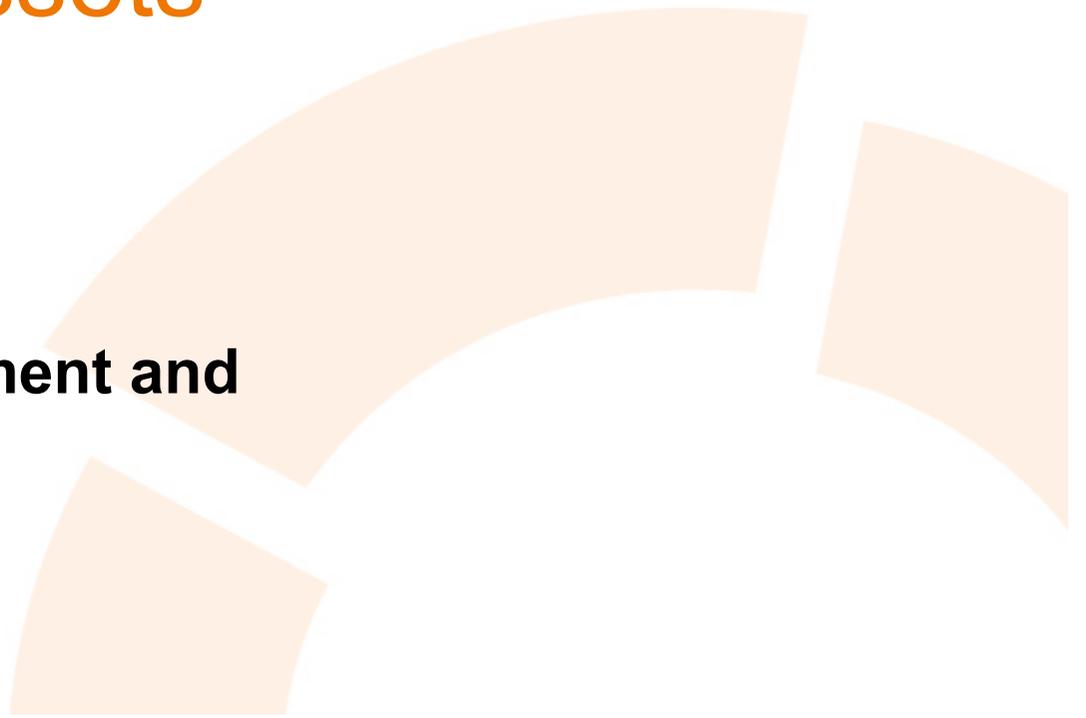


# The Management of High Consequence Assets

**Chris Clarke**  
**Director of Asset Management and**  
**HS&E**  
**May 2010**

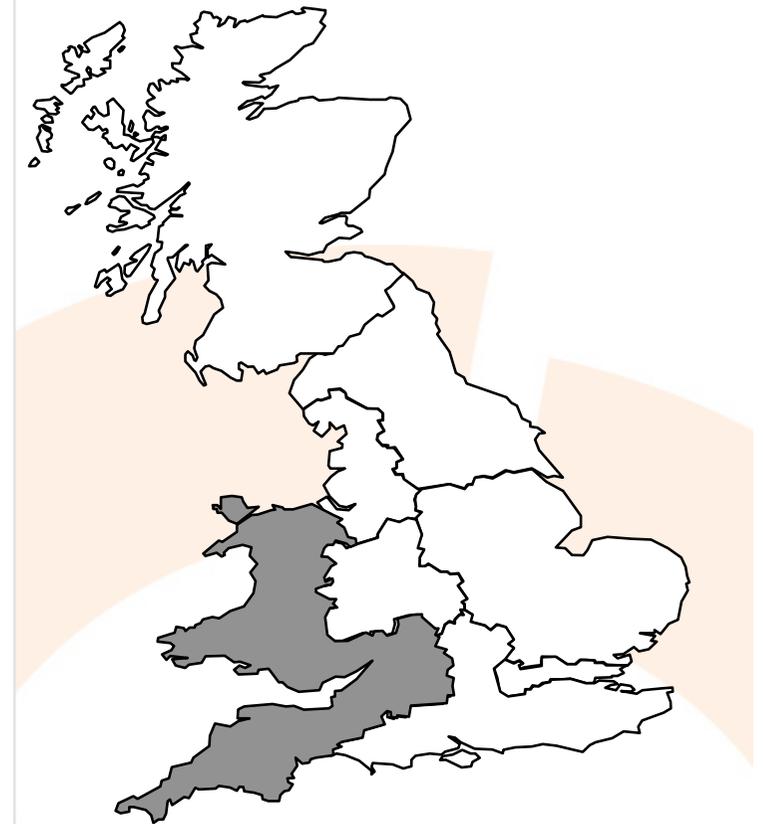


WWU commenced trading on 1 June 2005, following the £1.3bn acquisition of the Wales & South West gas networks from NG

WWU Operates under a Permissioning regime and is subject to acceptance by H.S.E of a Safety Case.

