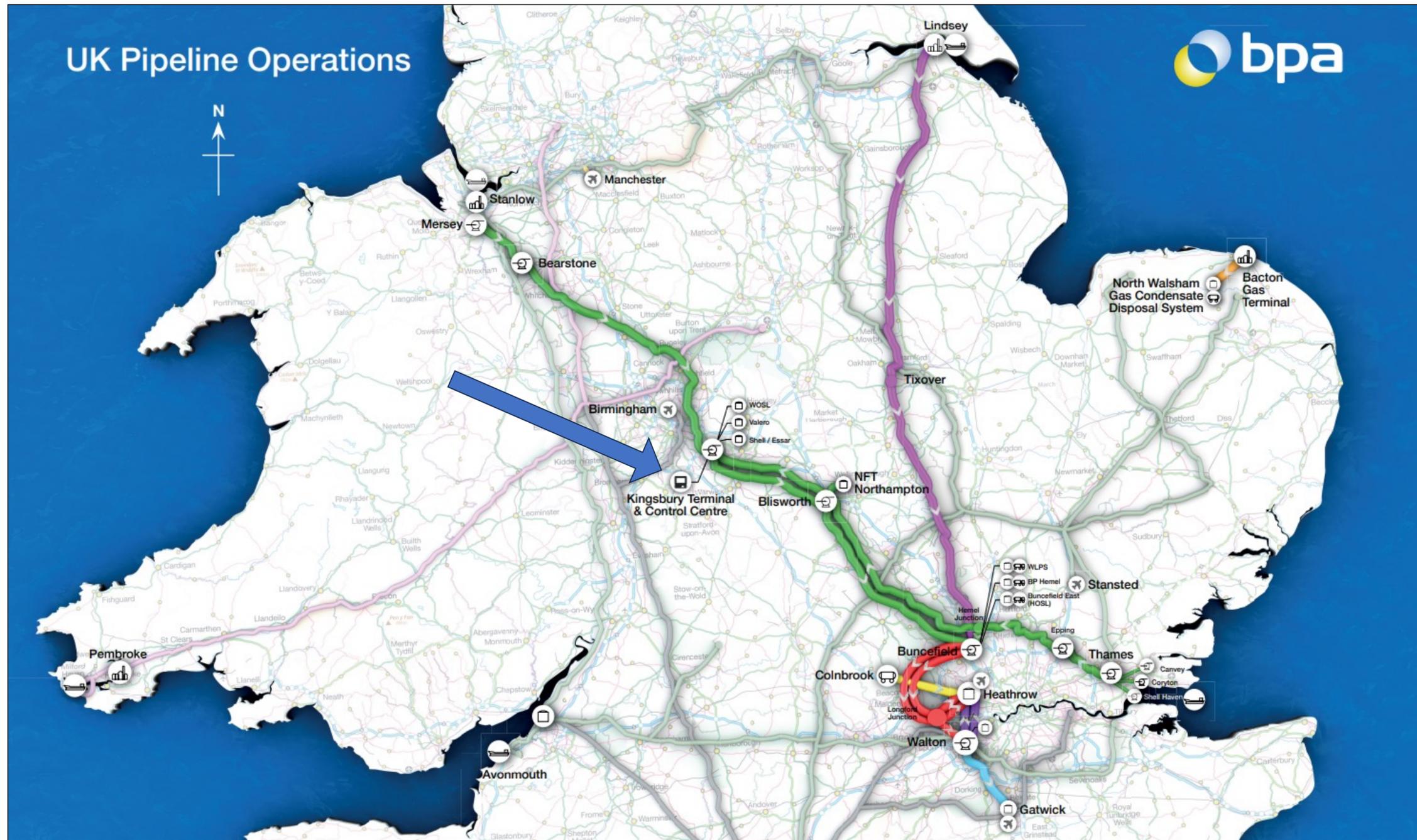




Human Factors in Pipeline Control Centres – BPA's Experience

UKOPA Members Meeting 17-18 Oct 2023

Introduction



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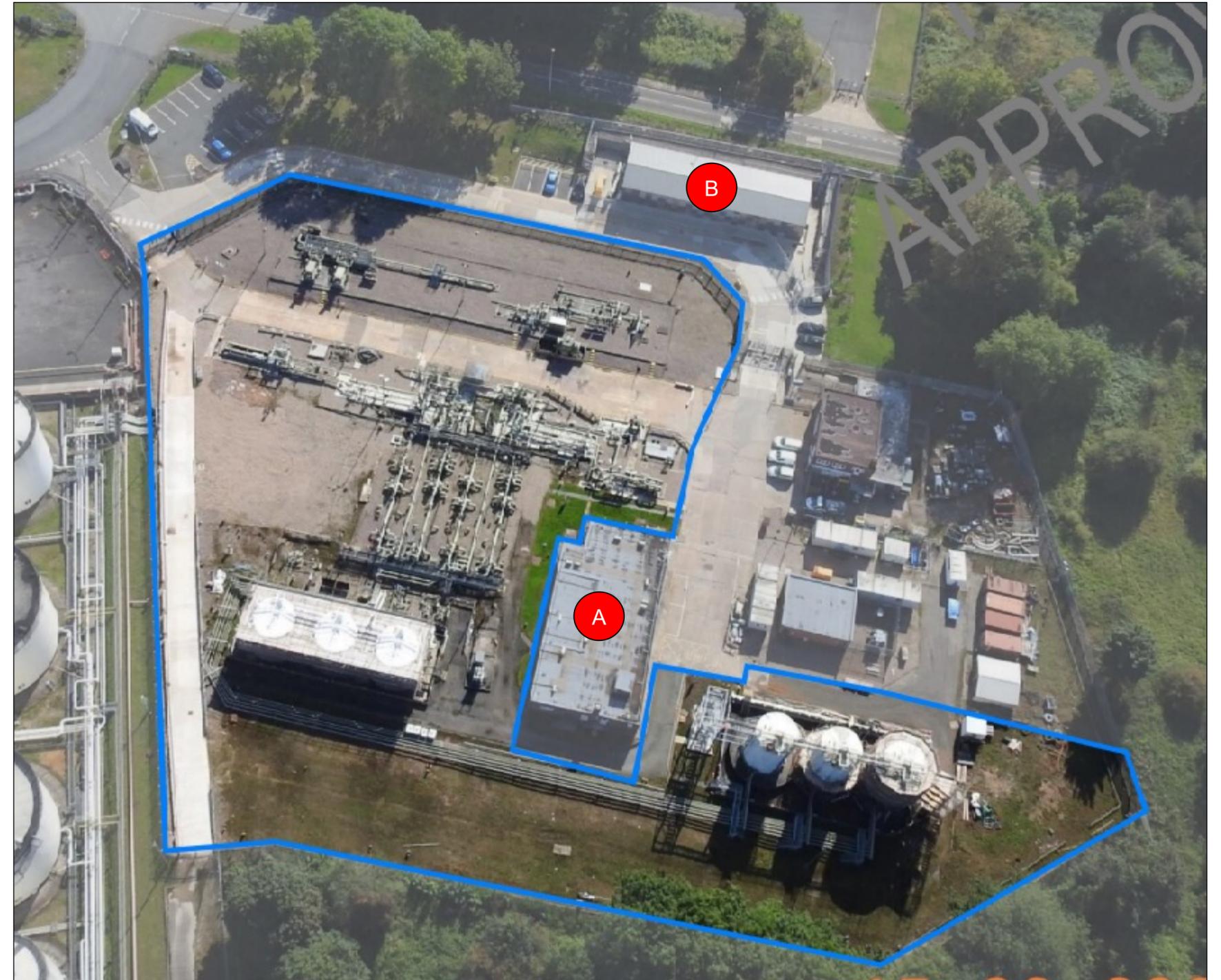
1. Design Journey – Buildings
2. Design Journey – SCADA
3. Risk Assessment – Human Factors
4. User Experience
5. Learning Points

Design Journey

Buildings

- Control room previously located close to flammable hazards
- Relocation of the UKOP Kingsbury Control Centre from centre of site to boundary
 1. Protection of People
 2. Protection of SCADA hardware
 3. Disaster recovery

-  Previous control room location
-  New control centre location





BPA Mersey Pump Station



BPA Thames Pump Station

Design Journey Buildings

Constraints:

- Modular construction
- Building size and height limited by transport restrictions
- Fully sealed blast resistant building – Natural ventilation not possible

Human Factors Aspects:

