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SCOTTISH POWER - PROCESS SAFETY MANAGEMENT

Case Study Topic: Process safety framework and KPI's to show real-time performance.

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Introduction

Scottish Power has developed an industry leading approach to Process Safety Management. Underpinned by a set of Company principles, based around Plant, People and Process, the management system has been recognised and commended by Judith Hackitt, Chair of the UK Health & Safety Executive and recently won the prestigious Institute of Chemical Engineering Award for Innovation and Excellence in 2010.

*Process safety is a priority for the Health and Safety Executive. It is not enough to simply have designed and implemented a process safety management system. Without collecting and acting on information that shows the system is actually working and delivering effective control of risk, you cannot be sure that your major hazards are being controlled and you will be operating blind, hoping and believing that everything is fine but without actually knowing. Reality has a habit of catching up on such companies – frequently with catastrophic consequences. No successful company could stay in business for long without accurate information on its financial performance – so why act differently when it **comes to process safety?***

Judith Hackitt, Chair, HSE.

Background

Generating electricity to feed the national grid and match consumer demand requires high levels of plant reliability. Unplanned plant outages and failing to meet generating contractual obligations have an immediate and detrimental impact on business. The need to stay 'online' is crucial.

A series of events in the industry during 2006/07, one being at Scottish Power Longannet, coupled with the publication of various asset integrity guidance, made Scottish Power consider what a similar incident might mean for its business. In particular, it highlighted its vulnerability to a major incident and the need to make process safety management a priority.

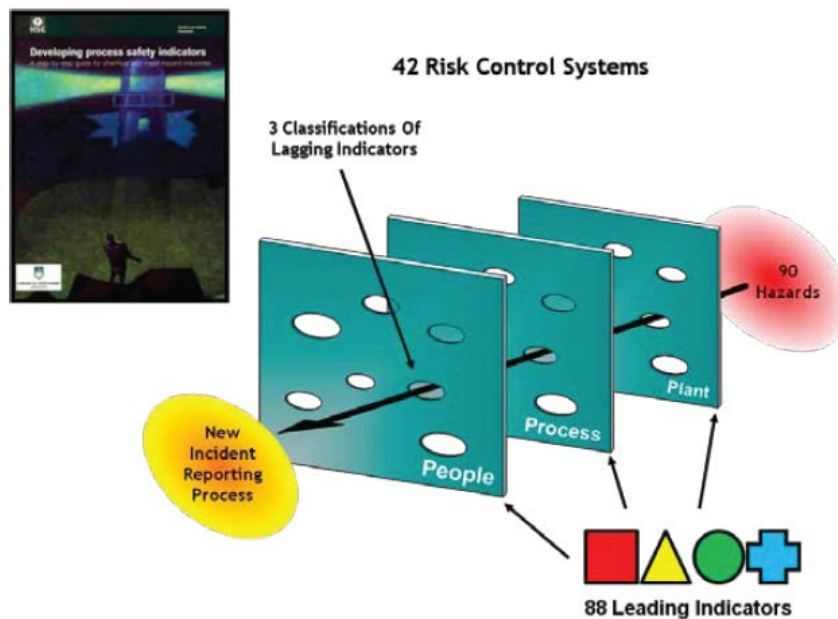
In mid-2007 the company established an Asset Management Department to coordinate a common approach to asset management and process safety. An early decision was made to fully implement RR509 *Plant ageing: Management of equipment containing hazardous fluids or pressure* and asset management standard PAS 55 as a way of defining the policy and strategy. During the same period, the publication of the Baker Panel report into the BP Texas City refinery fire stimulated Scottish Power to carry out an honest examination of whether a similar incident could happen within its operations. And, if it could, how well it was managing such risks.

Establishing key performance indicators (KPIs)

To deliver the process safety management system, and specifically to establish a comprehensive set of leading and lagging process safety performance indicators, Scottish Power set out to follow the six-stage approach guidance in HSG254.



