

National Energy
Board



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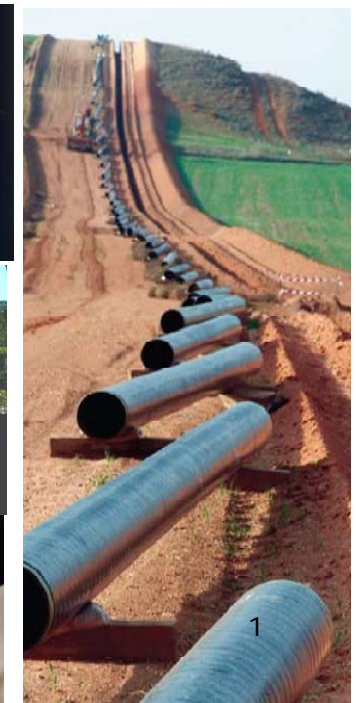
The NEB's Perspective on Risk Assessments

Risk assessment in pipeline integrity management

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National Energy Board

Canada



Today's Discussion

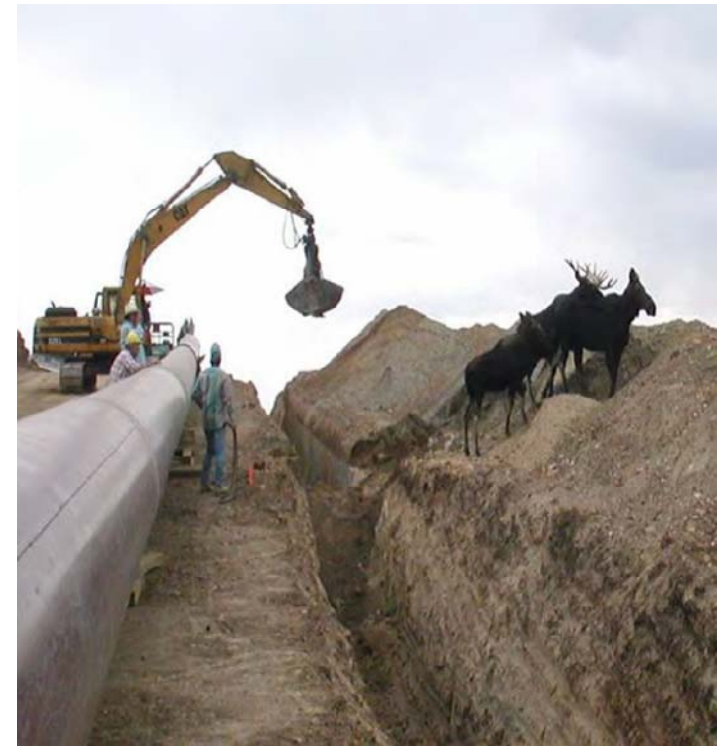
- Brief introduction to the NEB
- Prioritizing audits and inspections
- Prioritizing integrity management tasks & assessments
- Risk-based design and assessment (RBDA)
- Evaluation of class location changes
- How to deal with concentrations of people
- Frequency-Number impacted criteria (F-N curves)

The views, judgments, opinions and recommendations expressed in this panel do not necessarily reflect those of the National Energy Board, its Chairman or members, nor is the Board obligated to adopt any of them



NEB Mandate

- The NEB Regulates:
 - The construction and operation of:
 - Inter-provincial and international pipelines
 - International and designated inter-provincial power lines
 - Oil and gas exploration and production in Canada's North and most offshore areas
 - The export and import of oil, gas, natural gas liquids, and electricity
 - Pipeline traffic, tolls and tariffs



NEB Regulated Oil & Gas Pipelines

- Oil Pipelines (22%)



- Gas Pipelines (78%)



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April 20, 2010. Another date that
will live in infamy



Prioritizing audits and inspections

- Companies are responsible for their own performance
- The NEB manages its resources to ensure that regulatory oversight is prioritized according to risk
- The NEB regulates according to risk throughout the life cycle of facilities within its jurisdiction
- The level of regulatory oversight is directly linked to company performance
- Risk is considered from the perspective of risk to the NEB's mandate.

