Achieving Gas Safety Excellence through Continuous Risk Assessment and Sustainable Processes

August 27, 2013

Agenda

1. Safety Management Systems – Jane Yura
2. Risk Management for Gas Operations – Redacted
3. Asset Management Planning – Redacted
4. R&D Innovation – Redacted
5. Picarro Methane Detection – Redacted

NTSB's 10 Most Wanted List: Safety Management Systems

"… under a SMS, the whole process is continuous, there are mechanisms to gather data and use it to analyze trends and potential safety problems… The discipline and standardization of a SMS sets the stage for a positive safety culture…"

PG&E is implementing a safety management system – a long-term, process-based approach which requires continuous improvement

Gas Safety Excellence Vision

PG&E's goal is to become the safest gas utility in the nation

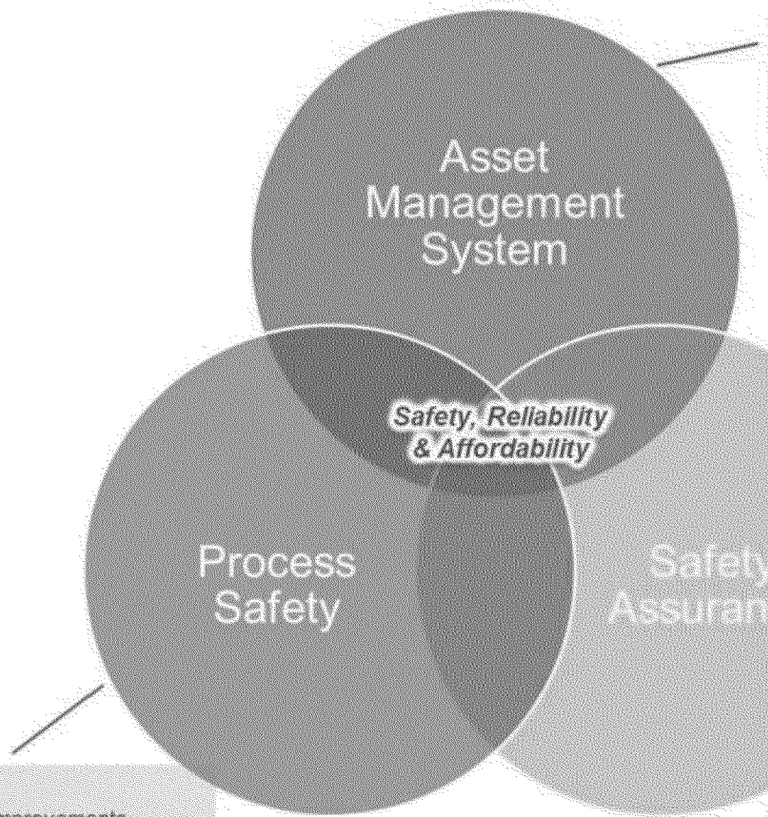
- Nurture a safety-first culture
- Understand and know our assets and their condition
- Continuously assess, re-assess risks, and adjust risk management plans
- Design safety into our processes and our asset systems
- Safely operate our system and respond appropriately to emergencies
- Embed continuous improvement in all that we do

The journey to gas safety excellence will establish perpetual and sustainable processes that encourage continuous improvement and mitigate organizational failures

Safety Frameworks Used by Industry

	Aviation, Transportation Industry	Nuclear Industry	Chemical Industry	Utilities, Asset Intensive Industry
Framework	Safety Management System (SMS)	Institute of Nuclear Power Operators (INPO)	Process Safety (OSHA, API 750)	Publically Available Standard 55 (PAS-55), ISO 55000
Attributes				
-Approach	Systematic and comprehensive safety management to reduce risk; supports collaboration between industry and regulators	Safety and reliability evaluations through periodic assessments of operations, processes and personnel; industry information exchange	Management of process hazards, through prevention and consequence reduction of toxic or explosive materials releases	Systematic and comprehensive asset management to reduce risk, mitigate organizational failures, and improve performance
-Emphasis	Sustainable processes from strategy to deficiency identification and correction	Continuous use of incident analysis, lessons learned/best practices and management reviews	Consistent procedures and practices, including planning, assessments, analysis, and training	Sustainable processes from strategy to daily operations and performance assessment
-Key Elements	Establish policy, risk management, evaluation, and support continuous improvement; encourage collaboration between management and workers	Establish performance objectives, criteria and guidelines, areas for improvement and best practices	Establish practices to manage process hazards, compliance, lifecycle activities and audits	Establish policy, risk management, evaluation and support continuous improvement; encourage collaboration between management and workers
Target Audience	Any business, tailored to size and activities	Nuclear power stations	Refineries, chemical, processing facilities	Utilities, and asset-intensive industries