### Key stats

- Covers 41,000km<sup>2</sup> – 1/6 of UK
- Serves 7.4 million people
- 2.4 million supply points
- 35,000km of gas transportation network
- 7 Lower Tier COMAH sites
- 3 High Pressure Storage sites
- 2500 Major Accident Hazard Pipelines



## What does Process Safety mean to WWU?





**WALES & WEST**  
UTILITIES

# Virginia





**WALES & WEST**  
UTILITIES

# Virginia





**WALES & WEST**  
UTILITIES

**UK. Dec 2008**







**WALES&WEST**  
UTILITIES

**Pentrebach Station**

**Wales – 3<sup>rd</sup> party  
activity**



*Not rocket science - just clarity of approach and a consistent focus*

- Utilised simple HSG65 Management System
- Apply principles to asset management
- Prioritise everything on risk
- Accountability at lowest possible level
- Ownership in all parts of the business
- What gets measured gets done!
- Visible leadership
- Fully engage staff



# WWU Management System



**Supports - ISO14001; WWU Safety Case; PAS55; ISO9001**

- Risk is a combination of the likelihood of an occurrence and the consequence (impact).
- Three categories:
  - Inherent – the risk in the absence of working controls.
  - Target – the risk with all reasonably practicable controls in place.
  - Current – the risk with the existing controls in place.
- It is important to use a foreseeable consequence.

Impact	Level	Severity	Description
<b>Safety</b>	1	Insignificant	Minor injury / Near miss / Negligible
	2	Low	Lost time injury
	3	Moderate	Major injury e.g. RIDDOR reportable
	4	Significant	Fatality
	5	Serious	Multiple fatality
<b>Security of Supply</b>	1	Insignificant	Interruptible supplies disrupted / negligible disruption
	2	Low	Firm customers disrupted (<250 domestics)
	3	Moderate	Network disrupted (>250 domestics)
	4	Significant	Major outage for significant period of time
	5	Serious	Total off-take zone outage

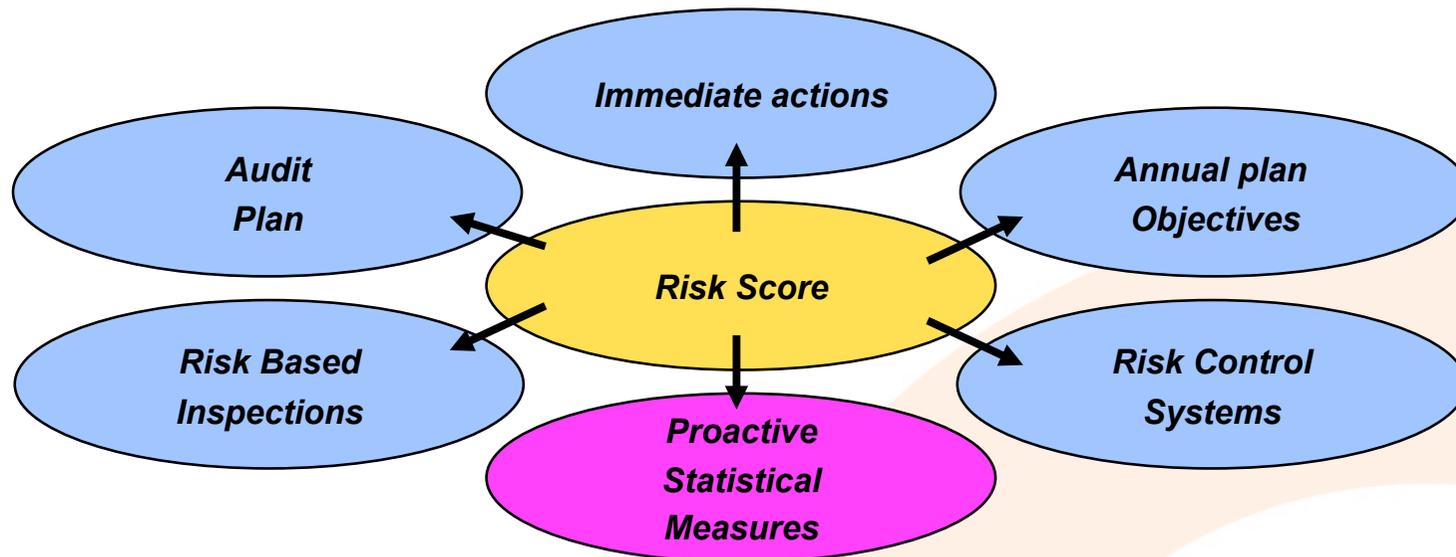
Likelihood of the event:

	Frequency of Occurrence	Probability of Occurrence	Score
<b>1. Remote</b> <b>2. Less Likely</b> <b>3. Equally likely as unlikely</b> <b>4. More Likely</b> <b>5. Almost Cert</b>	<b>&lt; once in 20 yrs</b> <b>&lt; once in 15 yrs</b> <b>&lt; once in 10 yrs</b> <b>&lt; once in 5 yrs</b> <b>One or more a year</b>	<b>&lt; 10 % chance</b> <b>&gt; 10% &amp; &lt; 40% chance</b> <b>&gt; 40% &amp; &lt; 60% chance</b> <b>&gt; 60% &amp; &lt; 90% chance</b> <b>&gt; 90 % chance</b>	<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b>

