Scottish Power Goal : to make Process Safety risks as visible as Health and Safety Risks?

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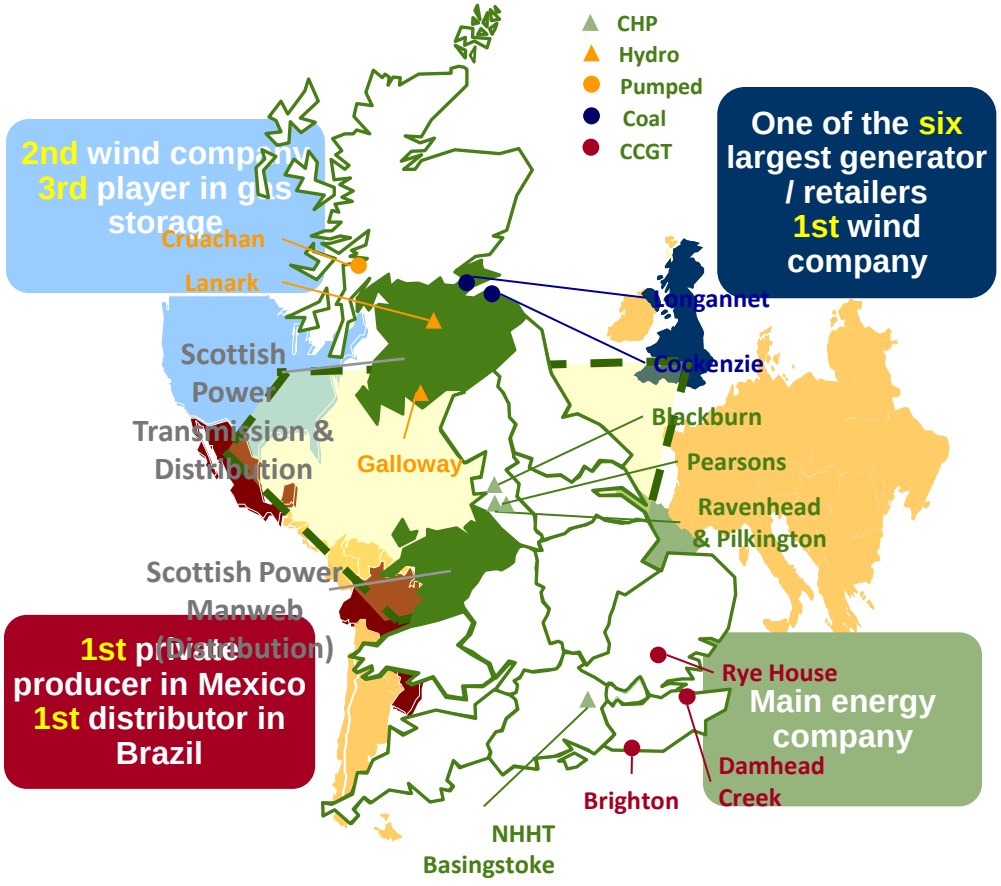
Agenda

- Introduction
- Safety and Business Benefits
- Making Process Safety Risks Visible
- The goal: to become a “High Reliability Organisation”
- Implementing HSG 254
- Process Safety KPI Dashboard
- Summary

Iberdrola Group and ScottishPower

- Supply 5.2 million customers
- Over 8,000 employees
- 6GW of coal, gas & hydro generation across the UK
- SP Renewables largest onshore wind operator in UK (1200 MW)
- Distribution area of over 35,000 square kilometres



Scottish Power Goal : to make Process Safety risks as visible as Health and Safety Risks?

HSE Case Study

Judith Hackitt CBE

We need more Leaders to adopt the ScottishPower approach and to consider innovative ways of making process safety an integral part of everyone's role

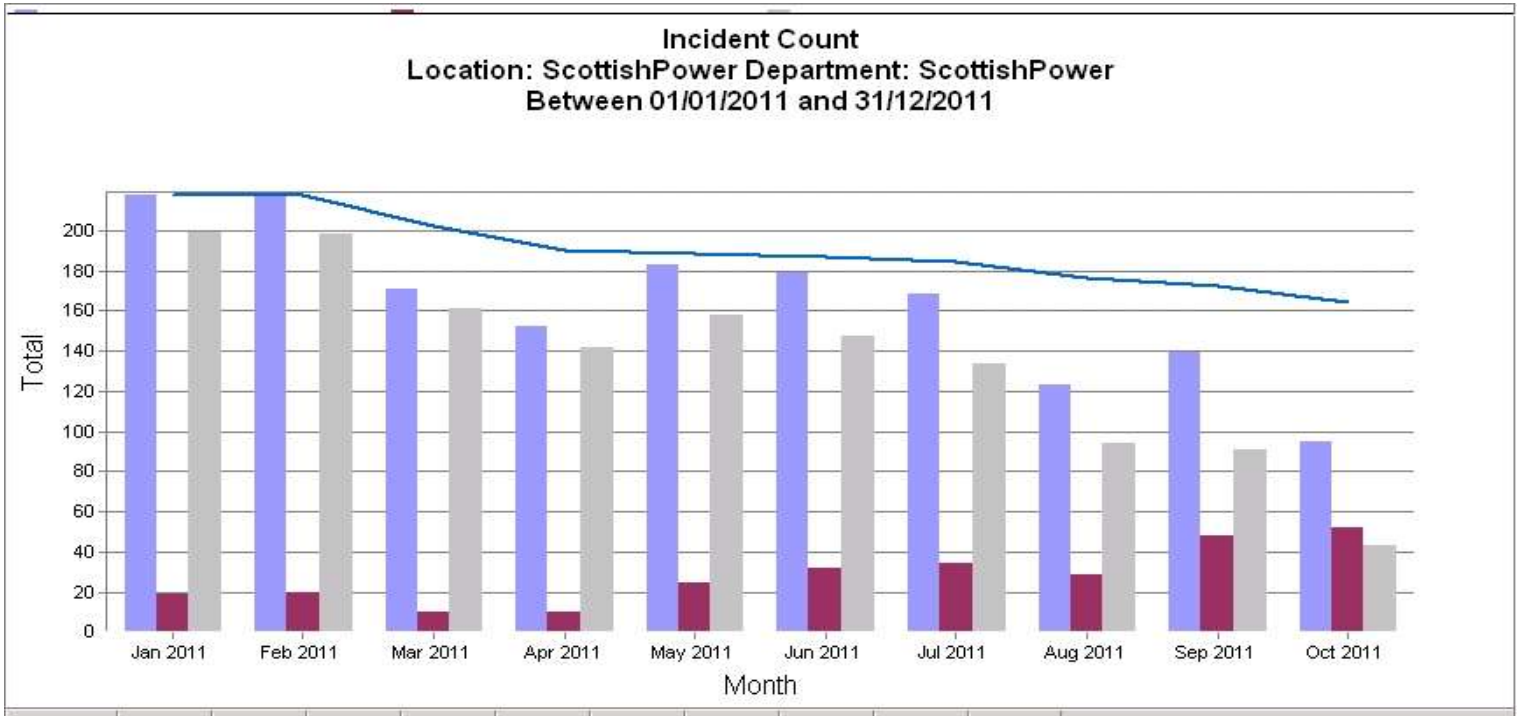
Judith Hackitt CBE, Chair of HSE UK
June 2011

Working in together

- Relationship spans 15 years +
- Aim to help other companies fast track a similar approach
- Best of breed Industry and implementation knowledge
- Providing access to recognised Industry leading expertise
- Providing access to proven tools and delivery methodology
- Jointly developed range of tool kits and training material
- Integrating technologies to deliver a sustainable solution

The Benefits

Incidents and severity now starting to fall...

