

CAPULA

IET BREAKOUT SESSION

Gantner Instruments

Austria | Germany | France | Sweden

India | USA | China | Singapore

Gantner
instruments

GI Systems
Measurement • Test • Technology

AGENDA

- + Introductions
- + Overview: Plant Monitoring Project
- + Gantner Instruments / Capula – Collaborative Approach
- + Chosen Technology
- + Strengths
- + Project Execution
- + Benefits Realised
- + Summary
- + Questions

CASE STUDY **PLANT MONITORING SYSTEM**

Background

- Urgent requirement from EDF Design Authority to implement a plant monitoring system at a UK nuclear power station
- During outage inspection works it was identified that certain steam valves may be subject to vibration and additional stresses

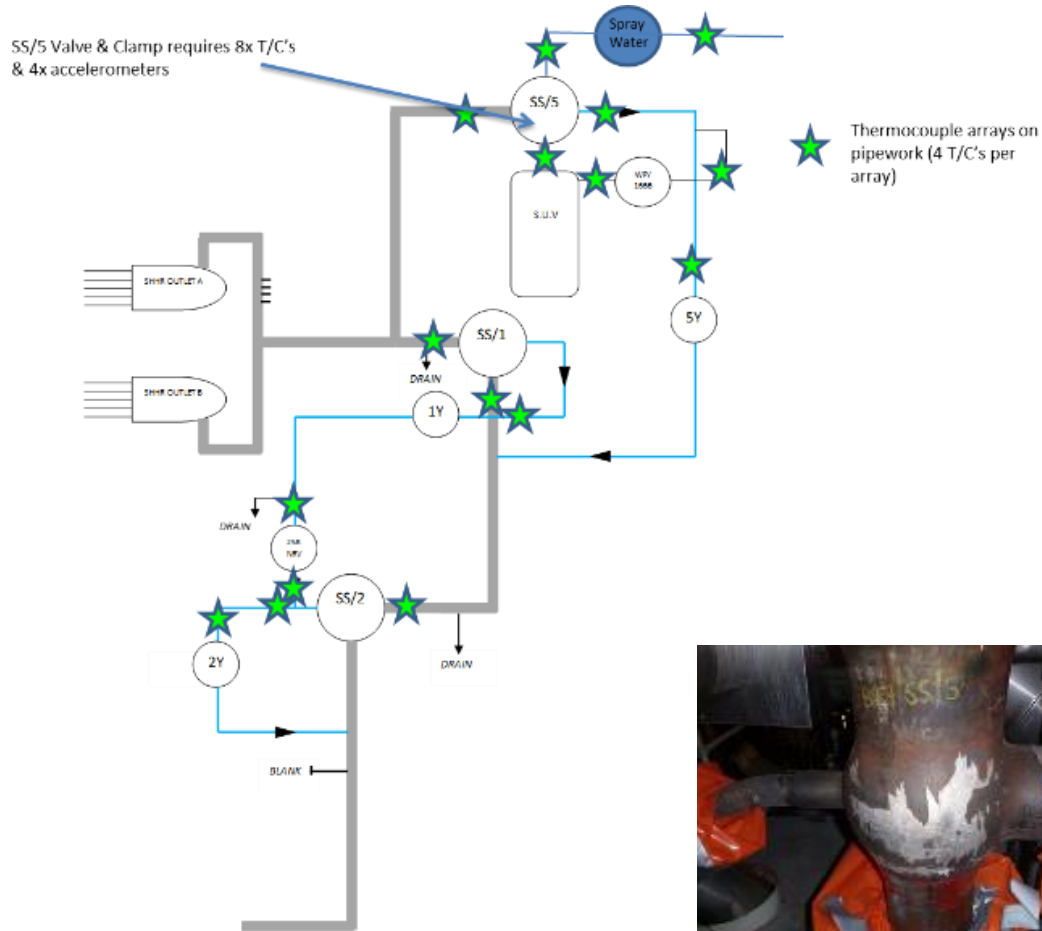
Requirement

- The station has two Reactors; each reactor has 4 boilers – steam leaving the boiler array passes through various hydraulically actuated valves during start-up
- To help better understand the conditions the valves are subjected to, a conditioning monitoring system was required to monitor several valves on each of the boilers
- The system is required to monitor and log temperatures, vibration and flow.

Scope

- Following initial on-site survey work Capula were engaged to provide
- concept design and detailed design
- manufacture and procurement of suitably assessed specialist equipment
- installation supervision
- commissioning of the final system prior to return from planned outage.