## Example – 3<sup>rd</sup> Party Damage to Below 7 bar mains leading to..

- Relevant/Foreseeable Impact
  - Safety – Dangerous Occurrence - 3
- Likelihood
  - Inherent – 5
  - Target – 3
  - Current – 4
- Risk
  - Inherent = 15 – Measure performance; Include in the audit regime
  - Target = 9
  - Current = 12 – Take action to improve communications with third parties

# Use of Business Risk



# Inherent Risk

		Consequences				
L i k e l i h o o d		1	2	3	4	5
	1	1	2	3	4	5
	2	2	4	6	8	10
	3	3	6	9	12	15
	4	4	8	12	16	20
	5	5	10	15	20	25

## **The overall asset strategy**

- Preserving Value – Asset Integrity
- Increasing Value – Asset Investment

## **The approach & culture**

- Encourage ownership & accountability at all levels
- ‘What gets measured get done’ – Asset/Process Safety KPI’s

## **The key messages**

- We have spent a lot of time improving the assets - to provide long term benefits mostly around safety.
- We will be investing in a data strategy which will bring the same benefits we enjoy on below ground assets to above ground assets.
- The above will enable the development of Decision Support Tools (DSTs) to better target future investment - eg replacement/refurbishment/maintenance.

- Asset Performance Measurement
  - Define Scope of Process Safety Indicators within WWU
    - Prevent Major accidents
      - ‘High Consequence – low frequency’
    - Set at Organisational level fed from site operations
    - What can go wrong?
    - Use of PAS 55 asset groups
    - Review existing documentation of risks and controls in place (PAS 55)
    - Benchmark performance against NGN and UKOPA Survey

## Identified Risk Control Systems – Leading and Lagging Indicators

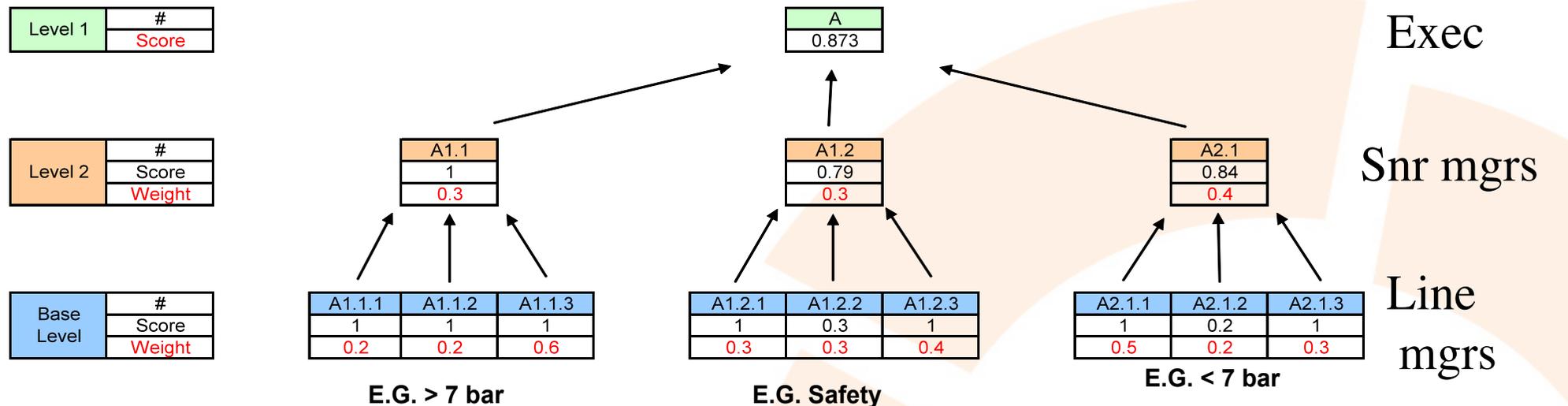
- PAS 55 Sessions Output
  - What causes a major accident?
  - What are the RCS?
  - Where is the data collection point?
  - What are current Leading and Lagging Indicators?
  
