

Instrument Cubicles

Background

As part of a boiler lifetime modification program, AMS were engaged by the client to design, substantiate, build, test and deliver a suite of instrument cubicles to support a risk reduction initiative to meet the station's Safety Case. Each of three new systems (Depressurisation, overfeed protection and valve isolation) were based on the use of redundant channels of voting logic taking inputs from a range of transducers measuring various process plant parameters.

Aside from the technical skills and capabilities required for the job, one of the biggest challenges was to meet the project timeframe in order that the equipment could be ready for installation at the next scheduled outage.

Scope

The scope of supply for this project included:

- Detailed system design, based on initial client concept design
- Selection and procurement of appropriate nuclear grade instrumentation
- Design and fabrication of bespoke, seismically suitable instrument cubicles
- Assembly of instrument cubicles including orbital welded piping
- Qualification Testing of cubicles including seismic and high temperature tests
- Delivery to site
- Supply of full set of Lifetime Quality Records

Outcomes

The outcome of the project was that AMS delivered all 20 instrument cubicles, fully tested and with all required Lifetime Quality Records within the required timescales. The key deliverables included:

- 6 depressurisation cubicles, 8 overfeed protection cubicles and 6 valve isolation cubicles
- Production of all design, substantiation, FAT and QA documentation



Key features of the cubicles included:

- Robust, seismically suitable, bespoke cubicle designs that met human factors requirements
- Instrumentation segregation
- Use of compartment interlocks
- Orbitally welded piping
- Nuclear qualified and type tested instrumentation

Key Skills Utilised

AMS were trusted to deliver this project due to having proven experience of:

- Designing bespoke cubicles
- Producing design substantiations compliant with client requirements
- Designing cubicles to meet seismic requirements
- Having good working relationships with key instrumentation manufacturers

In addition, AMS were able to utilise the following key skills for this project:

- Managing welding sub-contractors (a critical feature of this design)
- Utilising 3D CAD to design systems & equipment arrangement to meet demanding physical constraints but provide safe access for maintenance & operation
- Project management