UKOPA Presentation
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Environmental Aspects of Onshore Pipelines

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RSK Water Limited

UKOPA/08/0076

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Our company – key facts

- 920 people
- 40 offices
- £75 million revenue*
- ENDS list RSK as a ‘top 7’ service company
- An Investor in People




*Run rate

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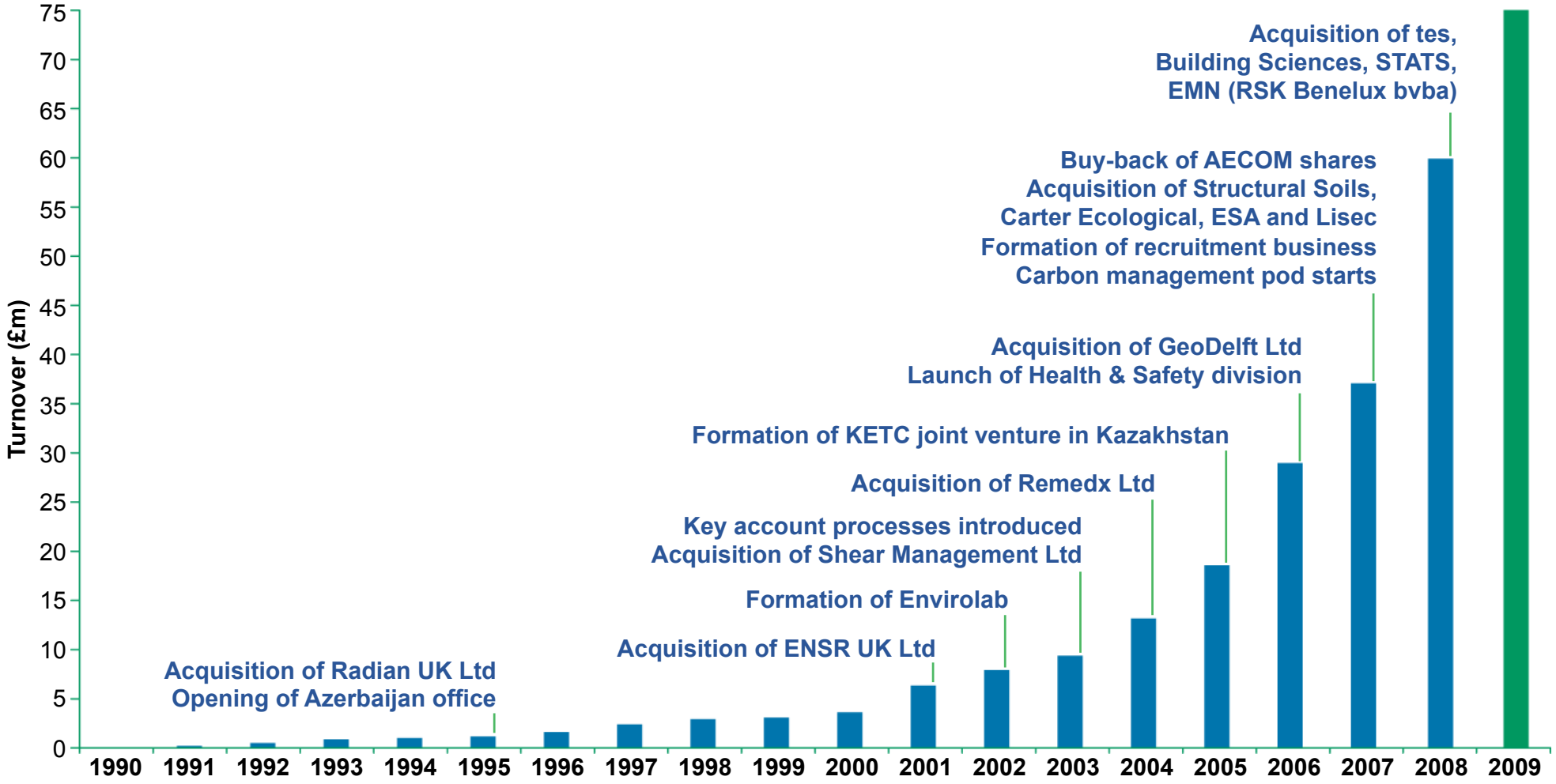
RSK Group history and growth



Recent organic growth rate > 40% per year

Presentation - contents

- Background
- Environmental issues during construction
- Environmental issues during operation
- Operator responses to environmental issues
- Conclusions

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What are the environmental issues

- There are three distinct phases in the life of an onshore pipeline
  - Construction
  - Operation
  - Decommissioning
- Most of the pipeline-specific environmental legislation and guidance relates to the construction phase
- EA do not regulate onshore pipeline operations
- Various existing environmental protection measures apply to pollution arising from a pipeline.
- Decommissioning not addressed but environmental impacts are minimal if pipeline is treated in-situ.