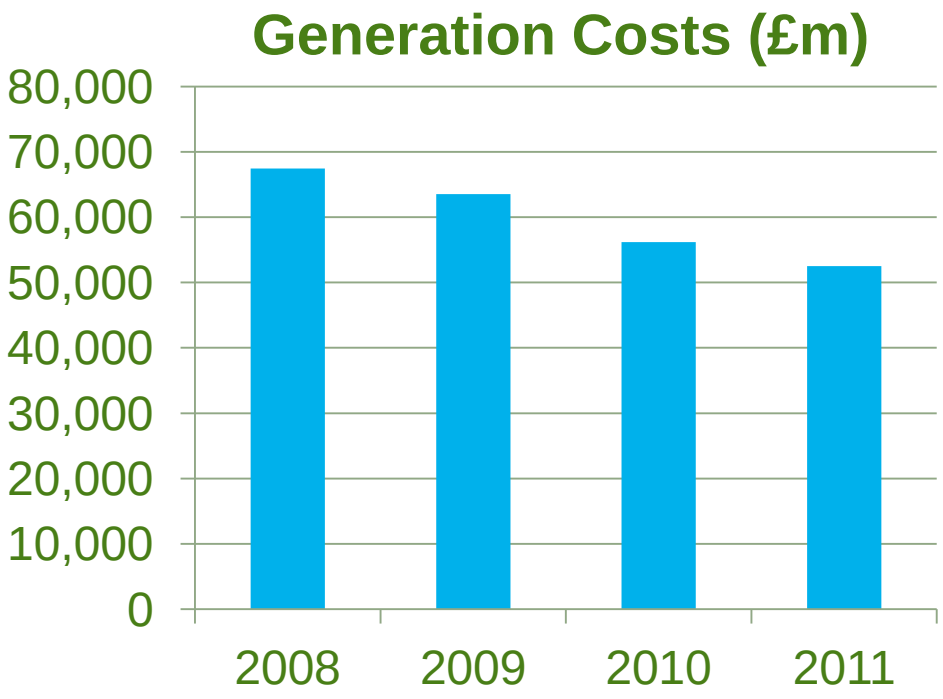


	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011	Oct 2011
Total	218	218	171	152	183	179	168	123	139	95
Open	19	20	10	10	25	32	34	29	48	52
Closed	199	198	161	142	158	147	134	94	91	43
Average	218	218	202	190	188	187	184	177	172	165

The Benefits

Significant benefits have been realised to date.....

	2008	2009	2010	2011
Plant Availability	64.5%	77.0%	83.9%	86.9%
EFOR[1]	10.1%	7.5%	6.4%	5.5%



- 29% reduction in Operations and Maintenance costs
- 22% increase in plant availability
- 50% reduction in plant forced outage rates
- 10% Reduction in Insurance costs and deductable period

Generation Strategy

Driving light into the future

Our Strategy...

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The electricity generation industry is facing significant challenges...

A "High Reliability Organisation" is one that produces its product relatively error free over a long and sustained period of time.

The two main attributes of a High Reliability Organisation are:

Have a chronic sense of unease – they lack any sense of complacency.

Make strong responses to weak signals - they set their threshold for intervening very low.

“High Reliability Organisation”

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Global Operational Integrity Plan

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Delivering Common Processes and Practices across the Iberdrola Group

ProcessSafety

Our 7 Step Approach (High Reliability Organisation)

1. Create Vision & Strategy
2. Establish Leadership
3. Design Asset Management & Process Safety Management System
4. Implement Foundation Dashboard
5. Integration &Automation Of Dashboard
6. Review & Governance
7. Benchmarking & Continuous Improvement

Road Map

Asset Management & Process Safety Integrated RoadMap

Pathway To A "High Reliability Organisation"

Establish integrated approach. Develop business case.	Ensure business buy in at CEO and Senior Leadership level. Common level of awareness and understanding established.	Follow HSG254 six step approach. Structured approach delivers comprehensive and rigorous analysis of hazards, risk control systems.	"Quick win" implementation of dashboard based on manual KPIs. Provides initial assessment of Process Safety performance and kicks off cultural change.	Move to daily tracking of KPIs based on automated feeds. Exploit drill down and trending to drive performance to next level.	Establish framework for delivery of sustained performance and improvements. Embed core decision making tool.	Maintain sense of vulnerability through learning from others and challenging business as usual.

Programme Time Line

Building a strong capability in Asset and Process Safety Management...

Set Vision & Strategy

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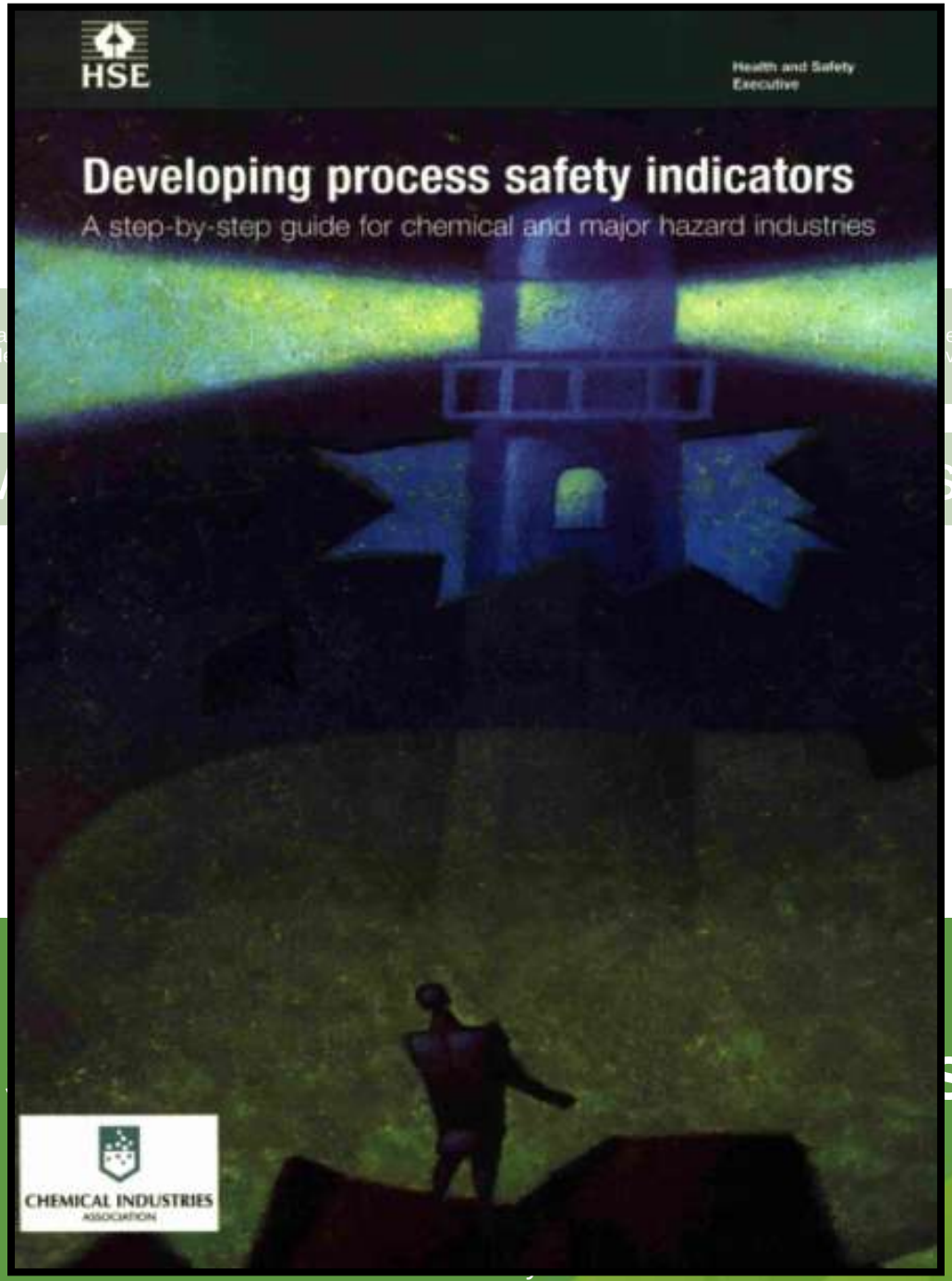
Benchmarking &
Continuous
Improvement

Pathw sation”

