handling Area – Secondary Containment Leak Detection and Collection System	GI-AP1000-CE-04 GDA Issue, Revision 0
Probabilistic Safety Analysis (PSA)	
Success Criteria for the PSA	GI-AP1000-PSA-01 GDA Issue, Revision 0
Fire PSA	GI-AP1000-PSA-02 GDA Issue, Revision 0
Fault Studies	
Spent Fuel Pool Safety Case	GI-AP1000-FS-01 GDA Issue, Revision 0
Design Reference Point and Adequacy of Design Basis Analysis	GI-AP1000-FS-02 GDA Issue, Revision 0
Diversity for Frequent Faults	GI-AP1000-FS-03 GDA Issue, Revision 0
Use of In-core Detectors to Protect Against Adverse Power Distributions	GI-AP1000-FS-04 GDA Issue, Revision 0
Potential Enhancements to the Diverse Safety Injection System	GI-AP1000-FS-05 GDA Issue, Revision 1
Validation of the IRWST Cooling Function for the PRHR	GI-AP1000-FS-06 GDA Issue, Revision 0
Safety Case for Shutdown Faults	GI-AP1000-FS-07 GDA Issue, Revision 0
Fault Schedule for AP1000	GI-AP1000-FS-08 GDA Issue, Revision 0

Annex 2 to the Interim Design Acceptance Confirmation for the AP1000 nuclear reactor

GDA Issues

GDA Issue	GDA Issue Reference
Control & Instrumentation	
Adequacy of Safety Case for DAS	GI-AP1000-CI-01 GDA Issue, Revision 0
DAS – Adequacy of Architecture	GI-AP1000-CI-02 GDA Issue, Revision 0
Diversity Between the PMS (CIM) and DAS	GI-AP1000-CI-03 GDA Issue, Revision 0
PMS Spurious Operation	GI-AP1000-CI-04 GDA Issue, Revision 0
SMART Device Justification for Use	GI-AP1000-CI-05 GDA Issue, Revision 0
Ovation Platform – Adequacy of Safety Case	GI-AP1000-CI-06 GDA Issue, Revision 0
DCIS – Adequacy of Safety Case	GI-AP1000-CI-07 GDA Issue, Revision 0
PMS – Adequacy of Safety Case	GI-AP1000-CI-08 GDA Issue, Revision 0
CIM – Adequacy of Safety Case	GI-AP1000-CI-09 GDA Issue, Revision 0
Class 1 Displays and Controls	GI-AP1000-CI-010 GDA Issue, Revision 0
Essential Electrical Systems	
Pre-construction Safety Report Presentation of Claims Arguments and Evidence	GI-AP1000-EE-01 GDA Issue, Revision 0
Fuel Design	
Fuel Pin Modelling Safety Justification	GI-AP1000-FD-01 GDA Issue, Revision 0
Tolerability of Depressurisation Forces in LBLOCA	GI-AP1000-FD-02 GDA Issue, Revision 0
Use of the BEACON Code for On-line Compliance	GI-AP1000-FD-03 GDA Issue, Revision 0
Reactor Chemistry	
Accident Source Terms	GI-AP1000-RC-01 GDA Issue, Revision 0
Primary Sampling System	GI-AP1000-RC-02 GDA Issue, Revision 0
Hydrogen Dosing System	GI-AP1000-RC-03 GDA Issue, Revision 0
Radiation Protection	
Spent Fuel Pool – Criticality Safety Case	GI-AP1000-RP-01 GDA Issue, Revision 0
Mechanical Engineering	
Squib Valve Concept and Design Substantiation	GI-AP1000-ME-01 GDA Issue, Revision 1
Metrication of Mechanical Equipment and Civil Structural Steelwork Connections	GI-AP1000-ME-02 GDA Issue, Revision 1
Mechanical System Pipework Design	GI-AP1000-ME-03 GDA Issue, Revision 0

**Annex 2 to the Interim Design Acceptance Confirmation
for the AP1000 nuclear reactor**

GDA Issues

GDA Issue	GDA Issue Reference
Structural Integrity	
Avoidance of Fracture	GI-AP1000-SI-01 GDA Issue, Revision 0
Fatigue Analysis	GI-AP1000-SI-02 GDA Issue, Revision 0
Reactor Coolant Pump	GI-AP1000-SI-03 GDA Issue, Revision 0
Containment Vessel	GI-AP1000-SI-04 GDA Issue, Revision 0
Compliance of AP1000 Main Structural Components with ASME III Design Rules	GI-AP1000-SI-05 GDA Issue, Revision 0
Categorisation and Classification	GI-AP1000-SI-06 GDA Issue, Revision 0
Human Factors	
Completeness of the Human Factors Safety Case	GI-AP1000-HF-01 GDA Issue, Revision 0
Cross-cutting Topics	
Limits and Conditions	GI-AP1000-CC-01 GDA Issue, Revision 0
Pre-construction Safety Report to Support GDA	GI-AP1000-CC-02 GDA Issue, Revision 3
Consider and Action Plans to Address the Lessons Learnt from the Fukushima Event	GI-AP1000-CC-03 GDA Issue, Revision 2