P = P(adequacy, implementation, effectiveness)

Q = Q(safety, environment, security of service)



Prioritizing IM tasks & assessments

- Concept formalized by US DOT c. 2001 (resulting in API 1160 and ASME B31.8S)
- Does not aim at an “acceptable risk level”
- Integrity management relies on physical integrity assessments
- Avoids concentrating on high likelihood-low impact or high impact-low likelihood events
- Enables a rapid evaluation of pipeline systems



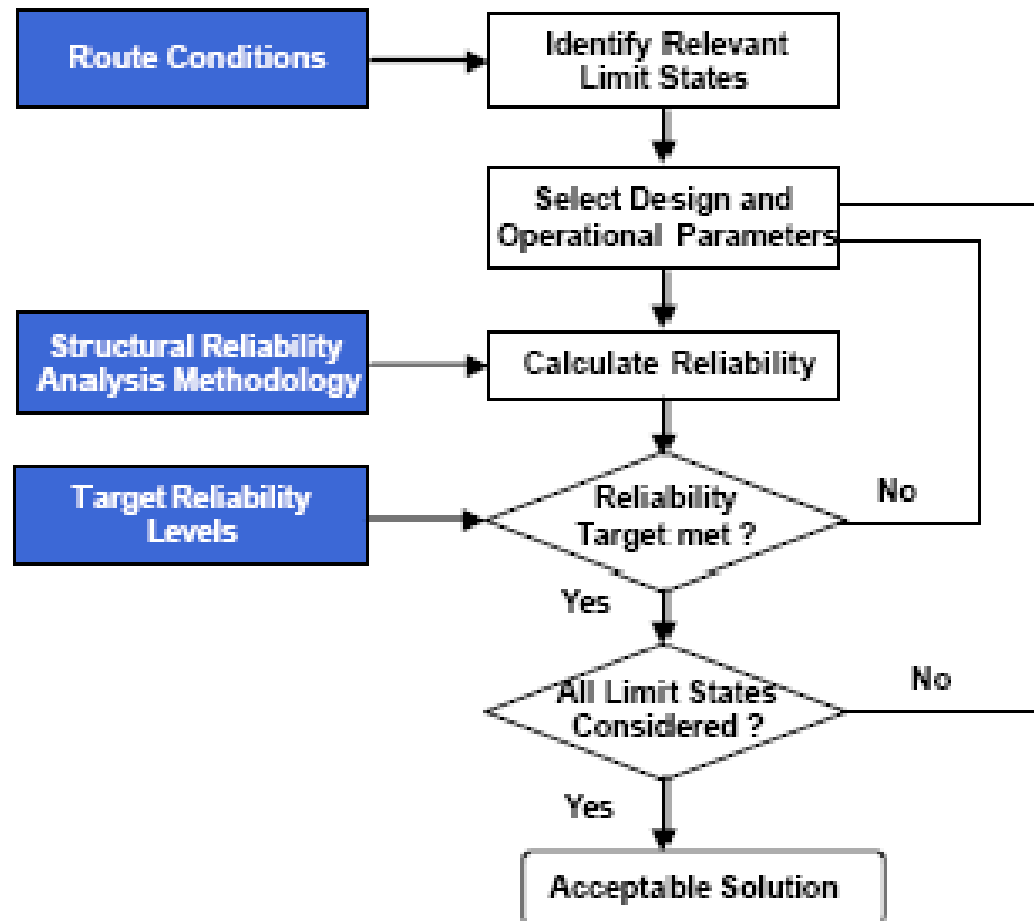
Risk-based design and assessment

- The Canadian code CSA Z66 has implicitly sanctioned risk assessment as part of integrity management for over a decade:
 - Annex B (informative) of the present code sets out general guidelines
 - Annex C (informative) gives guidance on the use of limit-states design
- Annex O (informative) provides for reliability-based design and assessment of onshore non-sour natural gas transmission pipelines (2007)
 - RBDA can be applied to the design and operation of pipelines to meet specified reliability targets throughout their design lives for all relevant limit states

Data. Data. Data. Risk assessments are only as good as the data they're fed.