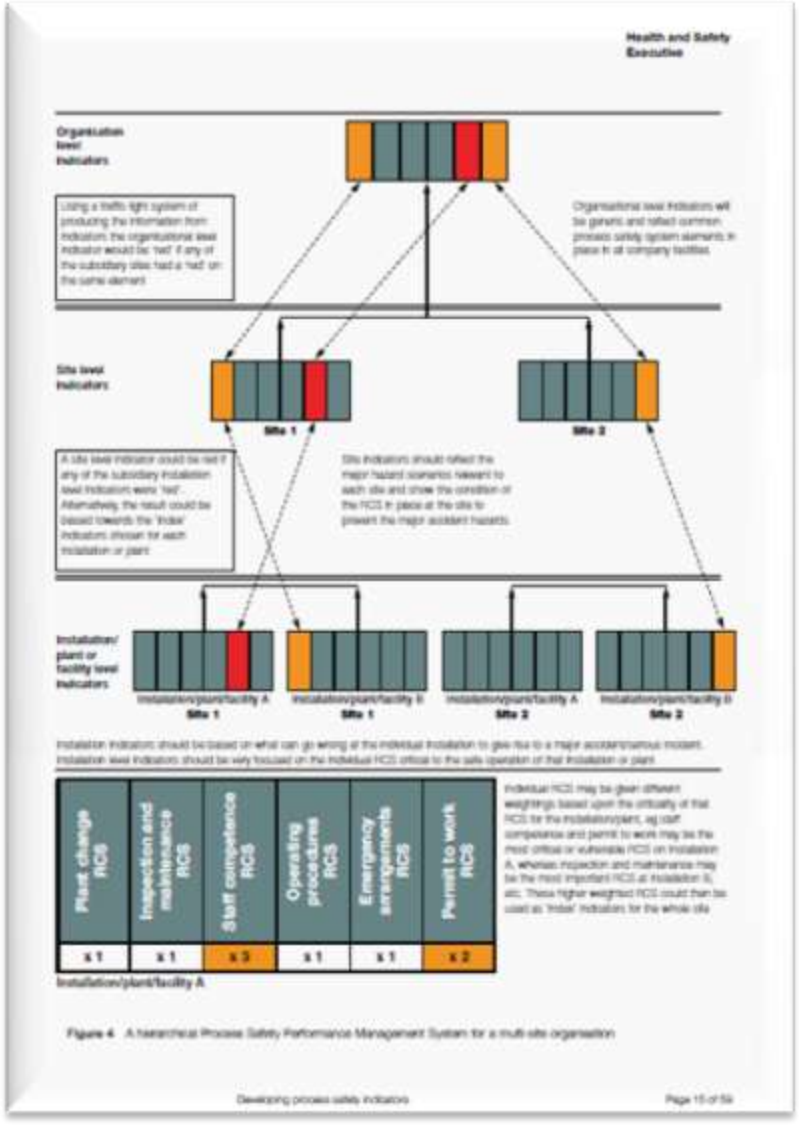


Design
Proces stem

February 2012

Development of KPI Dashboard

Based on Key Concepts in HSG 254...



Swiss Cheese Model

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Understanding hazards & creating barriers (People, Process & Plant)...

Plant | **Process** | **People** | **Recovery**

2 Technical Risk Management

- Plant Modification Procedure
- Plant Status Review / Technical Risk Register
- Strategic Spares
- Engineering Standards
- Technical Knowledge Management
- Design Review
- Asset Investment
- Civil Inspections
- Pressure System Safety Regulations

3 Critical Systems

- Emergency Supplies
- Fire Systems
- HV Electrical Systems
- Main Protection Systems
- Oil Separation Systems

4 Alarm and Instrument Management

- Control Systems
- Critical Instrumentation
- Protective Systems / Devices
- Alarm Systems

5 Maintenance Management

- Work Prioritisation
- Work Identification, Routine Plant Inspections
- Work Planning, Scheduling
- Work Execution
- Personal Risk Assessment

6 Operations Management

- Start-up /Shutdown Procedures
- Routine Plant Checks
- Routine Testing
- Shift Handover
- Company Safety Rules Management
- Plant Limiting Conditions

7 Staff Competence

- Communications
- Leadership
- Training Needs Analysis
- Training Plan
- Competency Assurance
- Staff Knowledge Management

8 Emergency Preparedness

- Emergency Planning
- Business Continuity Planning
- Environmental Containment Systems

1 Operation & Compliance Audit

- External Audit
- Integrated Internal Audit
- Action Tracking
- Controlled Documents (Policies, Procedures, Standards)

Classification Of Incidents

3 tier approach based on API guidance...

Classification of Process Safety Incidents

API

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- Breaches of plant limiting conditions

Key Performance Indicators

- **Fully defined KPI, including:**
  - Objective
  - Definition
  - Data Source
  - Data Aggregation / Calculation
  - Targets
- **Data Recording Guidelines**
- **Formal sign off by senior managers**

Process Safety Dashboard

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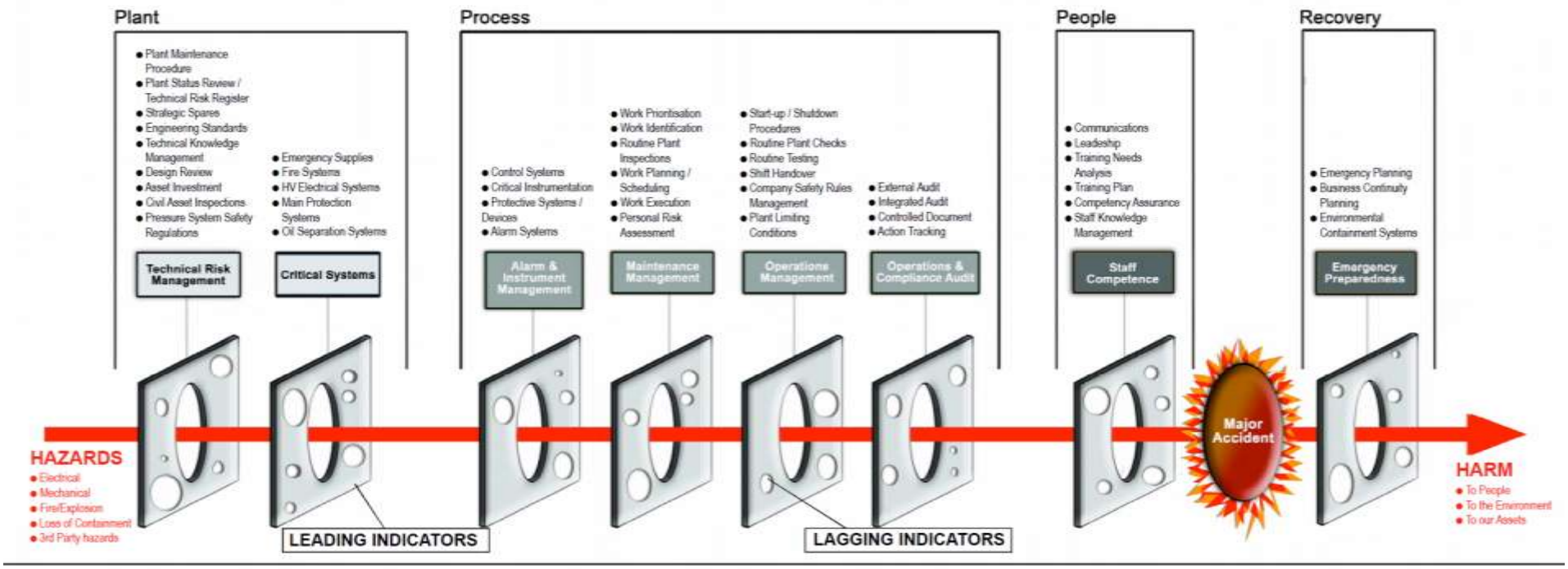
Philosophy is to visualise Swiss Cheese Model.....



Further HSE Guidance

Risk Ranking of Indicators…

Operational Control Indicators

Lagging Indicators

- Active Monitoring and Logging:
  - Breaches Of Plant Limiting Conditions (eg overpressure, overspeed, overtemp)
  - Control Loops Out Of Control
  - Equipment In Manual
  - Operation of protection systems
  - Failure of protection systems

Leading Indicators

- Inspection and Maintenance of Control Systems and Critical Systems
- Alarm Management
- Control Loop Performance
- Completion Of Operational Routine Checks / Testing
- Shift Logging & Handover
- Plant Overrides and Defeat of interlock
- Safety Critical Systems not available

Generic

Lagging Indicators

- Incident Reporting and Investigation:
  - Near Misses (eg demand on safety system)
  - Loss Of Containment (eg release of high pressure steam)
  - Process Safety Incident (eg major equipment damage)

Leading Indicators

- Critical processes undertaken correctly
  - Operations
  - Maintenance
  - Engineering