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Onshore pipelines in the EU

- The EU has an extensive network of onshore pipelines with a total length of nearly 40,000 km (2004)
- A network of ~10, 000 km pipelines convey more than 150 different hazardous materials such as: Ethylene, Propylene, Chlorine, Ammonia, Hydrogen, Oxygen, Butadiene and Styrene.
- EU safety record is good (EGIG and UKOPA databases).
- Third party interference is the largest single cause of failures.

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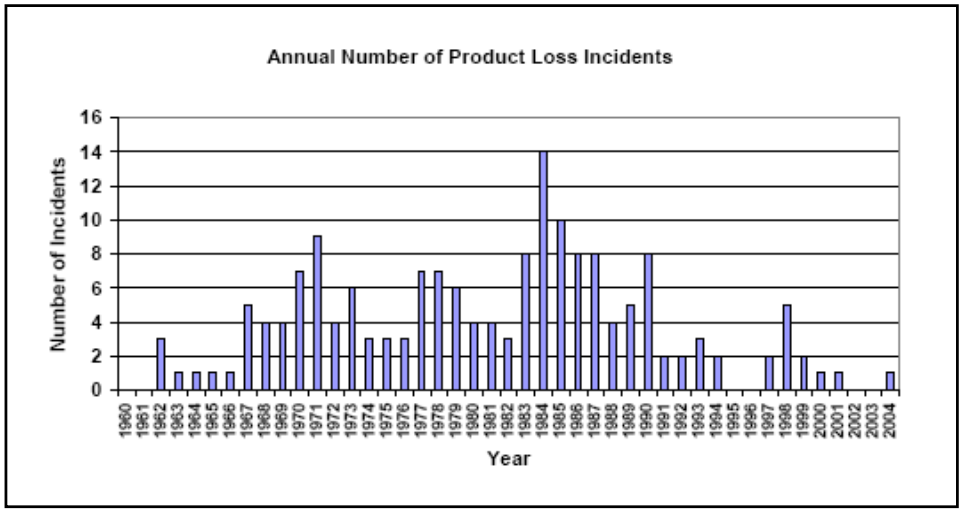
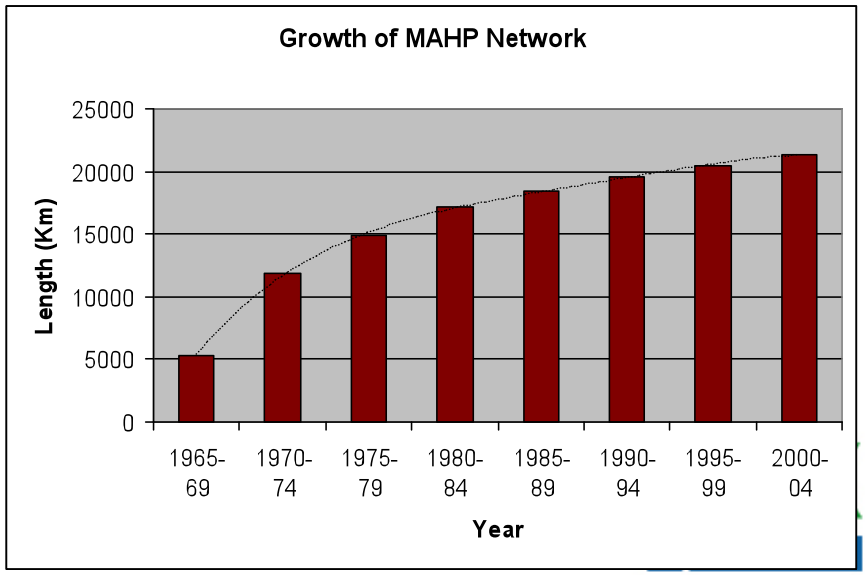
Onshore pipelines in the UK