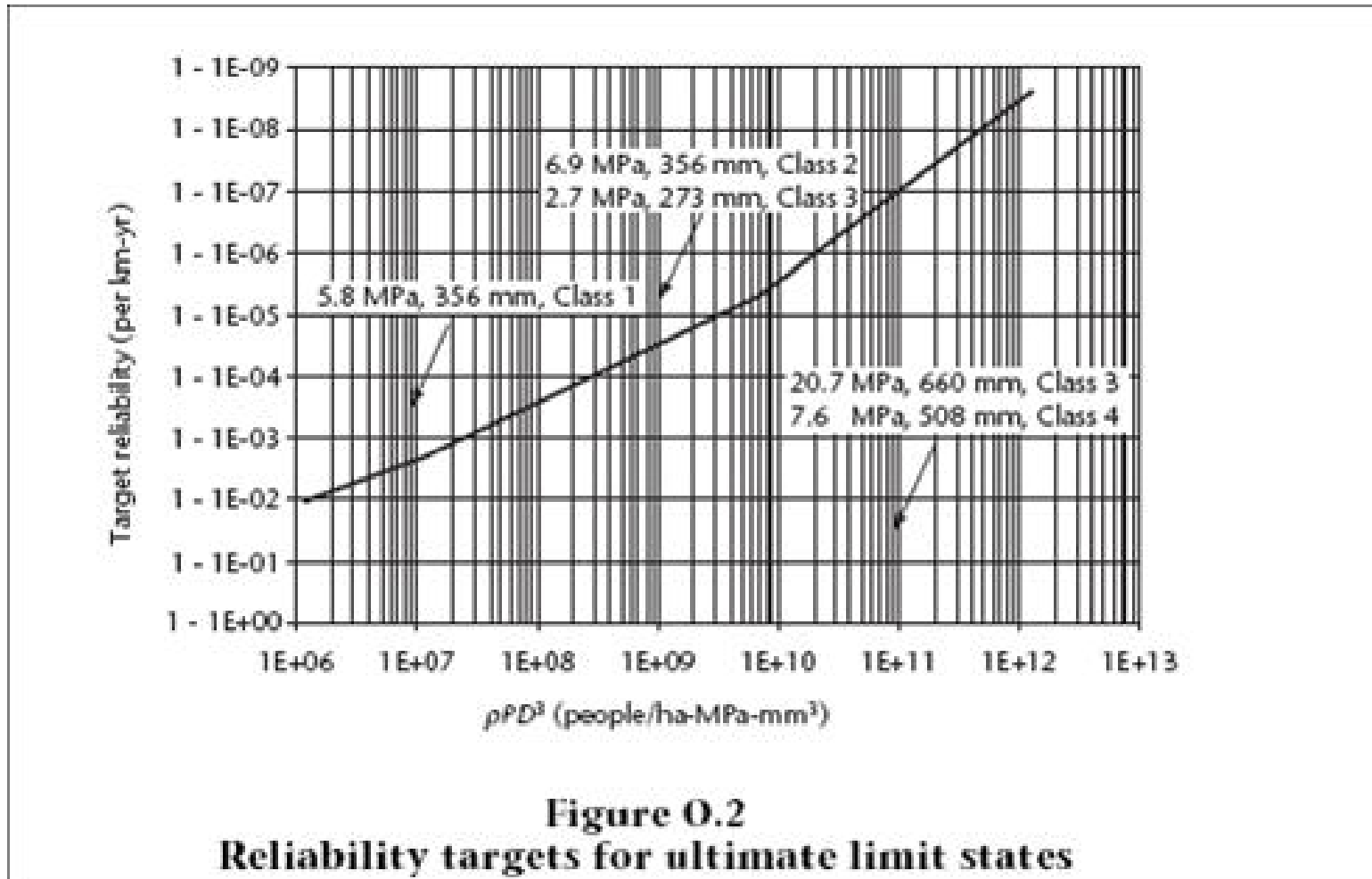
RBDA outline



Courtesy of C-FER Technologies



RBDA reliability targets



Evaluation of class location changes

- Pipeline encroachment due to residential and commercial development has become a global problem
- We know of specific concerns for example in South Korea and Thailand
- There are several applications currently before the NEB
- CSA Z662 and B31.8 give general guidance on engineering assessments to support changes in class without changes in pipe or operating pressure
- Z662 cites Annex O as a source of guidance, but the NEB has not accepted applications of this kind based on RBDA due to concerns with targets and applicability to fluids transported
- A possible approach could be to compare the subject pipeline segment with one that meets the changed class requirements.