Programme Indicators

Leading Indicators

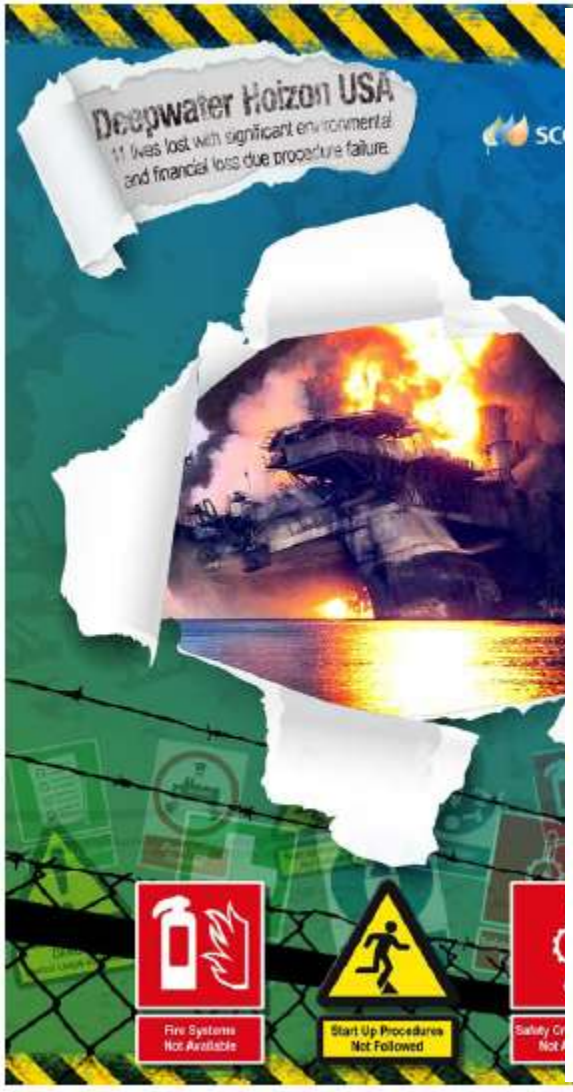
- Statutory Inspections Completed (eg PSSR)
- Audits To Programme
- Action Closure
- Training and Competence
- Procedures Up To Date
- Improvement programmes

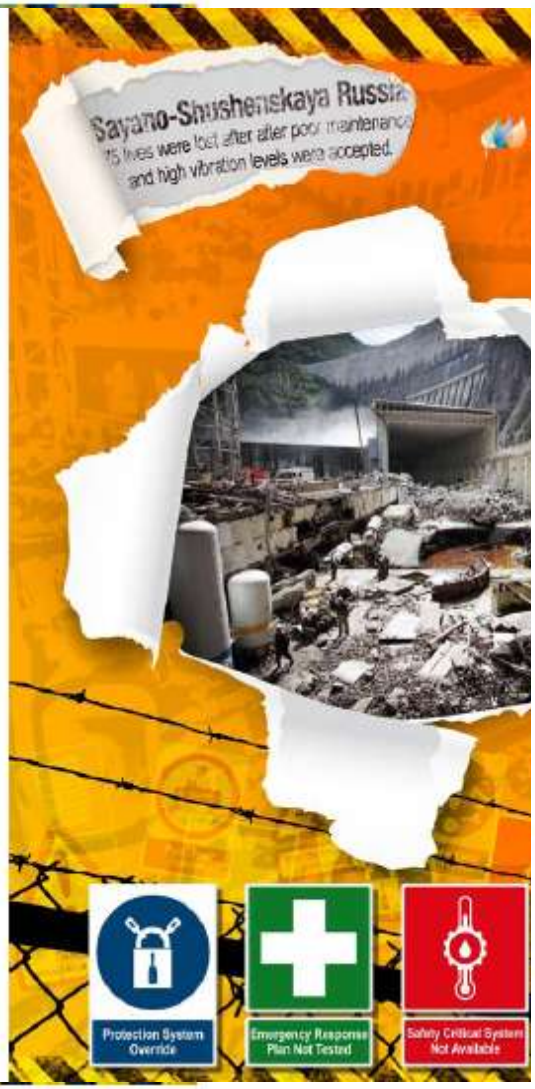
KPI Ranking

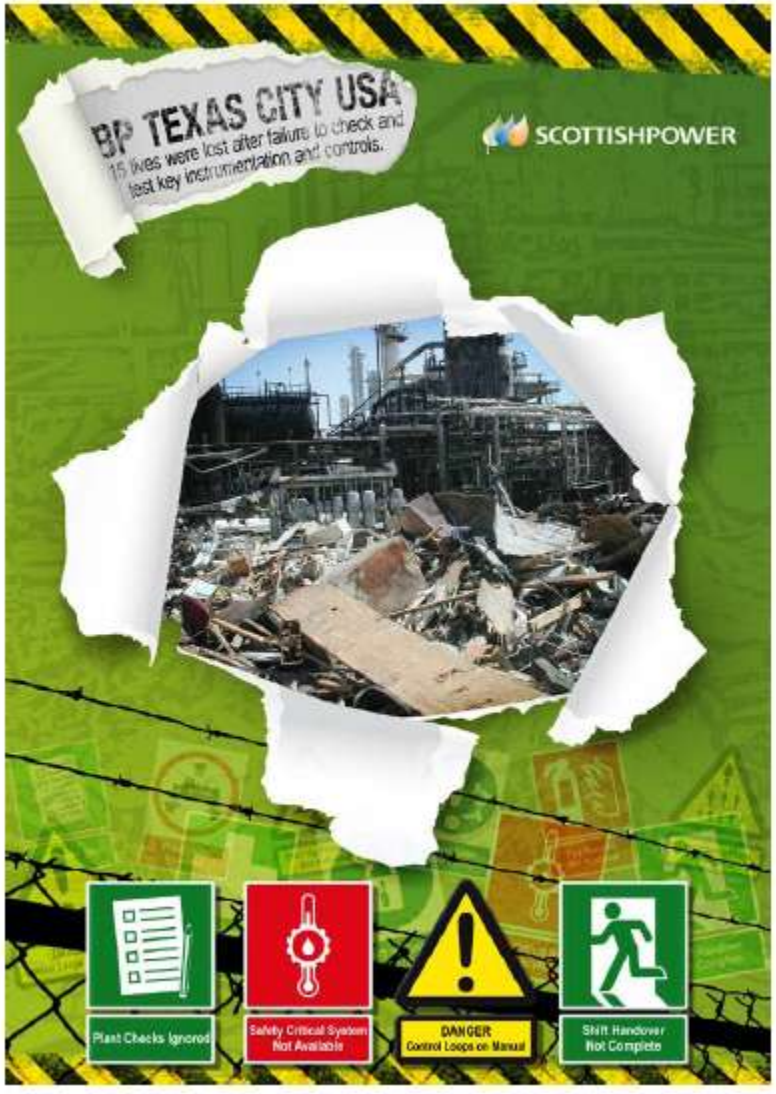
Operational Indictors are the key to avoiding incidents...

Major Hazard Accidents

Indicators Need To Be Visible to prevent accidents....