- KPI's Output
  - Review ran parallel to the PSI work
  - HSG 254 utilised



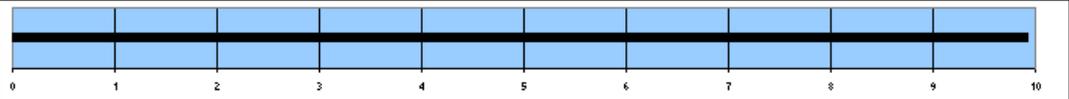
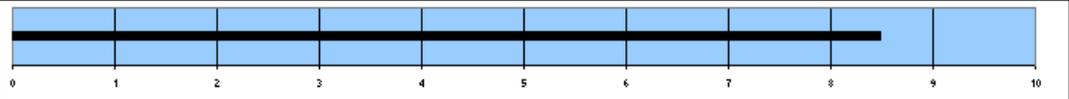
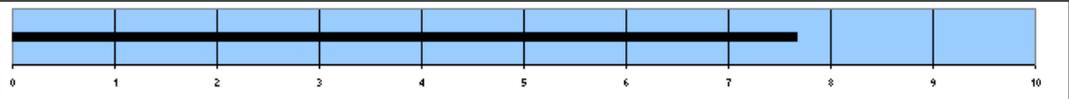
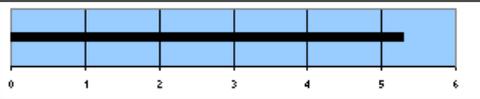
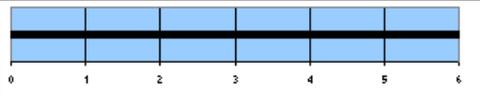
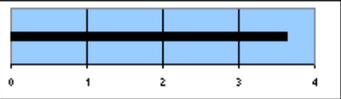
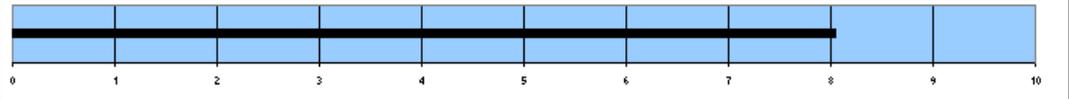
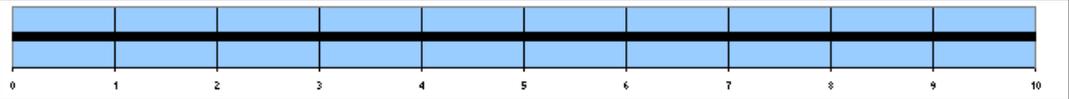
Control	Lagging indicator		Leading indicator	
	L3 ref	L3 Measure	L3 ref	L3 Measure
Inspection / maintenance	NP.>7BAR.5	Scheduled wr. un-scheduled maintenance hours	NP.<7BAR.3	Mechanical maintenance planned wr completed
	NP.>7BAR.5		NP.>7BAR.3	
	NP.<7BAR.7	Average number of <7bar regulator faultz per unit	NP.<7BAR.4	% of total programmed maintenance that is cancelled
	NP.>7BAR.7		AS.>7BAR.4	
	NP.>7BAR.8	Average number of >7bar Storage faultz per site	AS.>7BAR.5	Completion of OLI 1 pipeline inspectionz against plan
	NP.>7BAR.9		AS.>7BAR.6	
	NP.>7BAR.9	Average number of >7bar Pipeline faultz per Km	AS.>7BAR.6	Completion of cathodic protection surveyz (CIPS) against plan
	NP.>7BAR.10		AS.>7BAR.7	
	NP.>7BAR.10	Average number of >7bar Pressure Regulator faultz per installation	AS.>7BAR.7	Completion of Routine CP (Monthly Majorz) against plan
	NP.>7BAR.11		AS.>7BAR.8	
	NP.>7BAR.11	Average number of <7bar storage faultz per site	AS.>7BAR.9	TDZ surveyz - target against plan
	AS.>7BAR.9			
		AS.>7BAR.10	Pipeline action plan - closure of actionz	
		AS.>7BAR.11		
		AS.>7BAR.19	Pressurized System Safety Regulation inspectionz - actual wr plan	
		AS.>7BAR.20		
		HS.SAF.16	Pressurized System Safety Regulation inspectionz action - an inspection findingz	
			Odouration maintenance completed per month	
			Action on odouration fault findingz per month	
			No. of portable gas detection equipment in use and not tested in last 7 days	
Staff competence	HS.SAF.14	Number of network incidents resulting from human failure	P.<7BAR.1	STCz and Asset competency review wr plan
			P.<7BAR.2	
			HS.STAN.1	
			HS.SAF.12	
			Gap actionz - training / development planz wr actual	
			No. outstanding findingz - deviationz from golden rule	
			Required competence training received wr planned	
			System control competence measure to be added	
Operational procedures	AS.STAN.13	Number of network incidents resulting from policy or procedural failings	AS.STAN.12	Policy and procedure review - actual v plan
Instrumentation and alarm	NP.<7BAR.12	Average number of <7bar telemetry faultz per installation	AS.>7BAR.12	Electrical / instrumentation maintenance actual wr planned
	NP.>7BAR.13		AS.>7BAR.13	
	NP.>7BAR.13	Average number of >7bar telemetry faultz per installation		Electrical / instrumentation fault resolution within timescale
Plant change	AS.>7BAR.2b	Number of non-compliancez with GL5 process following sample audit	AS.>7BAR.2a	Audit on >7bar Capex work against audit plan
Communication	HS.SAF.15a	Number of network incidents resulting from failure in Sheave communication	HS.STAN.2.1	% of jobs in compliance with NRO/RO procedure following Responsible Engineer audit
Permit to work	HS.>7BAR.2	Number of rightingz per km from aerial / vantage point surveyz	HS.STAN.8	No. of contractoz used to carry out work for WWU (over £50,000) without proven competence (A-chiller)
			HS.STAN.7	
				Number of out of date Safe Control of Operationz competency matrix updates
Plant design	AS.STAN.14	Number of network incidents resulting from deficiency in design	AS.>7BAR.1	LTS analysis model validationz complete and within tolerance
			AS.>7BAR.1a	
			AS.<7bar.23	
				Decision support tool >7bar - update of health indicator against plan
				Decision support tool <7bar - update of health indicator against plan
Emergency arrangements	HS.<7BAR.10	No of uncontrolled PREz where response time more than 2 hours	HS.<7BAR.9	% Response to uncontrolled gas escape against SOS target
	HS.<7BAR.12		HS.<7BAR.11	
		No of controlled PREz where response time more than 4 hours	HS.<7BAR.13	% of outside escape completed within 7 days
			HS.<7BAR.14	
			HS.<7BAR.15	% of escape completed within 28 days
			AS.STAN.18	% of escape completed within 12 hours
			Business continuity plans reviewed and tested wr per annual plan	
Leadership	AS.STAN.15		AS.STAN.15	Number of monthly OSEC meetingz and safety tourz
	AS.STAN.16		AS.STAN.16	Number of monthly ASEC meetingz and safety tourz
	AS.STAN.17		AS.STAN.17	Number of monthly ESEC meetingz and safety tourz
				add board measure
				UKOP AFSI safety questionnaire (to be developed)