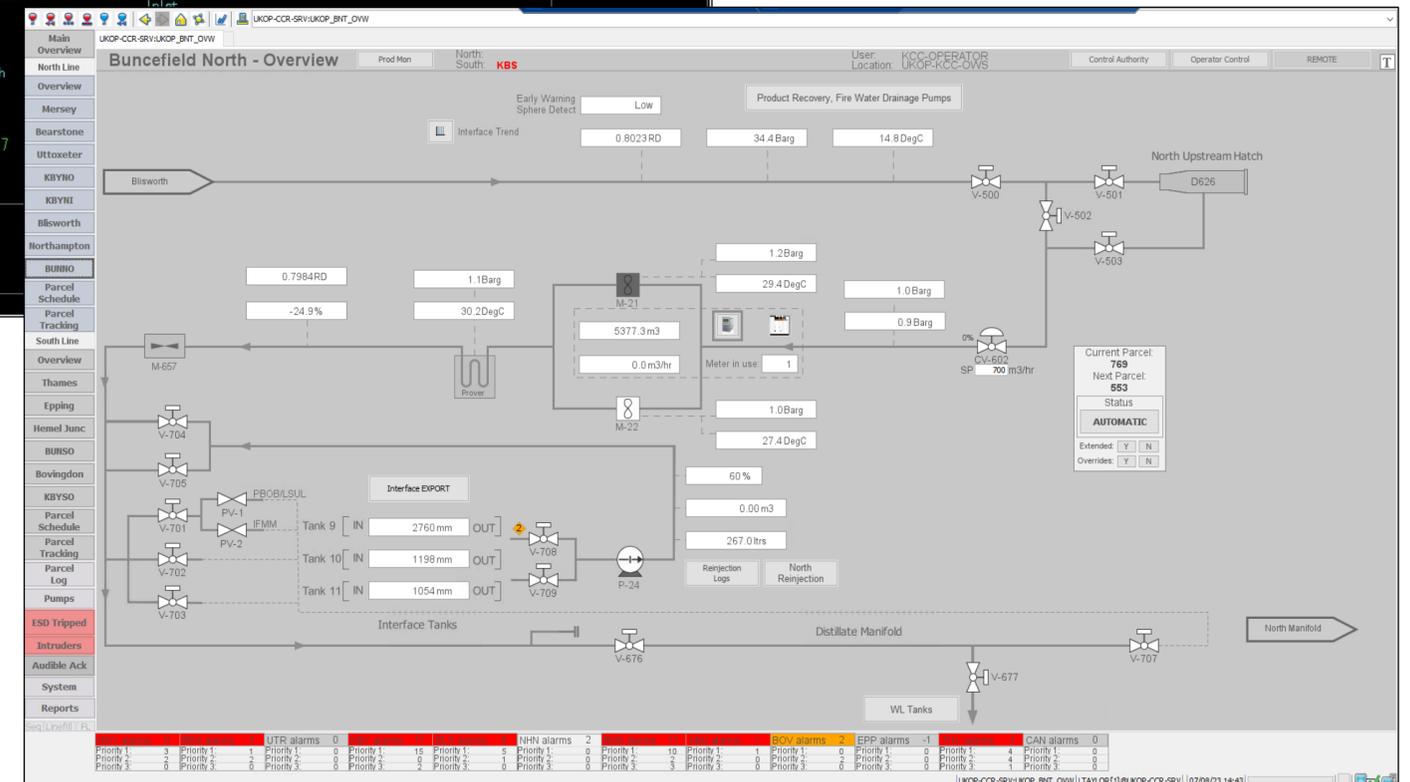
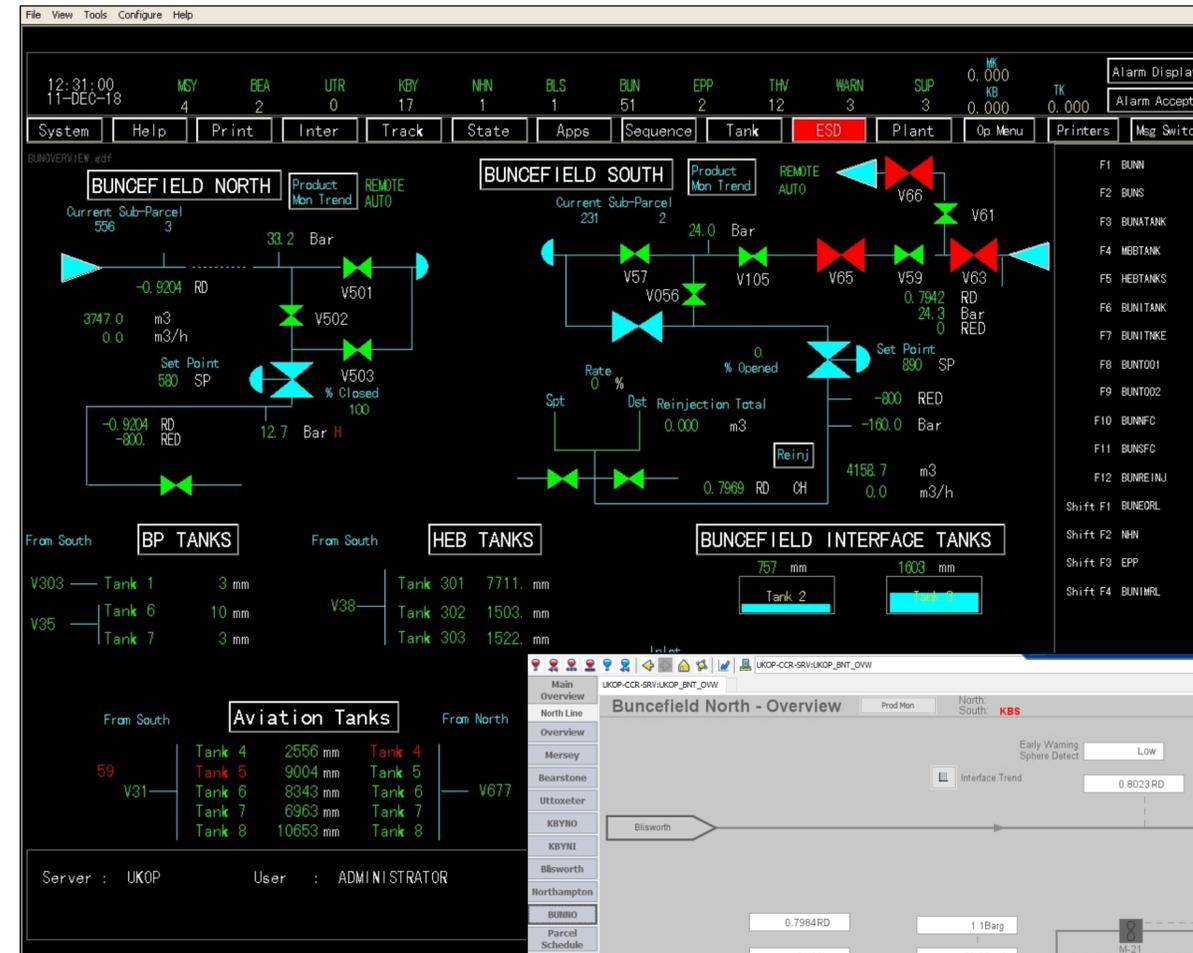
- Building designed for 24/7 occupation, lighting and temperature automatically controlled to maximise alertness
- Limited windows
- Coloured cladding