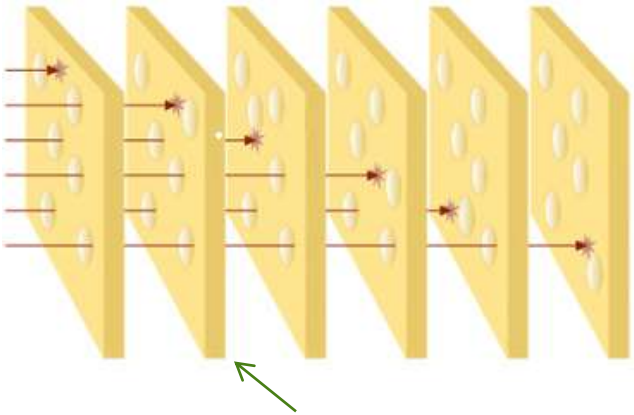






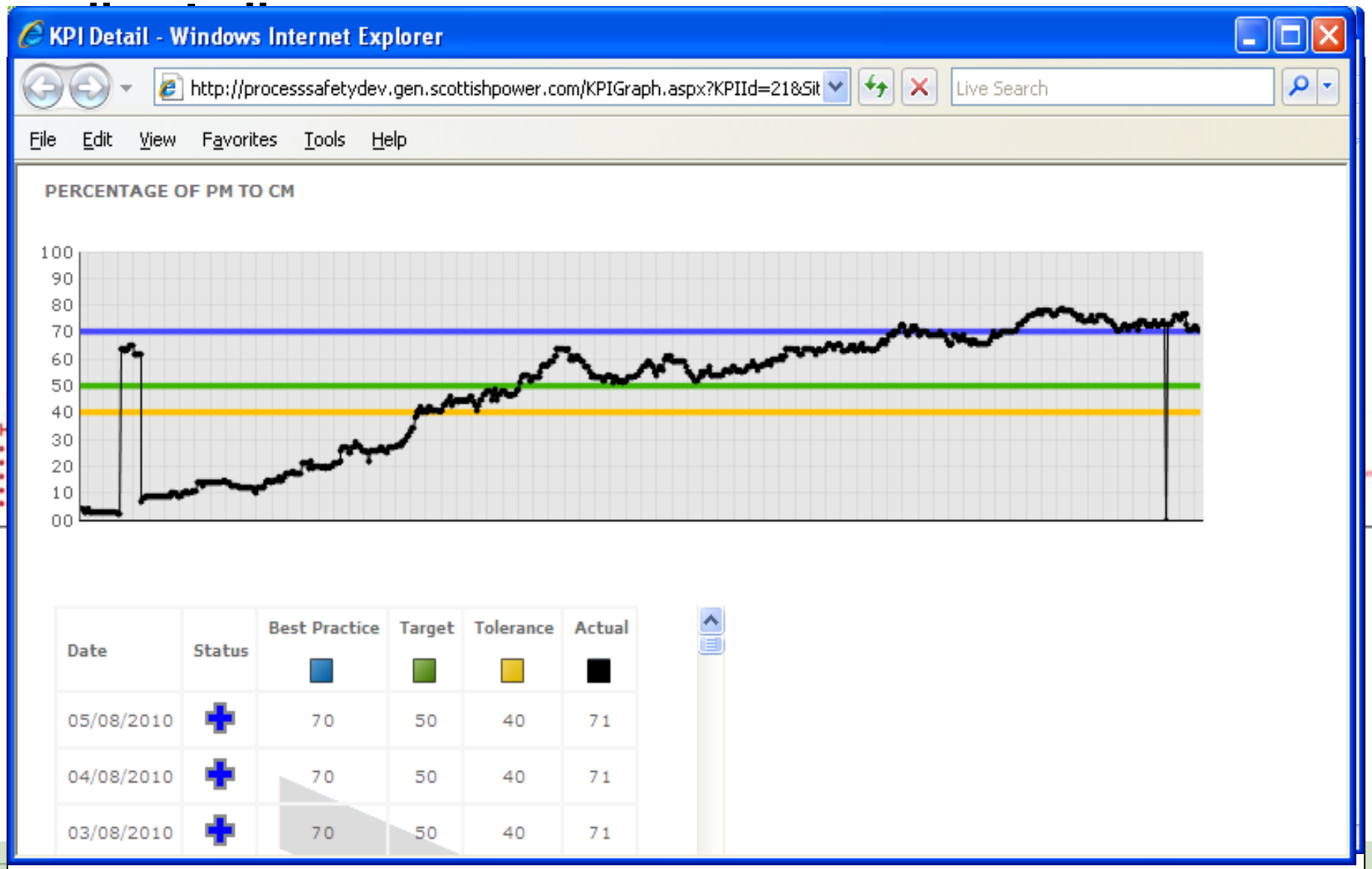
Making the warning signs visible to ALL Instantly !

Swiss Cheese Model



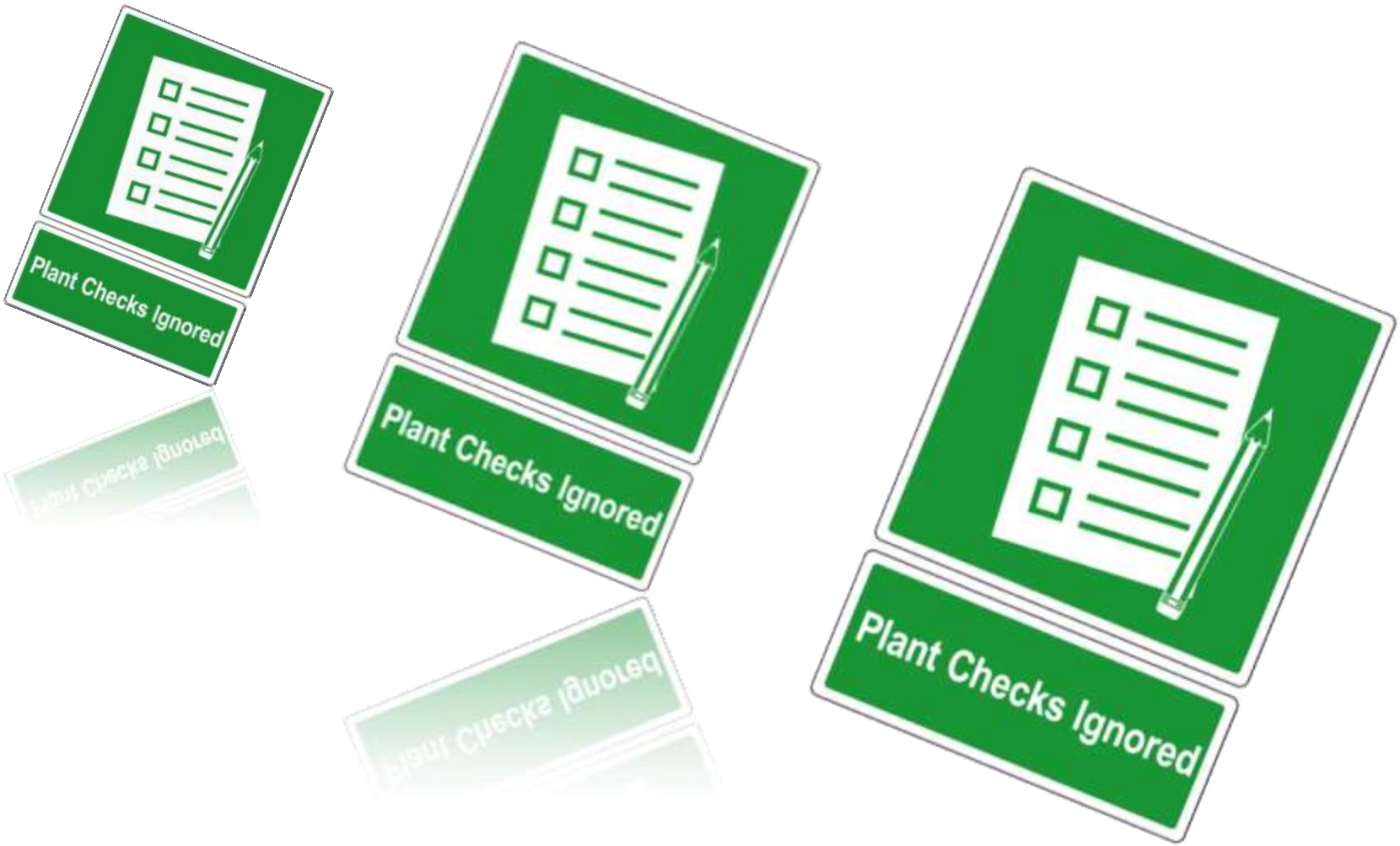
KPIs Based On 4 Icons

A simple concept that all staff can buy in to...



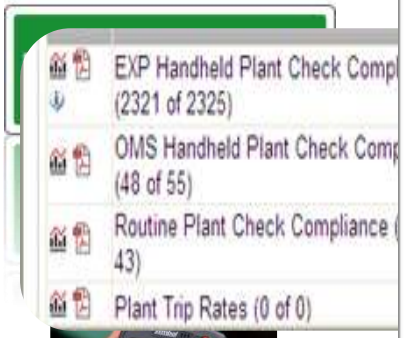
Plant Checks

Key Operational Indicators...



Plant Checks

Visibility Of All Routine Operations Plant Checks...