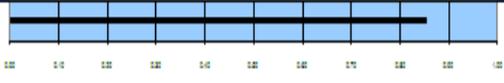
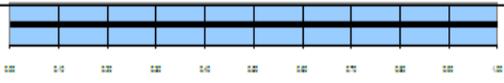
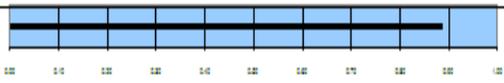
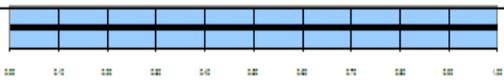
‘Scoring’ up through the levels cont..

The  $\sum \text{scores} \times \text{weighting}$  for each group will be the score for the KPI above



# Level 1 Report

Asset Management Key Performance Indicators - Level 1	Performance Against Inherent Risk	Status
Financial Efficiency & Effectiveness		
Asset Stewardship		
Network Performance		
Consumer		
New Opportunities		
People		
Safety		
Environment		

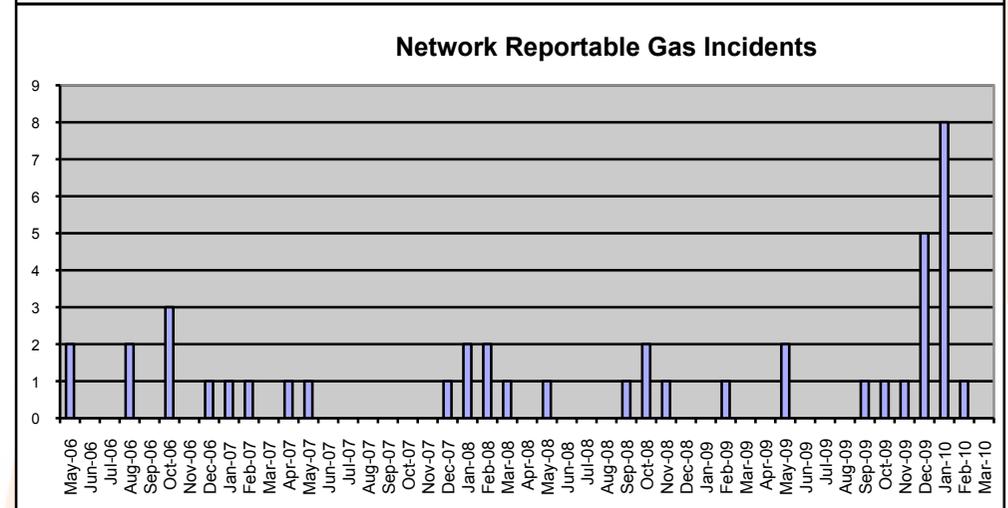
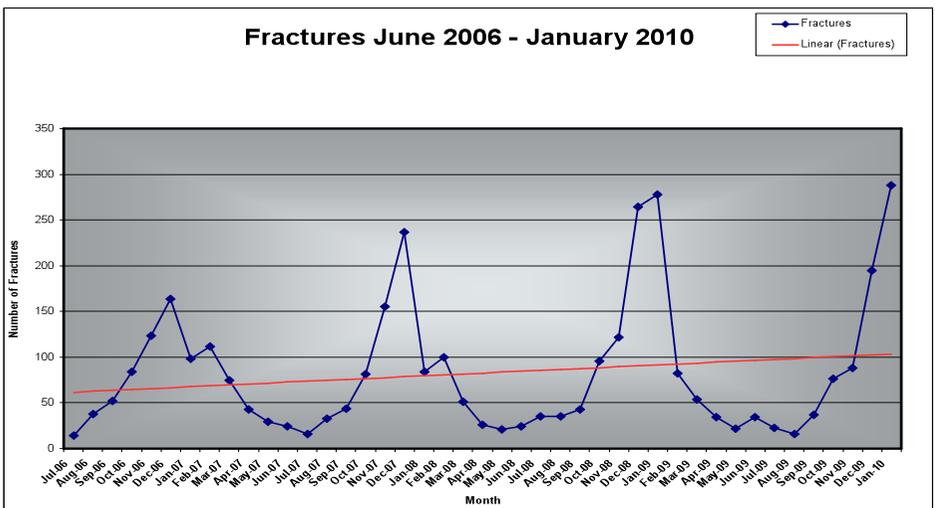
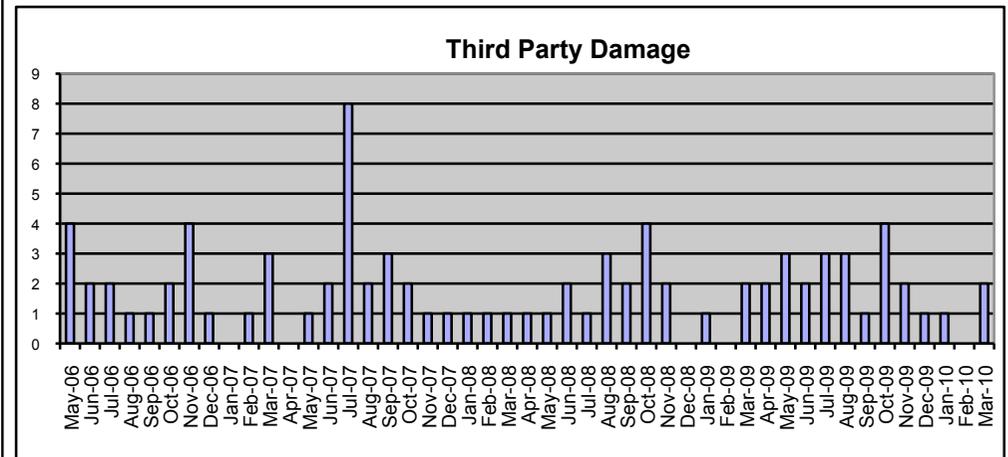
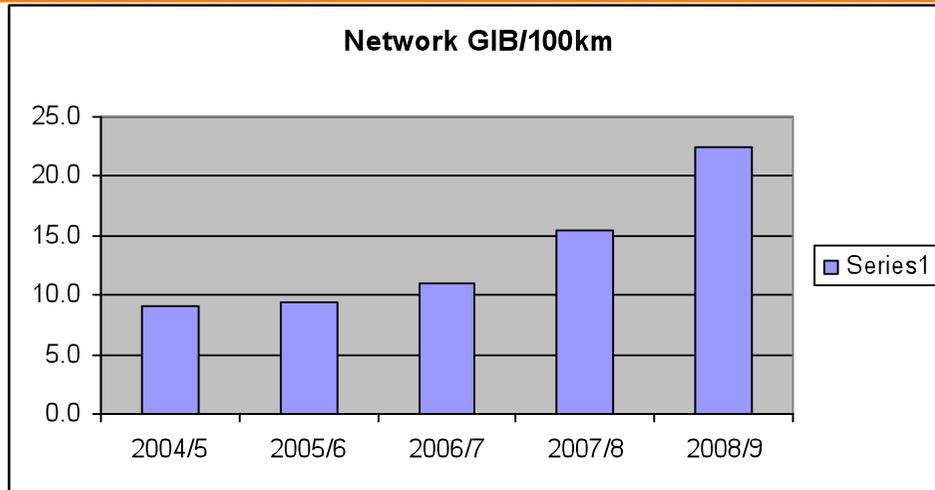
Level 1	L2 Ref	L2 Measure	Performance against inherent risk	Score	Status	Inherent risk score	Comments
Asset Stewardship	AS.L2a	Mains replacement compliance and delivery		0.85	▲	25	This measure has moved from amber to green as MRPS survey pass rates have improved and REP2 audits are hitting monthly targets
	AS.L2b	<7bar records update		0.58	▲	20	Amber status is due to failure of Operations to return packs in required standards of service. Discussed at OSEC with action on Steve Pitman to investigate.