- In the UK ~ 22,000 km of Major Accident Hazard Pipelines
- 20,000 km transport natural gas above 7 bar in pressure.
- Approximately 2,000 km transport ethylene and other dangerous fluids.
- Period of growth in 70's but recent growth is predominantly gas distribution.
- Average age ~ 30 years
- Safety record is extremely good



Period	Number of Incidents	Total Exposure [km.yr]	Frequency [Incidents per 1000 km.yr]
1965 - 1969	15	26.639	0.563
1970 - 1974	29	59.598	0.487
1975 - 1979	26	74.486	0.349
1980 - 1984	33	85.534	0.386
1985 - 1989	35	92.406	0.379
1990 - 1994	17	97.839	0.174
1995 - 1999	9	102.527	0.088
2000 - 2004	3	106.799	0.028



4th Report of the UKOPA **F**ault **D**atabase **M**anagement **G**roup

Review of regulation of pipelines

- The EU Joint Research Centre carried out a study of pipeline failures in 1996 (reviewed in 1999 and 2003)
- Reviewed accident records and legislative framework
- Key Conclusions

  failures are infrequent but can have high consequences

  environmental concerns relate primarily to oil and other fluids

  reporting requirements between countries are inconsistent

  key directive on accident prevention (Seveso II) excludes pipelines

  general operator obligations exist but there are many gaps

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Pipeline Construction – Environmental Issues

Key pieces of environmental legislation applicable to the pipeline construction are:

- The EU Directive 85/337 transposed into UK legislation in the form of the:
  - Town and County Planning (Assessment of Environmental Effects) (1988)
  - Public Gas Transporter Pipe-line Works (EIA) Regulations 1999 (National Grid Pipelines Laid under the Gas Act)
  - The Pipeline Works (Environmental Impact Assessment) Regulations 2000

- Wildlife and Countryside Act (1981)
- Conservation (Natural Habitats etc.) Regulations (1994)
- Hedgerow Regulations (1997)
- Countryside and Rights of Way (CRoW) Act (2000)
- Protection of Badgers Act (1992)
- The Ancient Monuments and Archaeological Areas Act (1979)
- National Heritage Act (1983)
- Planning Policy Statements

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Pipeline Construction – Environmental Issues

The Pipeline Works (Environmental Impact Assessment) Regulations 2000

- Proposed onshore pipelines more than 16 km long require a Pipeline Construction Authorisation (PCA)
- Such applications may be subject to EIA by virtue of the Pipeline Works (Environmental Impact Assessment) Regulations 2000.
- Environmental Statement should include
  - Description of operation and
  - Estimate of any pollution to water, air or land, from pipeline in operation

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Pipeline Operation – Environmental Issues

- Onshore pipelines are generally environmentally positive because they represent an efficient means of transporting products.
- MAHP carrying gas represent a safety threat but limited environmental concerns
- Main environmental risks arise from escape of petrochemical liquids and the pollution of land and water.
- In the event of such pollution arising the polluter may be liable under existing environmental protection legislation for clean up and remediation
- Relevant acts are
  - Water Resources Act 1991
  - Environmental Protection Act 1990
  - Wildlife and Countryside Act 1981

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Pipeline Operation – Current Environmental Liabilities

Receptor	Legislation	Scope of Damage Recovered	Liability Regime	Restoration Standards
Water	Water Resources Act 1991as amended by Environment Act 1995. Protection of water environment.	Damage in the form of "pollution of controlled waters", e.g. rivers, canals, lakes, ground waters	Strict. Anyone who "causes or knowingly permits" pollution of controlled waters" Applies regardless of who causes damage. No conviction required.	Restoration of waters to previous condition if "reasonably practicable to do so". Includes ecological restoration and restocking of rivers.
Land	EPA 1990 Part IIA (inserted by Environment Act 1995)	Damage (including historic) in the form of substances in, on or under land creating unacceptable risk to human health or the environment	Strict. Anyone who "causes or knowingly permits" presence of substances giving rise to the (contaminated) condition of land. Also owners/occupiers in some situations. No offence or conviction required. Applies regardless of "state of the art" or legality of the original contaminating activity.	Remediation to "suitable for use" standard, i.e. reduce risk to acceptable level and remedy effects of any significant harm or water pollution. Subject to reasonableness and other detailed rules.
Habitats and Species	Wildlife and Countryside Act 1981, as amended by CROW Act 2000,	Damage to special interest for which the site has been identified	Fault based. Owners/occupiers of SSSIs convicted of damaging sites via specified operations, and third parties convicted of reckless or intentional damage, can be ordered by Court to restore. Convictions required	Restoration of protected site to former condition where this is possible.