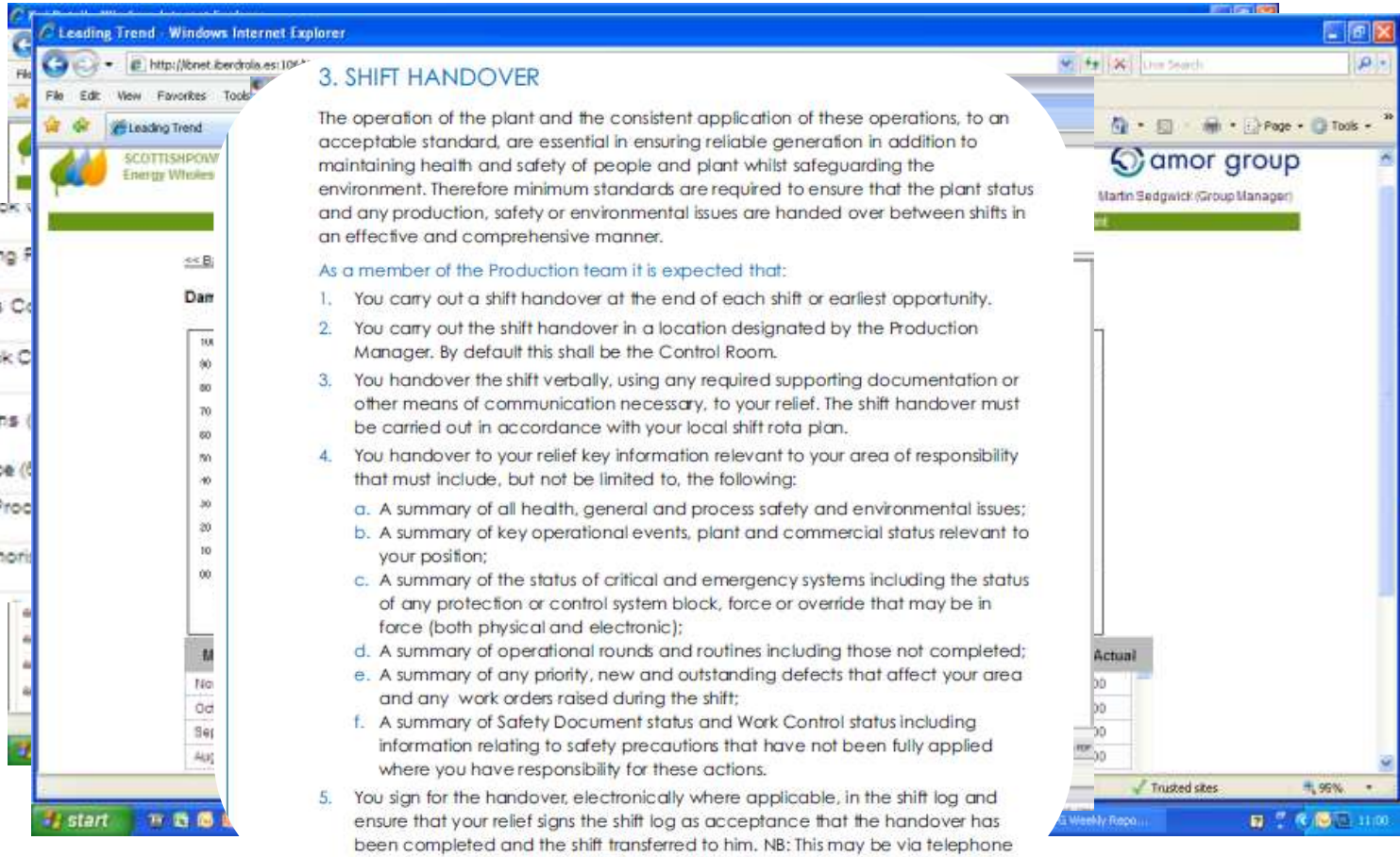


Shift Handover

Key Communication Tool...

Shift Handover

Linked to Operational & Competence Standards...

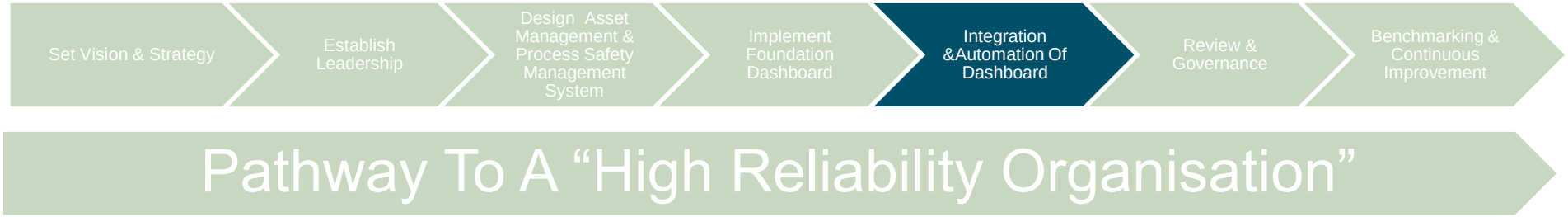


3. SHIFT HANDOVER

The operation of the plant and the consistent application of these operations, to an acceptable standard, are essential in ensuring reliable generation in addition to maintaining health and safety of people and plant whilst safeguarding the environment. Therefore minimum standards are required to ensure that the plant status and any production, safety or environmental issues are handed over between shifts in an effective and comprehensive manner.

As a member of the Production team it is expected that:

1. You carry out a shift handover at the end of each shift or earliest opportunity.
2. You carry out the shift handover in a location designated by the Production Manager. By default this shall be the Control Room.
3. You handover the shift verbally, using any required supporting documentation or other means of communication necessary, to your relief. The shift handover must be carried out in accordance with your local shift rota plan.
4. You handover to your relief key information relevant to your area of responsibility that must include, but not be limited to, the following:
   a. A summary of all health, general and process safety and environmental issues;
   b. A summary of key operational events, plant and commercial status relevant to your position;
   c. A summary of the status of critical and emergency systems including the status of any protection or control system block, force or override that may be in force (both physical and electronic);
   d. A summary of operational rounds and routines including those not completed;
   e. A summary of any priority, new and outstanding defects that affect your area and any work orders raised during the shift;
   f. A summary of Safety Document status and Work Control status including information relating to safety precautions that have not been fully applied where you have responsibility for these actions.
5. You sign for the handover, electronically where applicable, in the shift log and ensure that your relief signs the shift log as acceptance that the handover has been completed and the shift transferred to him. NB: This may be via telephone for remote sites.



Pathway To A “High Reliability Organisation”

Integration & Automation Of Dashboard

Data Source Systems

Data Source Systems

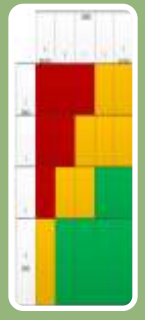
Alarm Management

- Proving real-time trend analysis of all alarms throughout the organisation
- Improvement plans developed for all sites

Works Management

- Single solution and set of processes defined and implemented across the asset estate
- Scheduling capabilities used outside core works management

Data Source Systems



Risk Management

- Single, fully integrated risk management, incident management, action tracking, audit tool

Shift Logging

- All Control Rooms and Unit Desks using standard electronic logging system
- Automatic feeds developed from plant information (OSI PI)

Data Source Systems

Reliability Engineering

- All sites using hand held technology for Operator Routes
- Automatic monitoring through single system

Staff Competence

- Operations standards introduced
- Start up and shutdown / shift handover competencies in place and monitored