	AS.L2c	< 7bar Capex delivery and effectiveness		0.67	▶	20	Mains reinforcement not delivered by winter period. Contingency plans in place and key network pressure points being monitored. Process reviewed for 10/11 programme
	AS.L2d	> 7bar Capex delivery and effectiveness		0.85	▲	20	CAPEX process reviewed with new appointments made, responsibilities clarified and processes redesigned to ensure delivery of future programme.
	AS.L2e	Pipeline inspections		0.93	▶	20	
	AS.L2f	Pressurised System Safety Regulations		1.00	▲	20	
	AS.L2g	Electrical Regulations		0.88	▼	20	75% of planned maintenance completed in Wales due to increase in CAPEX work
	AS.L2h	Gas quality		0.90	▲	25	Low odour issue in Mid Wales. Improved test results in December and satisfactory results in January at end of line. Situation to be closely monitored.
	AS.L2i	HP Metering (Fiscal)		0.89	▶	15	One meter validation outside of 14 months and two unresolved meter errors outside of 3 month target.
	AS.L2j	Risk management		1.00	▲	15	Has been red in previous months but improved as a result of increased focus on closing down outstanding actions
	AS.L2k	Data and reporting		1.00	▶	20	
	AS.L2l	Audit		0.67	▲	20	There were 13 outstanding reds in December. This has been reduced to 1 in January following increased focus by HS&E team