Design Journey SCADA

- SCADA systems replaced on multiple pipeline systems – Continual improvement process
- 4 different SCADA systems – Multiple alarm lists
- New systems are EEMUA 191 compliant – capable of producing meaningful alarm lists
- Regular alarm reviews to analyse data
- Parallel running of new and old SCADA systems



Risk Assessment

Human Factors

Risk assessment covered:

1. Operator workload
2. Conflicts across SCADA systems

Conflict No.	Operating Area	SCADA Systems	Potential Conflict Summary
1	Alarm Priority Colours/ shapes	Pipelines B, C and D	Priority 2 & 3 Alarms have a mix of orange and yellow visual indication
2	Alarm Priority Audible Notifications	Pipelines B, C and D	Priority 1 alarms have different sounds
3	Equipment Icons	Pipelines A and D	ESD Valves have different symbols
4	Use of system	Pipelines A, B, C and D	Access to subordinate screens are different: Left for some pipelines, top and bottom for others

Conflicts identified across SCADA systems

User Experience

- Dedicated control centre – Pride and ownership for operators
- Improved working environment for operators
- Adjustable height sit / stand desks in control room. Benefits include:
 1. Improved ergonomics
 2. Increased alertness
 3. Enhanced comfort
 4. Flexibility
- Colour screens to greyscale – well received



Learning Points

- Interior design of building could be improved
- Dedicated car parking for control centre staff located beside building
- Ergonomics much improved from previous building
- Human Factors consideration in operation of SCADA amongst system / building changes



Dedicated car parking for control centre staff



WE CARE.

WE DO THE RIGHT THING.

WE WORK AS ONE TEAM.