Concentrations of people

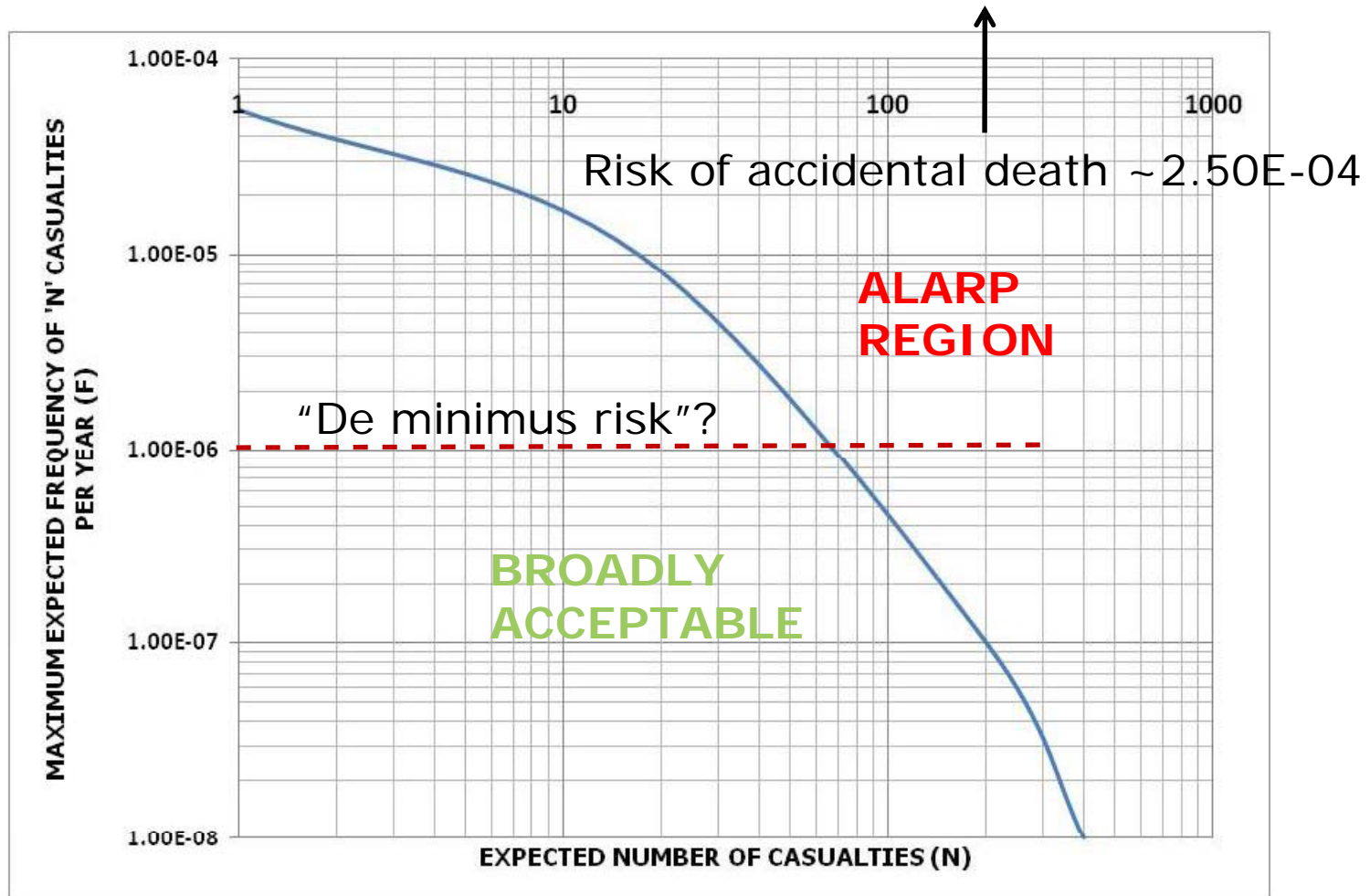
- Class location designations and current RBDA methods deal with distributed populations. For example, Z662 Annex O:

Location Class	Average population density (people per hectare)
1	0.04
2	3.3
3	18
4	100

- However, if people are located in a recreational facility or shopping mall or the likes, the number of people at risk could be considerably underestimated by using a distributed density
- Both Z662 and B31.8 give general guidance. However, both rely heavily on interpretations of the code provisions



Frequency-people impacted criteria



Risk communication

Trust and credibility are central to effective communication about topics of high concern. Key elements in trust and credibility are:



Source: Center for Risk Communication

Public perceptions and opinions have a profound impact on an organization's success.



Path forward?

- ❑ Continue reinforcing the need for risk assessment in integrity management programs
- ❑ Insist on a comprehensive risk assessment report on applications – including completeness of data and effects of uncertainty
- ❑ Apply appropriate levels of prescriptive regulatory components
- ❑ Incorporate risk assessment in Safety and Loss Management Systems



Thank you, merci, muchas gracias