REQUIREMENTS



Plant Monitoring Requirement
Temperature Monitoring Upstream of Item (NSEW TC Array)
Temperature Monitoring of the Item
Temperature Monitoring Downstream of Item (NSEW TC Array)
Flow Monitoring through valve
Vibration monitoring of valve
Temperature Monitoring of SS/5 On Load Valve Restraint

Instrument Types (Per Boiler)	
Pipework Thermocouples (Total)	52
SS/5 Thermocouples (Valve & OLVR)	8
Spray Water Flow Transmitters	1
Accelerometers	2

There are also a number of manual "Yankee" (Y) valves 1Y, 2Y and 5Y.

There was a requirement to monitor upstream and downstream temperatures for the main SS Valves and upstream temperatures for the Y valves.



ENVIRONMENTAL REQUIREMENTS

The Logging system was required to operate within the following environmental conditions:

- Operating temperature -20 °C to +60 °C.
- Relative humidity 5 - 95 % at 50 °C (non-condensing).
- ATEX is not applicable to the locations the equipment was housed.
- The equipment is required to meet IP54 as a minimum.
- The equipment was powered from an 110VAC centre tapped supply

PROPOSED SOLUTION

Prior to the detailed site survey, we noted several factors to be considered:

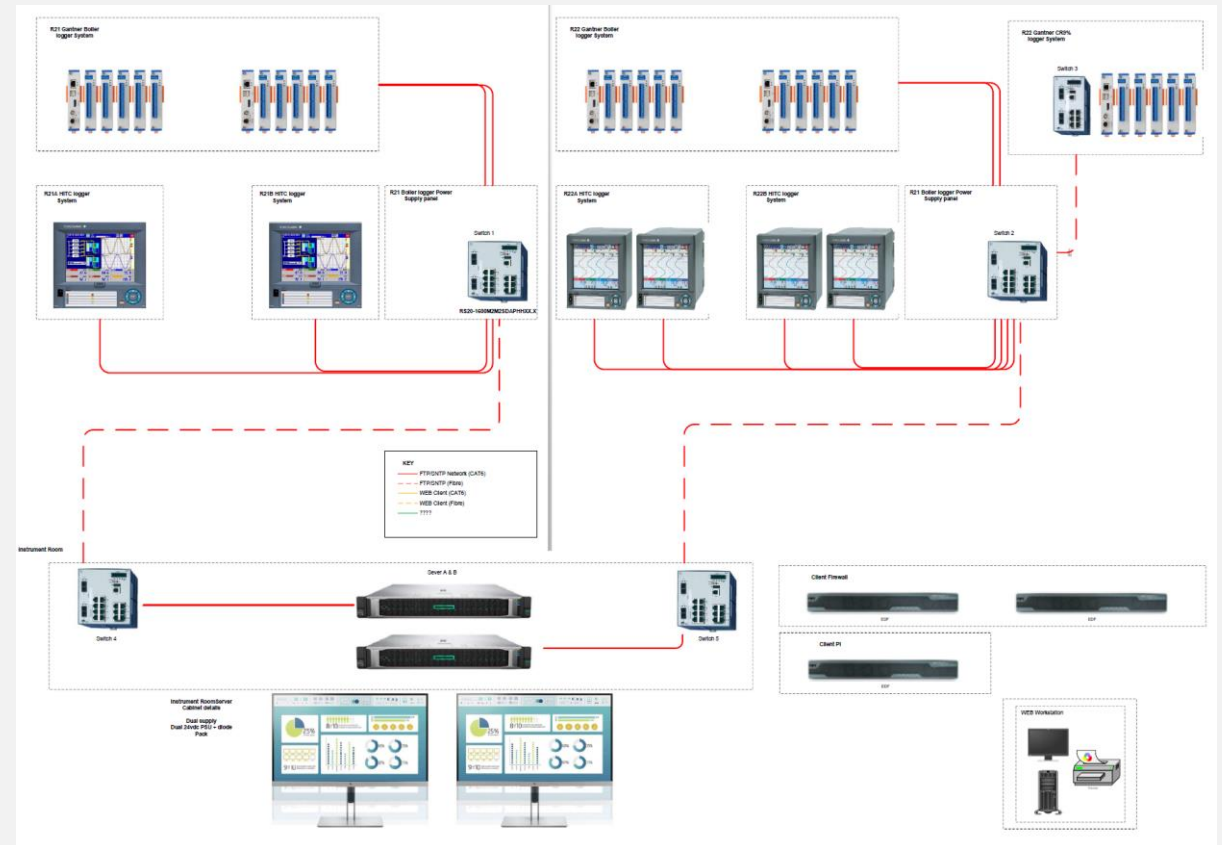
- Logged values shall have a time stamp that can be used to align the collected data with other plant data but it isn't necessary for the loggers to be synchronised to each other.
- The logger shall hold data for at least 1 week – data will be removed via USB memory stick.
- Data will be logged every 30 seconds.
- Data shall be collected at RTS, start-up and related manoeuvres (e.g. when the reactor changes power output) – Logging must take place during this period.
- At full reactor power the system shall continue to log values.