Data Source Systems

Data Source Systems

KPI Dashboard Architecture

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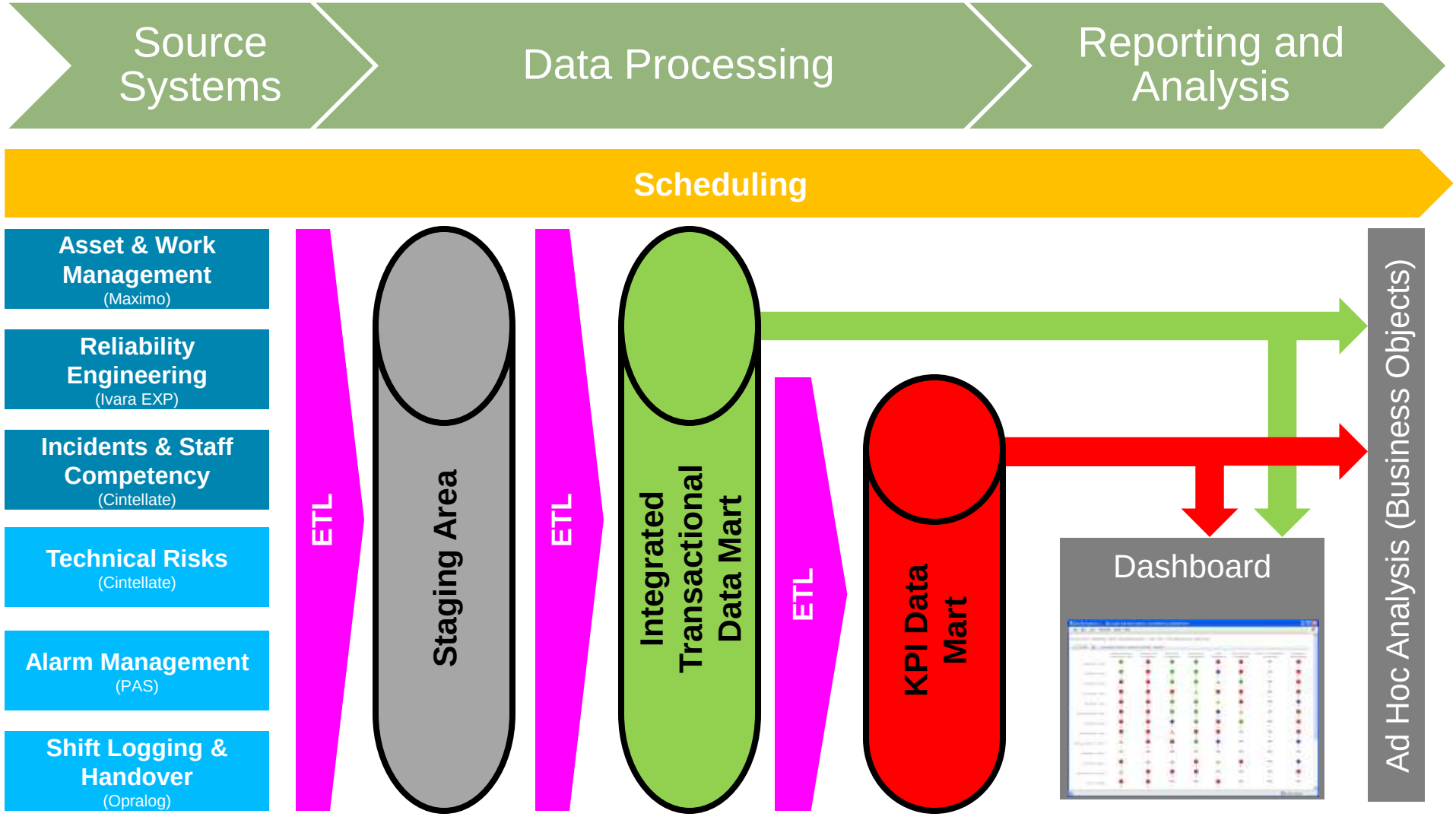
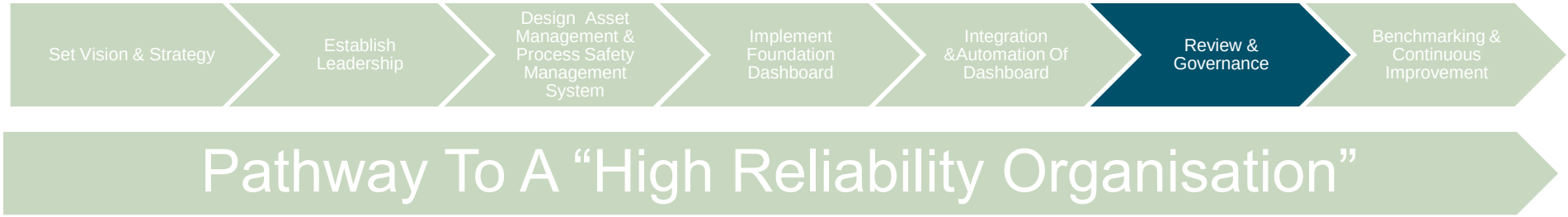
An enterprise scale solution...





Review & Governance

Group Governance Process

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Cascade up approach...

Review Level	Governance Body	Review Guidance	Frequency
Energy Wholesale	Energy Wholesale Board	Consolidated Indicators Major or Key Incidents	Monthly
Generation	Operational Risk Group (ORG)	Business Wide Indicators Significant Incidents Trends	Monthly
Generation Groups	Coal PRM Gas PRM Hydro PRM	Group Indicators Significant & Moderate Incidents Close-out rates	Monthly
Power Stations	LN, CK, DD RH , DC, SH, BB, HT CN, GW, LK	Local Indicators All Incidents	Daily

Process Safety Dashboard

Monthly Reports – support Operational Risk Governance meetings…

Operational Risk Group (ORG)

Overview of standard agenda items...

- Leading Indicators Performance (KPI Dashboard)
- Incident Reviews (Cintellate)
- Technical Risks
- Benchmarking
- Legislation Update

Learning Points

Key learning points from ScottishPower's journey to date...

- For the first time, senior management is given near time visibility of core processes
- Introduction of Process Safety KPIs has driven improvement across the business
  - Maintenance improvements – backlog, preventative maintenance, planning
  - Technical Risk – visibility and mitigation
- Business benefits also now being realised – e.g. insurance, plant availability increasing, opex and capex reductions
- Key success factors
  - Buy in and commitment from senior management
  - Involvement of staff in designing, developing and embedding
  - Clear definition of each KPI is essential
  - Common processes across all business units
  - Delivery of sustainable solution can only be achieved using integrated IT platforms – ie automatic generation of KPIs

In Summary

Business Benefits...

- Supports business drivers of improving plant availability, reliability and cost reduction
- Reduces the Frequency and Severity of system failures and their impacts.
- Save lives, time, careers, & money!

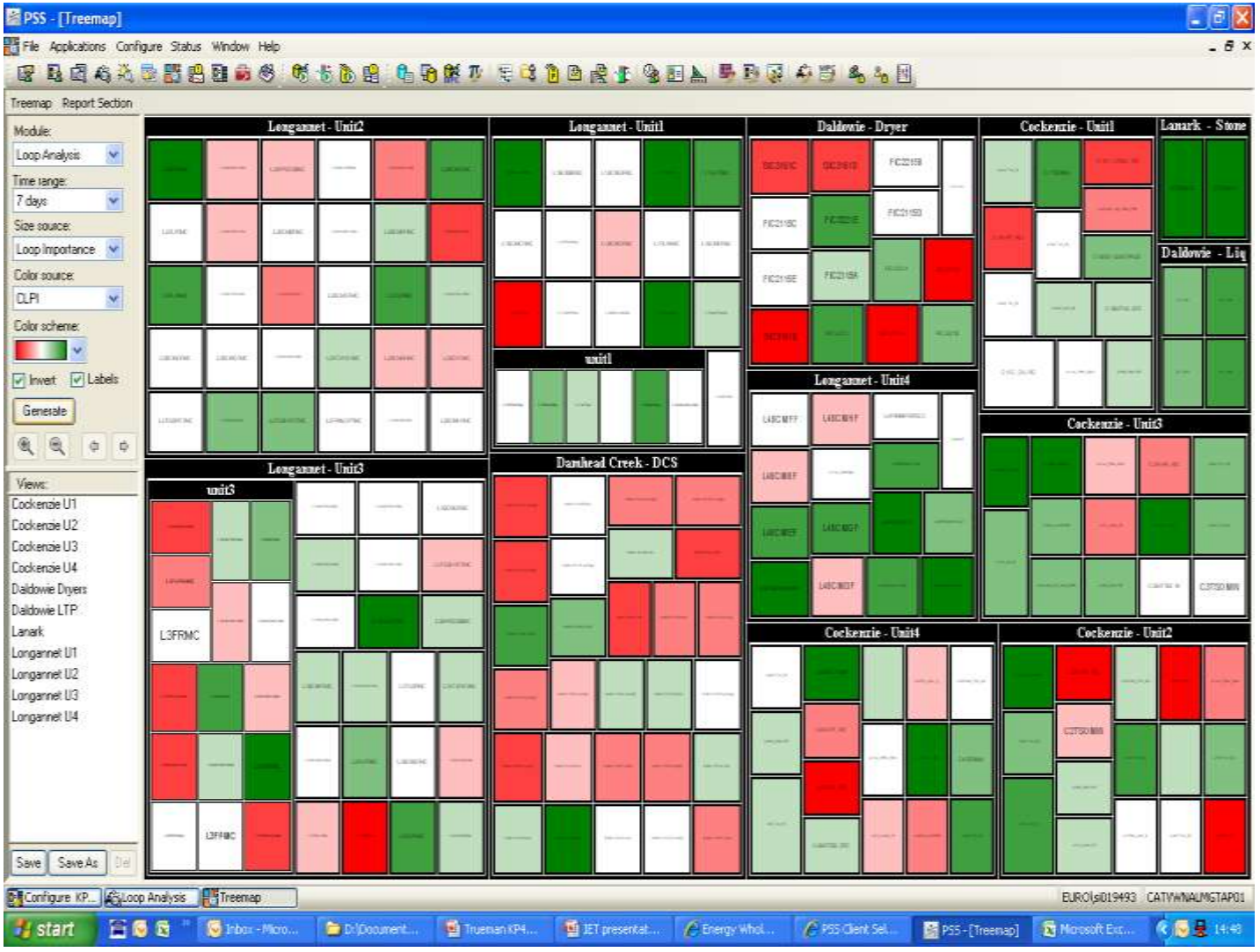
Question Time

Control Loops

Control Loop Management

Control Loop Management

Visibility of Control System Performance...