Safety Management System: Gas Safety Excellence



- Satisfy the world-class PAS 55 standard
- Build a holistic asset management system
- Define and adhere to a risk management framework

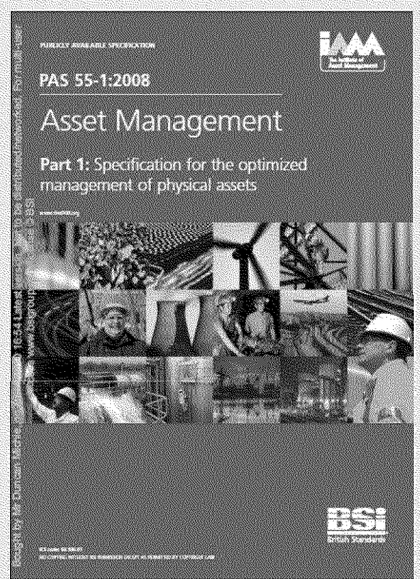
- Safety and process improvements
- Monitor and control safety gaps
- Improve system integrity

- Organizational alignment via Line of Sight
- Culture of continuous improvement
- Adopt mechanisms to address safety issues

Risk-based Asset Management Framework: PAS-55 ISO 55000

A systematic approach to safely manage assets throughout their life cycle-- from installation, to maintenance and operations, to retirement

- Sustainable best practice processes for all aspects of operations, clearly documented
- Continuously understanding and managing risks
- Requires independent evaluation to achieve accreditation, and continuous improvement and evaluation to maintain accreditation
- ISO 55000 will be internationally issued in Q4 2013



A world-class safety standard developed by experts to safely operate assets, assure availability, and meet emergency response requirements