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Environment Agency – Pollution Prevention Guidelines

- The EA, SEPA and EHS NI have produced of a range of Pollution Prevention Guidance Notes (PPGs).
- PPG gives advice on the law and good environmental practice.
- No specific PPG for pipeline operations but webpage lists “other useful guidance” which includes “Preventing of pollution from major pipelines”
- Minimal reference to pipeline operations but emphasises need for automatic shutdown facilities - inspected, maintained and tested.
- Also states -

“Emergency plans should be prepared in consultation with the Agency and where appropriate joint emergency exercises should be held at regular intervals.”

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Environmental Liabilities Directive – will this change things

- Due to be transposed into UK Law December 2008.
- Environmental Damage will be defined in regulations
- Intended to reinforce polluter pays principal
- With respect to Land and Water
  - applies only to specified activities which may be deemed to include pipeline operations.
- With respect to species and habitats
  - ELD applies to all activities
  - Strict liability with respect to specified activities fault based for others.
- Extends the responsibilities of operators and regulators and increases the potential remediation costs.

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ELD - Does it apply to pipelines? – the small print

The Environmental Damage (Prevention and Remediation) Regulations 2008

Manufacture, use, storage, processing, filling, release into the environment and onsite transport of ……

dangerous preparations as defined in **Article 2(2) of Directive 1999/45/EC**

Directive 1999/45/EC

Article 1 (6). This Directive shall not apply to:

Article 1 (6). This Directive shall not apply to:

- the carriage of dangerous preparations by rail, road, inland waterway, sea or air,

Article 2(2) of Directive 1999/45/EC

(o) substances and preparations which are dangerous for the environment: substances and preparations which, were they to enter the environment, would or could present an immediate or delayed danger for one or more components of the environment.

Environmental Liabilities Directive – will this change things

- Water

Receptor	Legislation	Scope of Damage Recovered	Liability Regime	Restoration Standards	Duties on Operators	Duty / power of regulator
Water	Water Resources Act 1991as amended by Environment Act 1995. Protection of water environment.	Damage in the form of "pollution of controlled waters", e.g. rivers, canals, lakes, ground waters	Strict. Anyone who "causes or knowingly permits" pollution of controlled waters" Applies regardless of who causes damage. No conviction required.	Restoration of waters to previous condition if "reasonably practicable to do so". Includes ecological restoration and restocking of rivers.	None except where covered by regulatory regimes such as PPC	Duty to maintain ecological status of rivers etc. Powers to require restoration.
Water	**Draft Environmental Damage Regulations (2008)**	Regs apply to significant impact on the status of a water body **Less stringent**	Strict liability remains under new regulations **Equivalent**	Regs require return to baseline standard and interim compensation for damage **More Stringent**	Regs introduce duty to notify authority of damage or imminent threat of damage and take immediate action **More Stringent**	Duty rather than a power to require preventative and remedial measures **More Stringent**

Environmental Liabilities Directive – will this change things

- Land

Receptor	Legislation	Scope of Damage Recovered	Liability Regime	Restoration Standards	Duties on Operators	Duty / power of regulator
Land	EPA 1990 Part IIA (inserted by Environment Act 1995)	Damage (including historic) in the form of substances in, on or under land creating unacceptable risk to human health or the environment	Strict. Anyone who "causes or knowingly permits" presence of substances giving rise to the (contaminated) condition of land. Also owners/occupiers in some situations. No offence or conviction required. Applies regardless of "state of the art" or legality of the original contaminating activity.	Remediation to "suitable for use" standard, i.e. reduce risk to acceptable level and remedy effects of any significant harm or water pollution. Subject to reasonableness and other detailed rules.	None except where covered by regulatory regimes such as PPC	Duty to identify contaminated land. Duty to serve remediation notice (subject to certain limitations). Powers to carry out remediation and to recover costs from liable parties.
Land	**Draft Environmental Damage Regulations (2008)**	Regs apply to significant risk to human health **Equivalent**	Strict liability remains under new regulations **Equivalent**	Regs require that significant risks to human health be removed **Less Stringent**	Regs introduce duty to notify authority of damage or imminent threat of damage and take immediate action **More Stringent**	Duty rather than a power to require preventative and remedial measures **More Stringent**