Level 2	L3 ref	L3 Measure	Month Target	Month Actual	Month Status	Year to date Target	Year to date Actual	Annual Status	Inherent risk score
Mains replacement compliance and delivery	AS.<7bar.1	MRPS survey progress against Profile	1,643	1,412	▶	18,077	17,581	▲	25
	AS.<7bar.2	MRPS survey quality audit progress against Profile	100	115	▶	1,100	1,243	▶	25
	AS.<7bar.3	MRPS surveys meeting quality standard	90%	85%	▲	90%	78%	▲	25
	AS.<7bar.4	Policy & condition schemes delivered to Alliance against target	0	0	▶	423	423	▶	15
	AS.<7bar.5	High rise survey vs plan	0	0	▶	0	0	▶	8
	AS.<7bar.6	Special crossing survey vs plan	40	42	▶	917	995	▶	12
	AS.<7bar.7	Action on audit findings of special crossing surveys	0	0	▶	46	52	▶	3
	AS.<7bar.8	Abandonment against profile	35.3	50.3	▲	387.8	381.1	▼	25
	AS.<7bar.9	Technical compliance audits on replacement schemes (REP2 audits)	5	15	▲	55	24	▲	15
	AS.<7bar.10	Action on audit findings of technical compliance audits (REP 2 audits)	0	0	▶	0	0	▶	15
	AS.<7bar.11	Annual Risk Reduction against profile	n/a	n/a	▶			▶	15

Level 3 KPIs at critical status					Duration at critical status	
Ref	Base measure	Commentary on issue and actions taken	Owner	Status	Consecutive months	No. months in previous 12
AS.<7BAR.9	Technical compliance audits on replacement schemes (REP2 audits)	Improvement plan in place focussing on desktop audits and assigning additional resource. This has resulted in the monthly target being exceeded in January and February. On target to recover by year end.	Nicola Evans	▲	9	9
AS.<7BAR.12	% of data returned by Operations within D+28 for completed replacement abandoned mains	59.74% in March, up 5% from February, still not on target but with current measures is improving	Andrew Hopkins	▶	9	9
AS.<7BAR.15	%age of data returned by Operations within D+21 for completed connections projects	Area Engineering Managers to address with Performance Managers weekly MI to amended to highlight D14 jeopardy jobs. Large improvement noticed with 98% in standard in January and 95% in February. One further month at 90%+ will remove this from red status.	Andrew Hopkins	▲	7	7
AS.<7BAR.18	Resolution of high priority DR4s within D+10	Performance has dropped again from the previous month 94% in January 87% in February and 86% in March	Dave Crittenden	▼	8	8
HS.<7BAR.1	Audit of self lay and IGT connections against plan	Additional resource assigned and audits numbers in December and January increased to satisfactory levels. Reduction in completed numbers in February to be addressed from March. No major issues encountered with construction on site.(no new update received this month)	Nicola Evans	▼	4	6
HS.<7BAR.3	Number of Backlog GSMR cut-offs not complete within the standard 12 months including no access to properties.	Increased performance area of focus for Area Engineering Managers. Trend improving with 998 outstanding in December reduced to 967 in January. No data for February at time this report was populated. (no new update received this month)	Andrew Hopkins	▲	6	6
HS.<7BAR.4	Number of Steady State GSMR cut-offs not complete within the standard 12 months including no access to properties.	This measure was removed from critical status in Summer 09 but has returned in December and January. Currently 1478 outstanding. No data for February at time this report was populated. Operations started the planning process to plan in the outstanding cut offs on 11.03.2010. (no new update received this month)	Andrew Hopkins	▼	2	2
HS.<7BAR.5	Number of IP works visited/ replied from Ops	Increase by 7% from last month, better measures in place	Chris Pugh	▼	2	2
HS.<7BAR.6	Number of MP packs returned	increase in the monthly stats by 10%, annual figures still need improvements	Chris Pugh	▼	2	2
HS.SAF.1	Number of hazard and near misses reports per month	468 hazards, up from 417 in February, more awareness being raised and new format discussed	Dave Tidball	▲	9	9
HS.SAF.6	Completion of Investigations against Number of No Lost time Injuries in a timely manner	1 Accident report without investigation in March, HSE team are chasing all outstanding investigations	Dave Tidball	▶	9	9

# Also use health trends – Pre-cursor events



- Performance Measurement – KPI's
  - Includes customer; quality and safety:
  - Active & reactive measures
- Management
  - Key issues identified
  - Reward for identifying non conformities in advance
  - Penalty for unplanned events/external audit N/C's
- Review
  - Alliance Board – WWU CEO; MUS & AMEC Directors; Asset Director
  - Proven behavioural change