The system needed to have the flexibility to be fully integrated / automated in the future

PROPOSED SOLUTION

Following a detailed site survey and working in collaboration with Gantner, Capula proposed the following solution:

- 1 off Logger Station Panel
- 7 off Remote I/O nodes (RIO1, RIO2, RIO13, RIO14, RIO10, RIO11 and RIO12) for Thermocouple logging.
- 4 off Remote I/O nodes (RIO7, RIO8, RIO4 and RIO5) for Thermocouple and Accelerometer logging.
- 3 off Remote I/O nodes (RIO3, RIO6 and RIO9) for Thermocouple and Flow monitoring.
- 224 off Thermocouples with weld pads formed to the required pipe radius.
- 4 off Flow Transmitters
- 8 off Tri-axial Accelerometers



INSTALLATION

Feedback from the ONR walk around:
Boilers – C&I dataloggers and thermocouples neat and well installed especially given the physical constraints in the area – Electrical Assessor impressed.
Plant Manager



Thermocouples



Vibration Sensors



U/S Flow metering



PLANT MONITORING SYSTEM / NEXT PHASE

Following successful installation of all the required Sensors and logging equipment the **station now has the data they require to help better understand the conditions** the valves and associated pipework are subjected to. At present the data is being collected manually.

The data can then be used to identify / when / if additional stress is being placed on the equipment, support and **enhance operational decisions and plan maintenance and outages** around known data.

The next phase is to provide a top end viewer (SCADA) and following this network all of the loggers together and **integrate into a cloud based system** e.g. OPUS so the data can be viewed both on an off site by operators, maintenance staff and system owners as well as experts within central engineering



CAPULA

ULTIMATE CONNECTIVITY / ULTIMATE CONTROL



SUPPORTING SLIDES

WHAT WE OFFER



SYSTEMS

- + SYSTEMS INTEGRATION
- + FUNCTIONAL SAFETY
- + CONTROL
- + PROTECTION
- + DESIGN & BUILD
- + SUBSTATION AUTOMATION
- + DIGITALISATION

DIGITAL

- + ASSET OPTIMISATION
- + ENERGY EFFICIENCY & PERFORMANCE MANAGEMENT
- + CONDITION MONITORING
- + DIGITAL DISCOVERY CONSULTANCY
- + TECHNOLOGY PLATFORM

DATA

- + DATA CAPTURE AND QUALITY
- + DATA INTEGRATION
- + DATA MANAGEMENT
- + REPORTING & VISUALISATION
- + PREDICTIVE ANALYTICS
- + ARTIFICIAL INTELLIGENCE
- + CLOUD DATA SERVICES
- + DATA HISTORIANS
- + OSISOFT PI SYSTEM SUPPORT AND TRAINING

CYBER

- + SECURE SYSTEMS
- + RISK ASSESSMENTS
- + SECURE ARCHITECTURE DESIGN
- + COMPLIANCE ASSESSMENTS
- + DEFENCE TECHNOLOGIES
- + INTRUSION DETECTION SYSTEMS
- + INCIDENT RESPONSE
- + CYBER ESSENTIALS AND ESSENTIALS PLUS

SERVICE & SUPPORT

- + SYSTEM HEALTHCHECK
- + OT CYBER SECURITY
- + EMBEDDED RESOURCE
- + RAPID ENGINEERING SUPPORT
- + OBSOLESCENCE MANAGEMENT
- + DRIVE SERVICING
- + INSTALLED BASE EVALUATION
- + SPARES MANAGEMENT
- + DISASTER RECOVERY
- + TECHNICAL AUDIT
- + UPGRADES AND MIGRATION
- + HEALTH ASSESSMENT AND REPAIRS
- + REMOTE MONITORING
- + TRAINING

CONSULTANCY

- + SYSTEMS CONSULTANCY
- + DIGITAL DISCOVERY
- + CHANGE MANAGEMENT
- + TECHNOLOGY SELECTION
- + PARTNER PROGRAMMES

GANTNER / CAPULA - OVERVIEW

Gantner Instruments GmbH is pleased to have worked with Capula providing data acquisition and condition monitoring hardware and software, using Q.station X Series family of products on vibration and temperature logging for steam valve monitoring at EDF Energy Dungeness nuclear power station.

Capula has on-going EDF and EDF Energy applications for Gantner Instruments technology and looks forward to a close relationship, providing class leading data acquisition and condition monitoring solutions to complement Capula's breadth, scope and scale of engineering capabilities.

GI Systems Ltd is the United Kingdom sales representative for Gantner Instruments, providing close support and experience, especially in the applications and demands of the UK nuclear industry.