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Environmental Liabilities Directive – will this change things

- Habitats and Species

Receptor	Legislation	Scope of Damage Recovered	Liability Regime	Restoration Standards	Duties on Operators	Duty / power of regulator
Habitats and Species	Wildlife and Countryside Act 1981, as amended by CROW Act 2000,	Damage to special interest for which the site has been identified	Fault based. Owners/occupiers of SSSIs convicted of damaging sites via specified operations, and third parties convicted of reckless or intentional damage, can be ordered	Restoration of protected site to former condition where this is possible. Convictions required	None except where covered by regulatory regimes such as PPC	Duty to maintain status of EC protected habitats and species. Powers to order restoration
Habitats and Species	**Draft Environmental Damage Regulations (2008)**	Regs apply to damage to integrity of SSSIs **Less stringent** ↓ scope extends to significant effects on protected habitats and species wherever found **More Stringent** ↑	Regs introduce strict liability for scheduled activities **More Stringent** ↑	Regs require return to baseline standard and interim compensation for damage. No need for conviction **More Stringent** ↑	Regs introduce duty to notify authority of damage or imminent threat of damage and take immediate action **More Stringent** ↑	Duty rather than a power to require preventative and remedial measures **More Stringent** ↑

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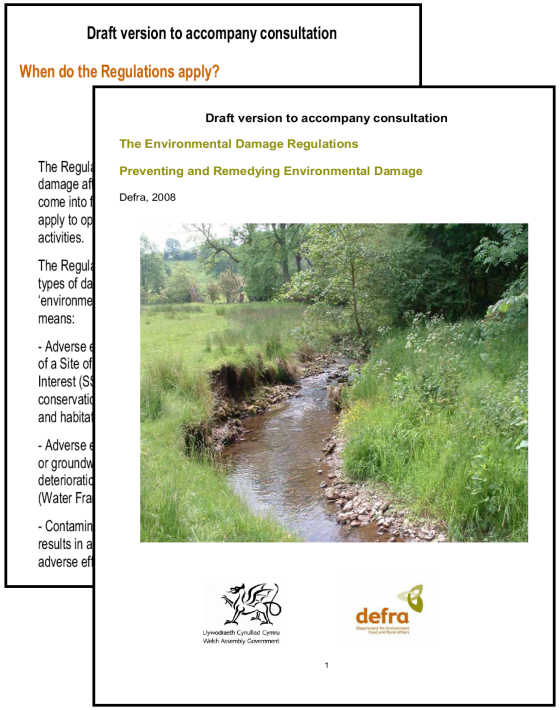
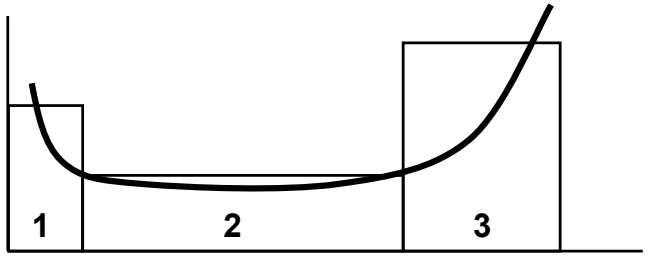
Environmental Liabilities Directive – Overview

- Increases in liabilities with respect to habitats and species due to ELD.
- Liabilities with respect to water and land exist and remain largely unchanged.
- Increased scope of remediation
- Operator duty to inform (risk or actual damage)
- Regulator duty to require preventative / remedial action
- Consequences of pollution event includes damage to brand image.
- Average probability of a failure (pollution incident) remains low but pipelines are ageing.
- What should a prudent pipeline operator do?

