Case study

Generic Design Assessment (GDA) of new build reactor designs

THE CHALLENGE
Proposals to licence the next generation of nuclear power stations in the UK are subject to an evaluation process by the UK Health and Safety Executive (HSE) / Office of Nuclear Regulation (ONR) known as the Generic Design Assessment (GDA). The process included two reactor designs, the UK EPR reactor from EDF-Areva, and the AP1000 reactor from Westinghouse.

The ONR contracted Frazer-Nash as the Technical Support Contractor for a large part of the GDA review of the Control & Instrumentation (C&I). Our challenge was to provide an independent view to the ONR on the adequacy of the Safety Case in respect of C&I for the two reactor designs.

OUR SOLUTION
We split the assessment of the AP1000 and UK EPR C&I into several distinct but interrelated tasks to gain confidence that the C&I platforms, systems and architectures comply with the relevant guidance and standards. These included ONR Safety Assessment Principles and Technical Assessment Guides as well as international nuclear standards, such as:


The tasks considered:

- The adequacy of the implementation of Class 1 C&I systems and the key Class 2 (safety-related) systems. This separately considered the Commercial Off The Shelf (COTS) equipment and other platforms on which the systems were to be implemented
- The safety capability of the C&I architectures, including the overall system integration
- The adequacy of the diversity between the designs of systems contributing to implementation of category A safety functions and the effect of common mode failure on these systems
- The impact of selected Pre-Construction Safety Report (PCSR) revisions.

Undertaking these tasks involved a team reviewing, typically through a sampling based approach, a significant volume of evidence presented by Westinghouse and EDF-Areva as well as reviews at supplier locations.

BENEFIT
This project enabled the ONR to understand the robustness of the safety cases for the UK EPR and AP1000 reactor C&I. This is significant in aiding the ONR’s decision on whether the reactor designs could be licensed to be built and operated in the UK, and whether a Design Acceptance Confirmation (DAC) can be issued.

Client
UK Health and Safety Executive / Office for Nuclear Regulation

Business need
To provide an independent view of nuclear and non-nuclear safety critical C&I system documentation for the Westinghouse AP1000 and the EDF-Areva UK EPR nuclear reactors, which are proposed for nuclear new build power stations in the UK.

Why Frazer-Nash?
Frazer-Nash has a track record in the delivery of projects for clients, taking into account the specific requirements for safety and quality in the nuclear industry.

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