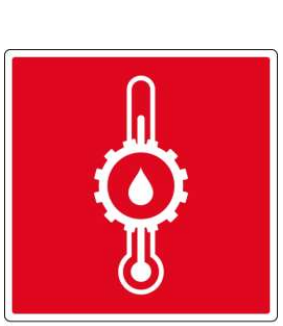


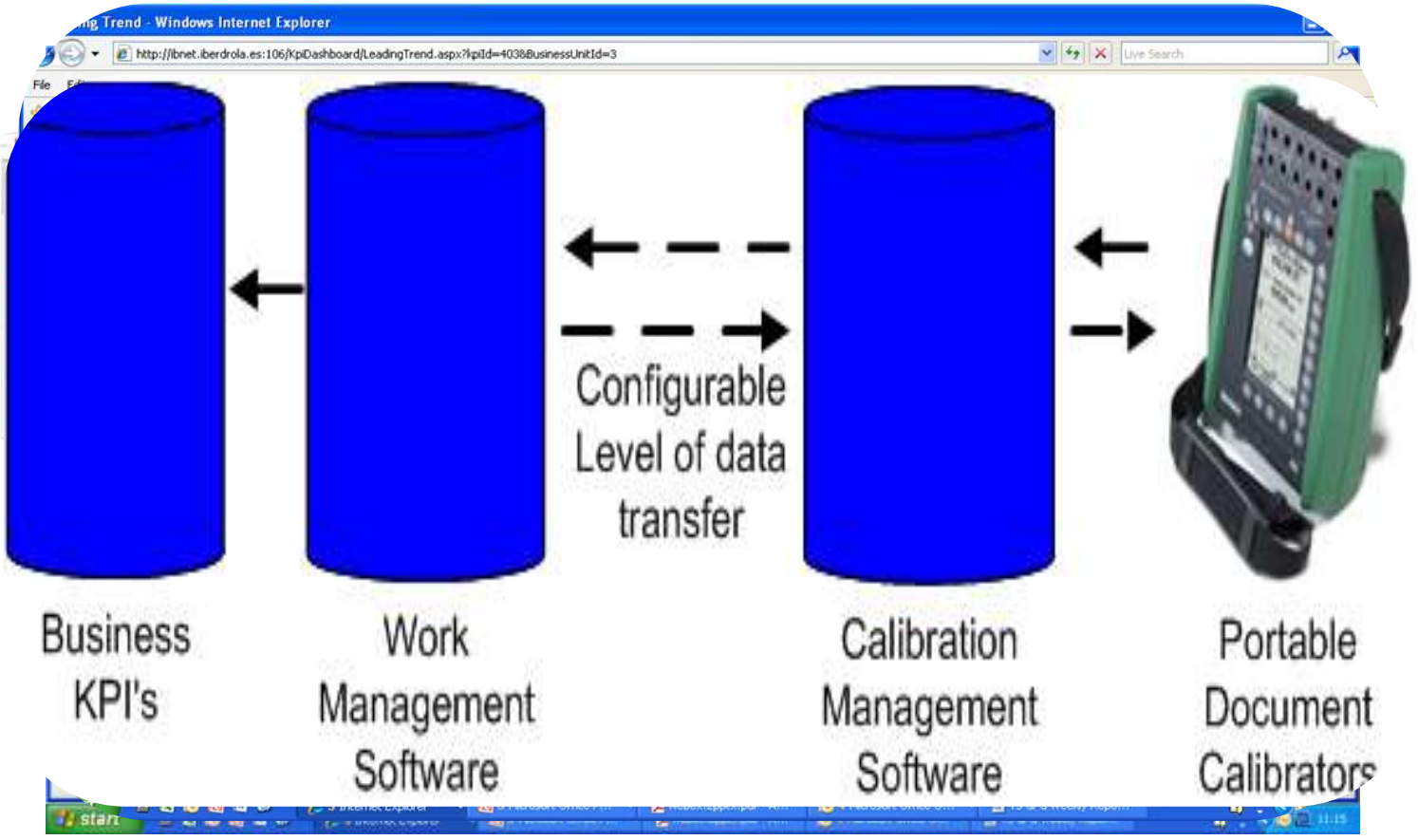
Safety Critical Instrumentation

Calibration and Proof Testing of Critical Protection Systems...

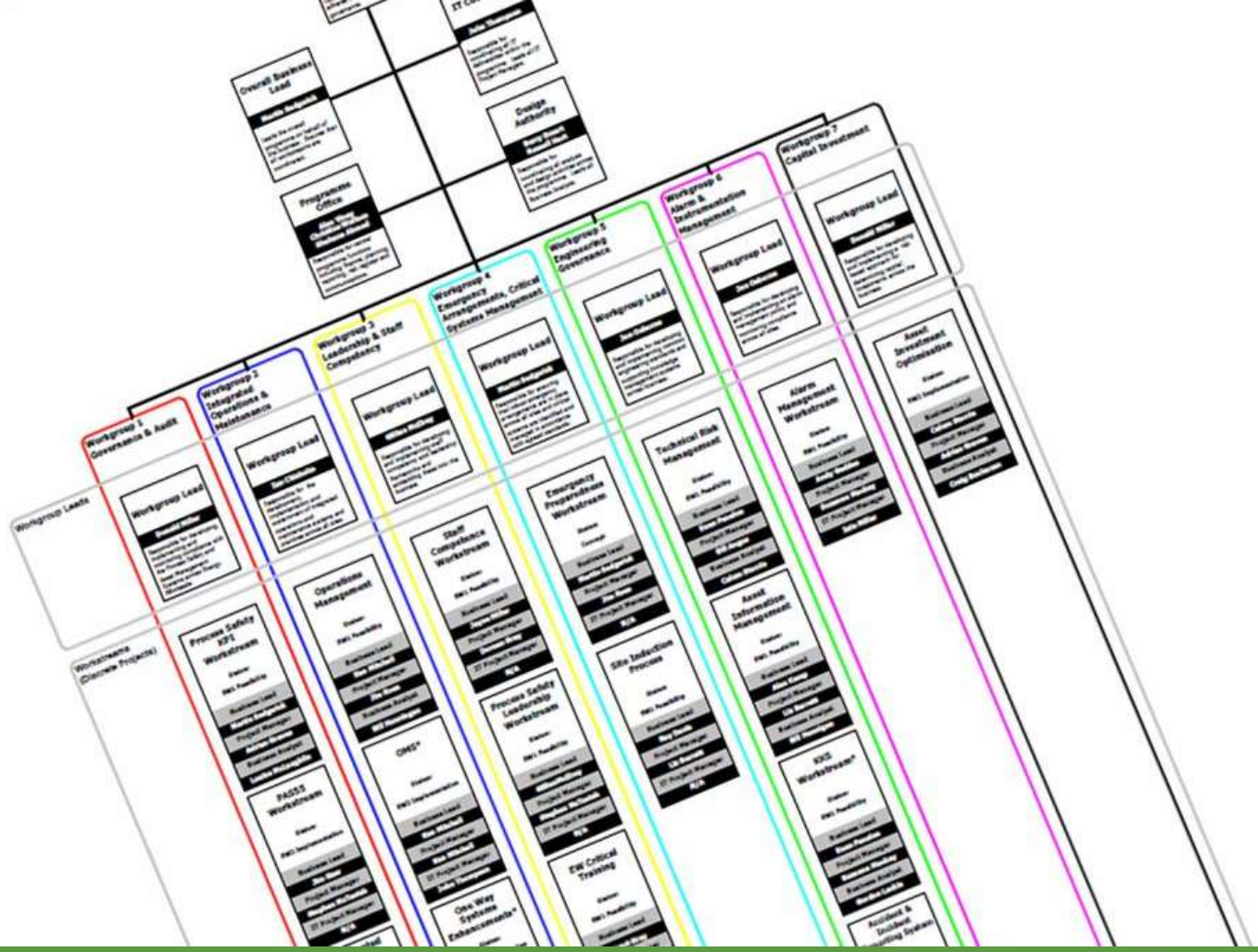
Safety Critical Systems

Standard Approach to Monitoring & Proof Testing...





Process Safety Approach



Operational Transformation Programme

Centrally coordinated, business driven approach...