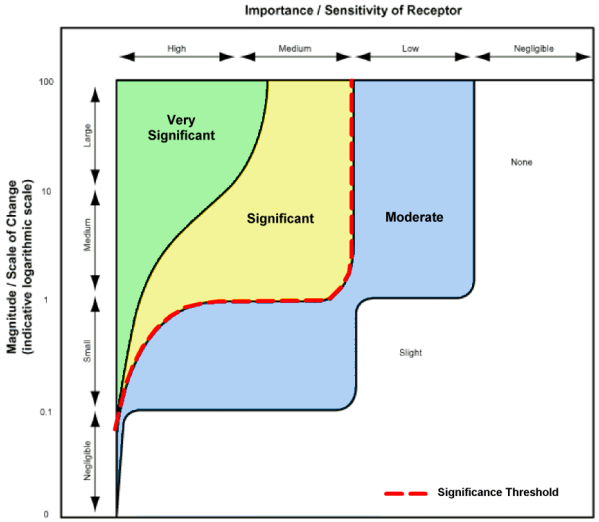


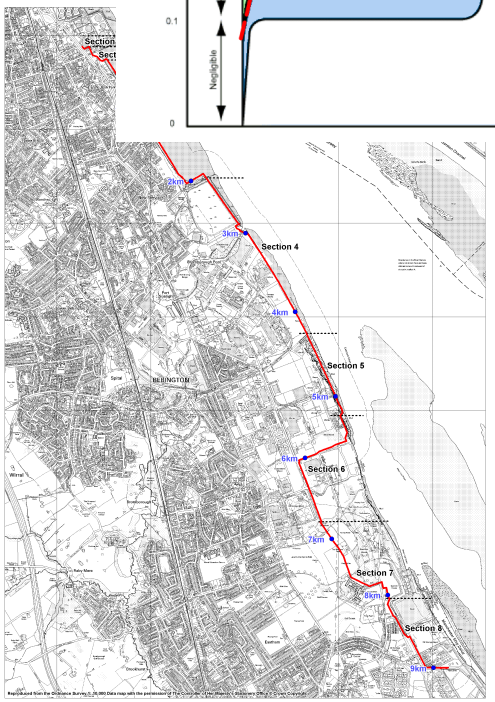
Bath-tub deterioration curve for pipelines



Pipeline Operation – Managing Environmental Risks

- What should operators due to reduce liabilities?
  - Proactively manage environmental risks or
  - Accept reactive costs of clean up and compensation
- Risk often described in terms of probability of failure x consequence of failure but …
  - Probability is low and difficult to ascertain at discrete location
  - Consequence is very site specific and dependent on scale of impact
  - Scale of impact depends on size of break, duration of spill, speed and effectiveness of containment and clean up.
- Prioritised approach which balances cost of implementation against risk.





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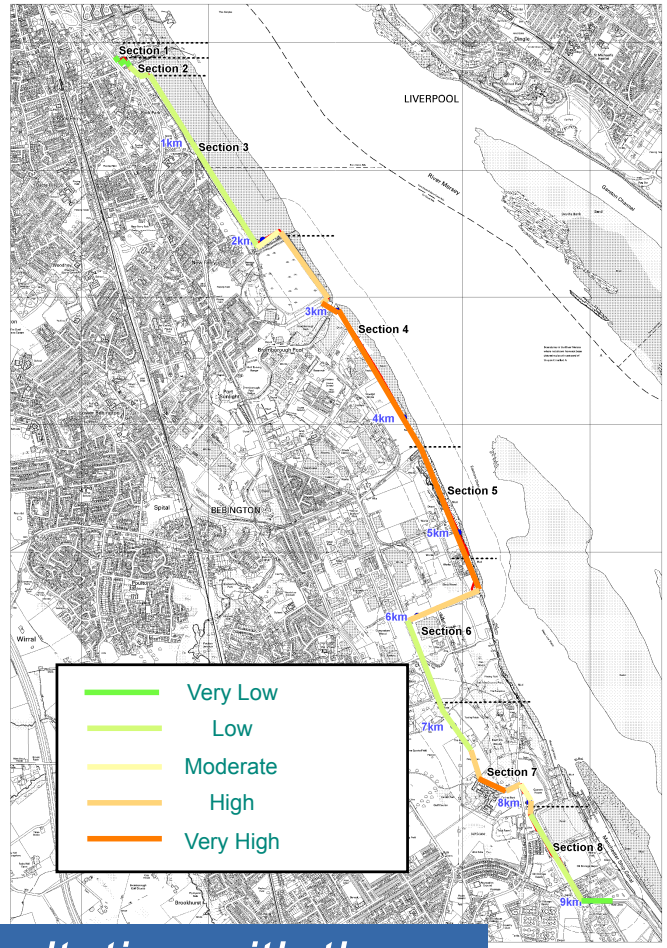
Pipeline Operation – Managing Environmental Risks