Evolution of PAS-55, ISO 55000

Hatfield Rail Incident

2000

PAS-55 released by the British Standards Institute with globally derived input

2004

nationalgrid

National Grid: the 1st organization to be certified

2006

ofgem

OFWAT

Regulators strongly 'encourage' adoption

Revised PAS-55 standards released

2008

2009

National Grid US Gas Distribution become certified

2010

ISO

Work begins to convert to an ISO standard

2011

gasunie

VATTENFALL

SCOTTISHPOWER

Greater adoption of the standard across the world

2012

ISO 55000-55002 expected to be released Q4 2013

2014

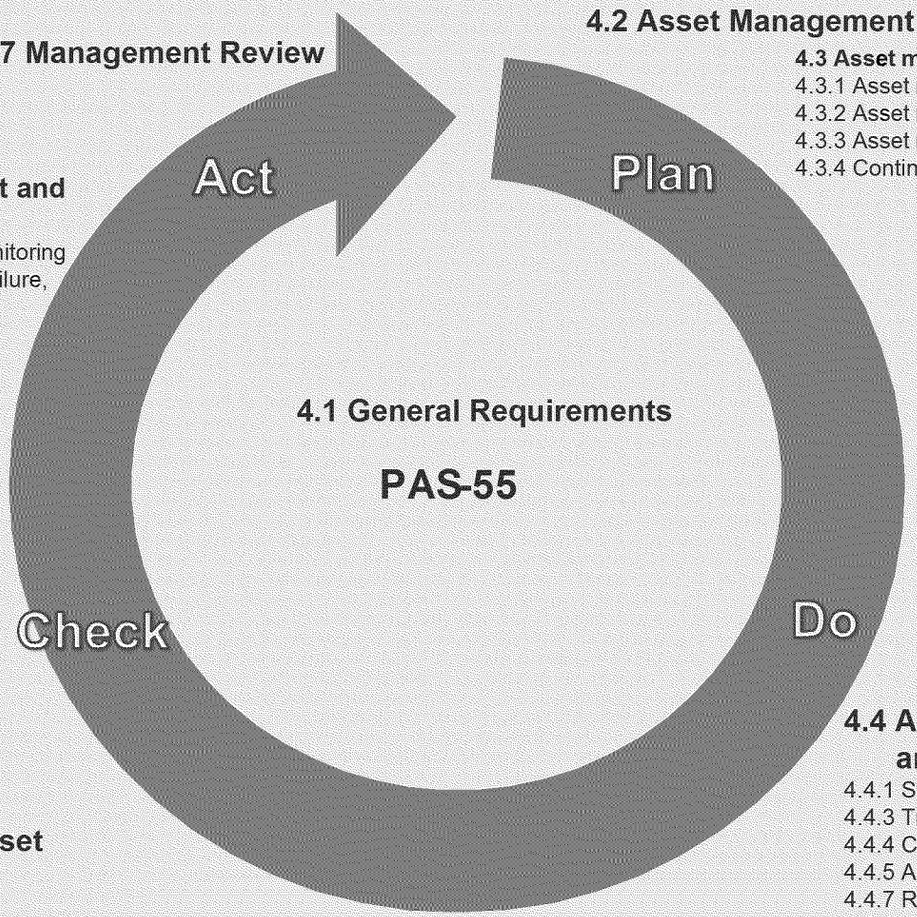
Goal: PG&E Gas Operations certified!

PG&E

..Plus 30+ Other Companies

PAS-55 Framework: Specific Requirements

The Framework requires clearly defined plans, procedures, compliance in 28 categories



4.7 Management Review

4.2 Asset Management Policy

4.3 Asset management strategy, objectives, plans
4.3.1 Asset management strategy
4.3.2 Asset management objectives
4.3.3 Asset management plans
4.3.4 Contingency planning

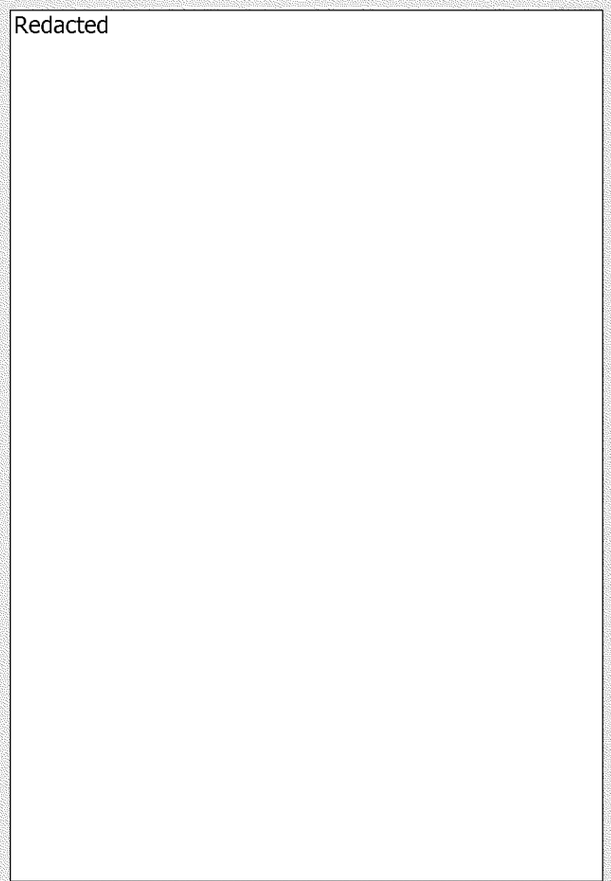
4.6 Performance assessment and improvement
4.6.1 Performance and condition monitoring
4.6.2 Investigation of asset-related failure, incidents, nonconformities
4.6.3 Evaluation of compliance
4.6.4 Audit
4.6.5 Improvement actions
4.6.6 Records

4.4 Asset management enablers and controls
4.4.1 Structure, authority and responsibilities
4.4.3 Training, awareness and competence
4.4.4 Communication, participation and consultation
4.4.5 Asset management system documentation
4.4.7 Risk Management
4.7.8 Legal and other requirements
4.7.9 Management of change