Frequency	Key Performance Indicator (KPI)	Owner	Benchmark	Max Bonus & Penalty payments	2009/10 Improvement			Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	YTD Perform	Current Position		
					Penalty	Null	Bonus	Monthly Perform			Monthly Perform	Monthly Perform														
Quarterly	<b>Customer Satisfaction</b>	Julie Milford	8.0	Bonus £25k Penalty £25k	< 7.0	7.0 to 8.0	> 8.0																	£25k		
Quarterly	<b>Customer Satisfaction</b> <small>(Comparison with other GDN's following results from regulators SSCDR Customer Satisfaction Survey)</small>	Julie Milford	Upper Quartile	Bonus £25k Penalty £25k	7th or 8th	3rd - 6th	1st or 2nd																	£25k		
Monthly	<b>Supply Interruptions</b> <small>(Average supply interruptions in minutes)</small>	Dave Crittenden	300 minutes	Bonus £50k Penalty £50k	>350	250-300	<250																	£50k		
Monthly	<b>D+42 Compliance</b> <small>(For all 09/10 work, achieve an average of 42 days)</small>	Dave Crittenden	42 days	Bonus £75k Penalty £75k	> 42 days	42 days	< 42 days																	£75k		
Monthly	<b>D+42 Compliance</b> <small>(For all 09/10 work, percentage achieved under 42 days)</small>	Dave Crittenden	95%	Bonus £75k Penalty £75k	< 90%	90% to 95%	>95%																	£75k		
Monthly	<b>Complaints (GS14)</b> <small>(Substantive response to complaints completed in accordance with published timescales. No each failure = 5.5%)</small>	Julie Milford	Substantively completed within 10 days	Bonus £25k Penalty £25k	< 95%	95% to 97%	> 97%																	£25k		
Monthly	<b>Complaints (GS14)</b> <small>(TBD - comparison against period, with agreed reduction in numbers)</small>	Julie Milford	10% reduction on previous benchmark	Bonus £50k Penalty £50k	> 15 per month	15 per month	< 15 per month																	£50k		
Monthly	<b>Supply interruption (GS13)</b> <small>(Notification of supply interruptions within 5 working days)</small>	Dave Crittenden	97% at least 5 days	Bonus £50k Penalty £50k	< 94%	94% to 97%	> 97%																	£50k		
Monthly	<b>Private Reinstatement (GS2)</b> <small>(Reinstatement of works to customers premises within 5 days)</small>	Dave Crittenden	5 Days	Bonus £50k Penalty £50k	< 95%	95% to 97%	> 97%																	£50k		
Monthly	<b>Priority Customers (GS3)</b> <small>(Provision of alternative cooking and heating facilities within 4 hours of supply interruption)</small>	Dave Crittenden	Zero	NIL	> 6	6	< 6																	NULL		
Monthly	<b>Engineering Quality</b> <small>(Number of S1 QMS findings that have been closed out, or action plan in place by agreed deadline, must find 30 annually)</small>	Steve Oldrieve	Minimum 90%	Bonus £25k Penalty £25k	< 85%	85% - 90%	> 90%																	£50k		
Monthly	<b>S&amp;I Compliance</b> <small>(Number of significant non-compliances identified from external audits &amp; site visits (HSE) and unplanned events)</small>	Steve Oldrieve	15	Bonus £25k Penalty £25k	>10	10-15	<15																	NULL		
Monthly	<b>Deviations from Window of Opportunity</b> <small>(Number of networks out of range due to repx activity)</small>	Dave Trott	Zero	Bonus £40k Penalty £40k	TBC	TBC	TBC																	£40k		
Monthly	<b>Noticing Performance</b> <small>(Noticing compliance)</small>	Dave Crittenden	TBA	Bonus £75k Penalty £75k	< 94%	94% - 98%	> 98%																	£75k		
Monthly	<b>Materials</b> <small>(Target Cost vs Actual Cost on completed jobs)</small>	Dave Robinson	TBA	NIL	<80%	80 - 90%	>90%																	NULL		
Monthly	<b>Margin Improvement Plan</b> <small>(Adherence to the plan)</small>	Dave Robinson	Deliver plan to deadline	NIL	<70%	70% - 80%	>80%																	NULL		
Bi-annual	<b>PDR completion</b> <small>(Completion of objective setting/development planning process &amp; interim review process)</small>	Julie Milford	100%	Bonus £20k Penalty £20k	< 100%	< 100%	100%																	£20k		
Bi-annual	<b>Interim PDR completion</b> <small>(Interim review of performance &amp; development against set objectives)</small>	Julie Milford	100%	Bonus £20k Penalty £20k	< 100%	< 100%	100%																	£20k		
Monthly	<b>Communications</b> <small>(Percentage of industrial conferences/Meetings during 10/11)</small>	Julie Milford	24%	Bonus £25k Penalty £25k	< 24%	24%	> 24%																	£25k		
Quarterly	<b>Communications</b> <small>(Percentage of staff attending House/Team Meetings following Tier 2 days during 10/11)</small>	Julie Milford	75%	Bonus £25k Penalty £25k	< 75%	75%	> 75%																	£25k		

Working to keep our customers Safe

£655k

- Safety & Engineering Committee (Exec sub committee)
  - Chaired by CEO and attended by Exec members
  - Held monthly at depots
  - Preceded by round tables with supervisors and work force
  - Management presentations
  - Review performance
  - Includes 'safety & integrity tours'
- SHE Steering Groups - monthly
  - All operational managers hold them
  - All direct reports attend

- Build Human Factors into everything!
- Use technology
  - e.g. email alerts when notification criteria breached
  - Cross check data
- Use every possible source of feedback – consumer complaints; employee survey; random checks
- Investigate minor events – don't blame the individual!
- Checking and corrective action is vital for asset managers.
- Don't forget occupational safety!