- Insufficient knowledge to differentiate in terms of probability
- Focus on change of consequence
  - Select appropriate analysis corridor
  - Consult stakeholders and review publicly available information
  - Identify receptors and their sensitivities
  - Assess scale of consequences
  - Sub-divide pipeline into sections of similar consequence
  - Develop contingency plans appropriate to each section.



"Emergency plans should be prepared in consultation with the Agency and where appropriate joint emergency exercises should be held at regular intervals."

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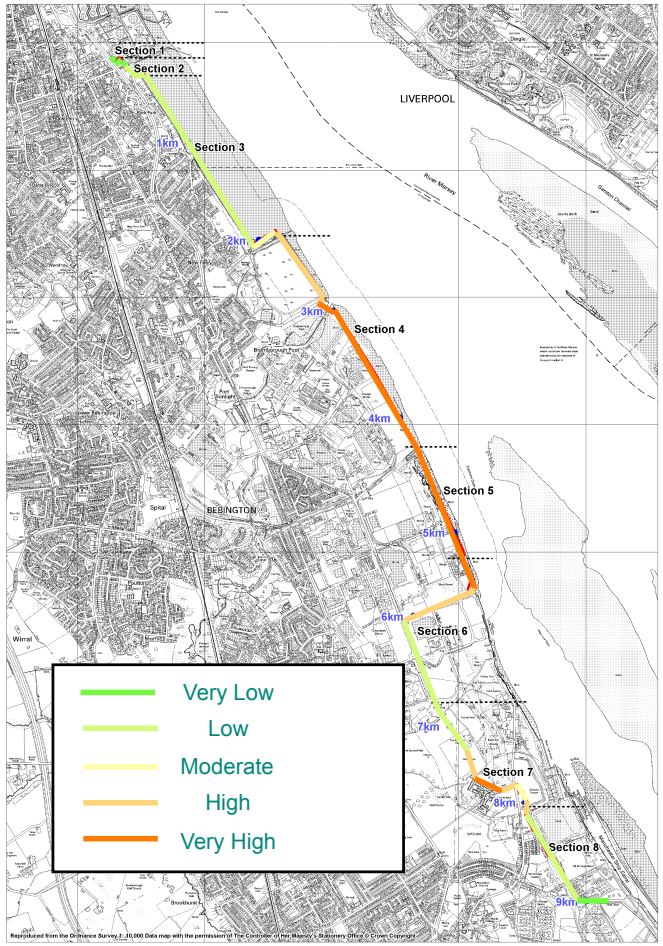
Pipeline Operation – Managing Environmental Risks

- Are contingency plans enough?
  - Some consequences may be unacceptably high
- Targeted investment may reduce probability of failure to as low as reasonably possible
  - Leak detection system reduce awareness time
  - Ground water monitoring to detect small leaks
  - Pipeline inspection (intelligent pigging)
  - Surveys to ensure CP is effective
  - Testing / inspection of above ground systems including automatic shut down systems
- Such actions reduce risk of damage to land / water habitats and species
- Reduce the likely scope of any remediation required.



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Environmental Aspects of Pipelines - Conclusions

- Pipelines are a safe environmentally friendly means of transport.
- EIA legislation focussed construction phase.
- Strict liability already exists for pollution to land or controlled water.
- Environmental liabilities directive may increase liability re habitats and species.
- Regulator has duty to require preventative or remedial action
- Operator has duty to notify regulator of damage or imminent threat
- Operators should ensure they are aware of scale of consequences
- Contingency plans should be developed (and tested) in conjunction with key stakeholders
- Consider greater levels of integrity management - monitoring / testing and inspection where consequences are particularly high.
- Important to consider systems as a whole not just pipeline in isolation

Deciding on the right approach requires a balanced judgement – informed by a clear understanding of the consequences of a pipeline failure.

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Any Questions?

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