4.5 Implementation of asset management plan
4.5.1 Life cycle activities
4.5.2 Tools, facilities and equipment

Summary

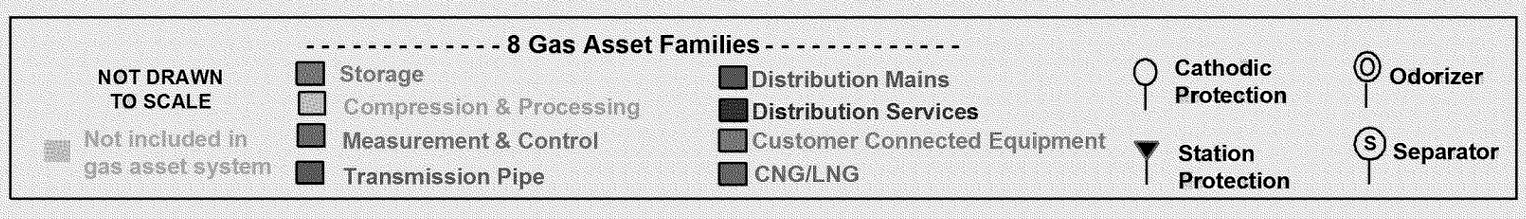
- **Implementing Gas Safety Excellence requires perpetual and sustainable processes that encourage continuous improvement and mitigate organizational failures**
- **Gas Safety Excellence integrates people, information, and investment to manage physical assets**
- **PG&E is committed to gas safety excellence, and using a risk based asset management process to achieve our vision of becoming the safest gas system in the nation**



Appendices

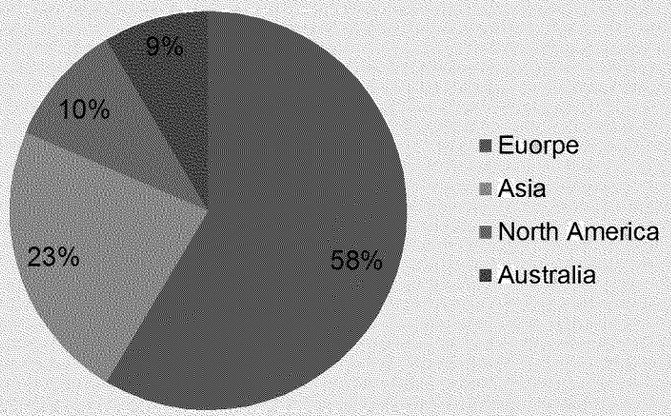
Gas Asset Families

Redacted



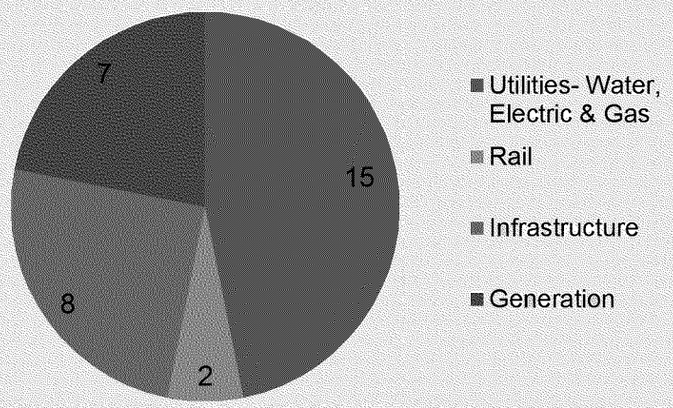
Geographic and Industry Footprint of PAS-55

Geographic Coverage



Regions that are growing in momentum include: Middle East and Far East.
Ports Authorities and State owned vertically integrated energy/utility companies are progressing with accreditation in these regions