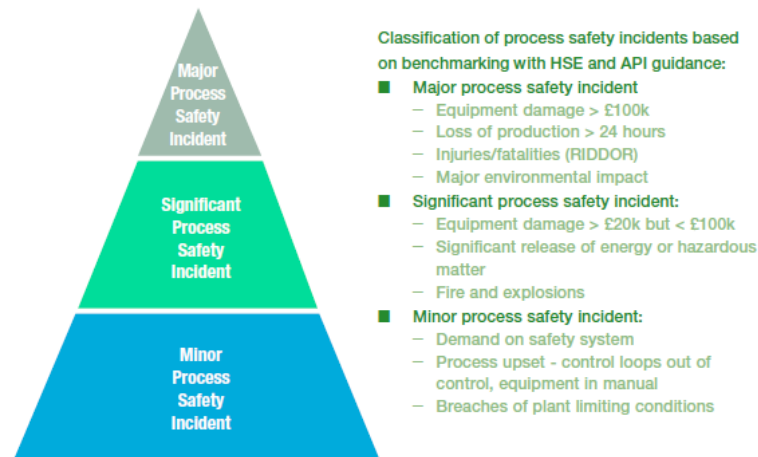
Using this approach a multi-functional team identified 90 hazards and the 42 risk control systems (or 'protective barriers') that were required to manage these hazards. The team then reviewed each risk control system to identify one or more leading indicators. In total 88 leading indicators were identified across all risk control systems.



The 42 risk control systems and 88 associated leading indicators was too large a data set to present meaningful information to the management team so the 42 risk control systems were nested into eight headline risk control areas to form the basis of the Process Safety Management Dashboard that covers:

- operational and compliance audits;
- technical risk management;
- staff competence;
- operational management;
- maintenance management;
- critical systems management;
- alarm and instrument management; and
- emergency preparedness.

Scottish Power took a simple view that incidents and near misses were the single source of lagging indicators. It implemented a new incident management process to capture this data and drive consistent investigation of root causes. Incidents were classified as major, significant or minor (based on API 754 *Process safety performance indicators for the refining and petrochemical industries*) related to one or more of the underlying 42 risk control systems.



To improve performance and track trends simple colour-coded targets were set for each KPI. Blue shows where performance meets a level that is considered industry best practice. Green indicates performance is on target, amber that it is within acceptable tolerance and red shows where it is below acceptable.

Managing the Process

An effective IT strategy and system lies at the heart of Scottish Power's success with process safety management. Early on in the Programme a partnership was formed with the Amor Group to develop an integrated data management system that pulls performance data for KPIs from core operational business applications used to manage the business and asset integrity.

The smart use of IT – including the use of handheld data loggers – means data management systems are integrated into process plant and other 'day-to-day' operational systems. This enables the company to drill down through each headline KPI to reveal the underlying transactions, assess near-time performance of each generating station and to see trending information and progress towards the agreed targets. This allows accurate benchmarking between the Company's other comparable assets. The information is available to everyone in the company at anytime enabling them to identify and act upon problems within their system before it affects their business/safety.

This information is not stand alone and is part of a complete programme covering plant, people and process. It sits within an overarching leadership framework where senior management has a good understanding of process safety and the direct links to business performance.

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Scottish Power believes it could not run its business effectively without this process safety framework and KPIs to show real-time performance. It took a couple of years of hard work but the benefits far outweigh the effort. Enhanced plant reliability has led to a reduction in unplanned outages and breakdowns, and a drive to less reactive maintenance has significant cost savings. These benefits can be summarised as:

- 20% reduction in operations and maintenance costs;
- 22% increase in plant availability; and
- 25% reduction in plant forced outage rates.

Senior management has meaningful visibility of core operational processes. This has increased confidence and assurance from Board to plant level which has resulted in improved cooperation between leadership and workforce and the drive to deliver a 'high reliability organisation'. Improved performance and transparency of key processes has led to a significant reduction in insurance premiums which in turn affects the bottom line of the business.

What next?

Further enhancements are planned including a weighted KPI process, which allows a risk-based approach to reporting to KPIs, along with a new dashboard, which integrates leading and lagging KPIs to improve the visibility of performance. The new dashboard shows leading indicators as a doughnut on the outside and lagging indicators as a pie on the inside, as a means of visualising the 'Swiss cheese' model that is at the heart of its Process Safety Management System. This integrated approach to combining leading and lagging indicator performance enables Scottish Power to calibrate its Process Safety Management System by questioning areas where leading and lagging performance is out of sync.



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