Industry Coverage

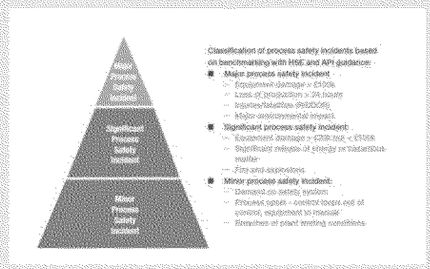


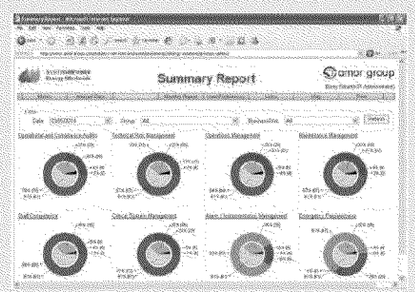
Companies that have certification include: National Grid, EoN, Essent, EDF, Western Power Distribution, Scotia Gas Networks, Scottish Power, Wessex Water, UK National Air Traffic Services

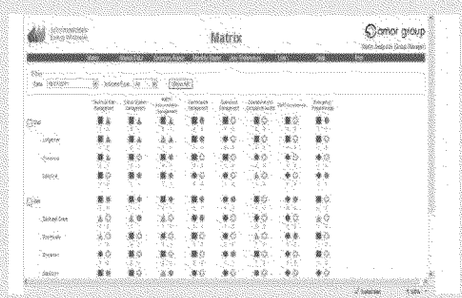
PAS-55 is on-track to become an ISO standard at the start of 2014. This 'ISO 55000' standard is expected to increase the level of global adoption

Scottish Power

- Scottish Power owns and operates electric networks and generation (Iberdrola Group)
- 2007, a coal supply conveyor collapsed at the Longannet thermal power station -- significant plant outage and damage to the company's reputation for process safety and reliability
- Event and others (Texas City) caused Scottish Power to review its vulnerability to process safety incidents
- Scottish Power created a dedicated Asset Management division to focus on all aspects of asset stewardship, process safety and understanding root causes







Scottish Power achieved PAS-55 accreditation in 2009 resulting in significant reliability and process safety improvements across its business through use of consistent data, process and systems

PAS-55 Certified Companies

- UK's largest Utility
- Presence in the Northeast US
- Serves over 10 million UK customers, 7 million US customers
- Over 30,000 employees

nationalgrid

- World Leader in Air Traffic Management
- Manages UK Air Traffic and handles over 6,000 flights per day
- Over 4,000 employees

NATS

- State owned Swedish vertically integrated company
- Serves over 10m customers across 8 Western European countries
- Over 35,000 employees

VATTENFALL

- Finland's State Owned National Electric Transmission System Operator
- Serves over 5 million customers
- Less than 300 employees

FINGRID

- One of the world's largest underground transport networks
- Over 250 stations, across 11 lines
- Over a billion passengers transported per year
- Over 13,000 employees

UNDERGROUND

PAS-55 Case Study- National Grid

Background:
Largest investor owned utility in the UK and fourth largest in the US

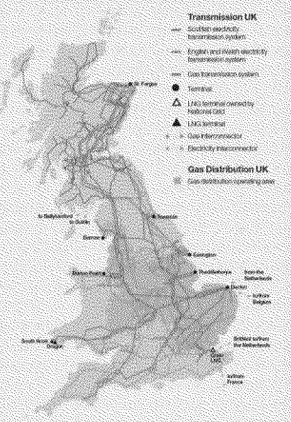
Operating Territory:
United Kingdom and North-eastern US- New York, Massachusetts and Rhode Island

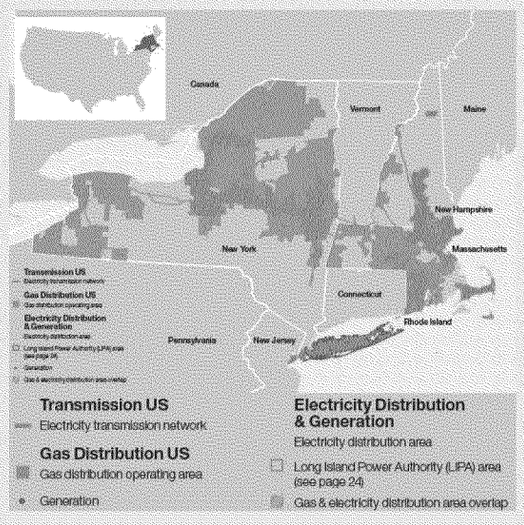
Date of PAS-55 Certification:
2006 for UK Electricity Transmission and, then the remainder of the business over the following 4 years, including National Grid US Gas business in 2009

Trigger for Certification
Desire to be a leading Asset Management Practitioner

Approach to Certification
First organization to become certified to PAS-55 Standards in 2006. It then used this learning to apply across other parts of its portfolio across the UK and US. It has also played a huge role in the ongoing development of the standard and is regarded globally as a leading operator

Benefits of Certification
Developed holistic risk management and investment management processes, which applied across the entire UK and US entities. In addition, a number of significant improvements were seen in the areas of process safety, asset condition information and the creation of an organizational wide line of sight framework





PAS-55 Case Study- London Underground

Background:
One of the largest underground transport networks in the world

Operating Territory:
Serving Central London and surrounding Boroughs

Date of PAS-55 Certification:
July 2011- the first UK rail operator to become certified

Trigger for Certification
Desire to improve the understanding of condition, risk and performance

Approach to Certification
London Underground had observed the benefits of accreditation achieved by other infrastructure organizations and felt that they could gain from better understanding the assets that they operate and maintain.

Benefits of Certification
Implemented a single way that projects are designed, managed and delivered throughput the organization. This has led to consistent use of design principles, repeatable processes and a much better understanding of whole life cycle costing.

Background:
The Finnish state owned National Transmission Network Operator and Owner

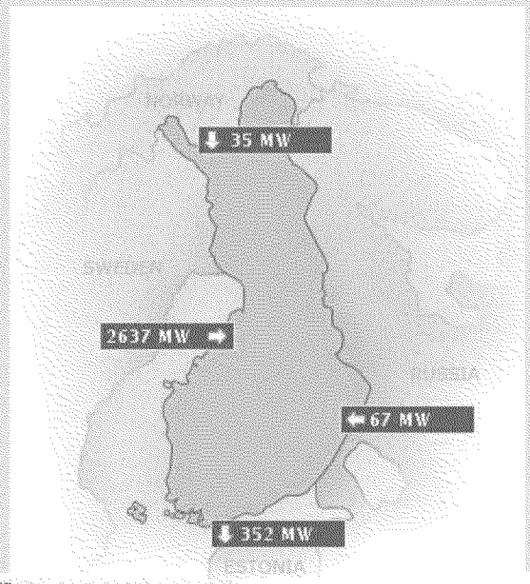
Operating Territory:
Mainland Finland

Date of PAS-55 Certification:
May 2010

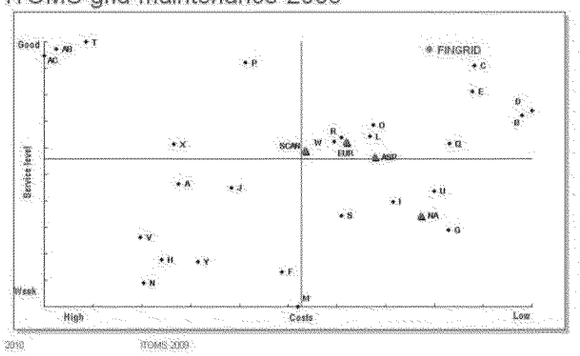
Trigger for Certification
Comparative regulation and results of regional benchmarking

Approach to Certification
Approached accreditation as an enabler of making large-scale changes to the way that it conducts asset management

Benefits of Certification
Better alignment of processes with the strategic plans of the organization. In addition, since the vast majority of Fingrid's operations are outsourced, the maturity of enablers, controls and audit processes were significantly enhanced. Lastly, Fingrid used the accreditation process to improve its records and improve on its knowledge management capabilities



Efficency measurement
ITOMS grid maintenance 2009



PAS-55 Case Study: CE Electric

Background:
CE Electric is a wholly-owned subsidiary of MidAmerican Energy Holdings Company and comprises of 2 regional electricity distribution business in the UK

Operating Territory:
North Eastern UK

Date of PAS-55 Certification:
March 2011

Trigger for Certification
Comparative regulation

Approach to Certification
In order to stay ahead of the regulatory challenges, CE Electric embarked on a 3 year journey to overhaul its Asset Management practices

Benefits of Certification
CE Electric used the accreditation process to establish asset management policies and strategies that were then used to drive the business planning activity. In addition, improvements in predictive and preventative maintenance programs