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**RPIC FEDERAL CONTAMINATED SITES NATIONAL WORKSHOP
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IMPLICATIONS OF RISK ASSESSMENT METHODOLOGY CHANGES ON CONTAMINATED SITE REMEDIATION MANAGEMENT STRATEGY

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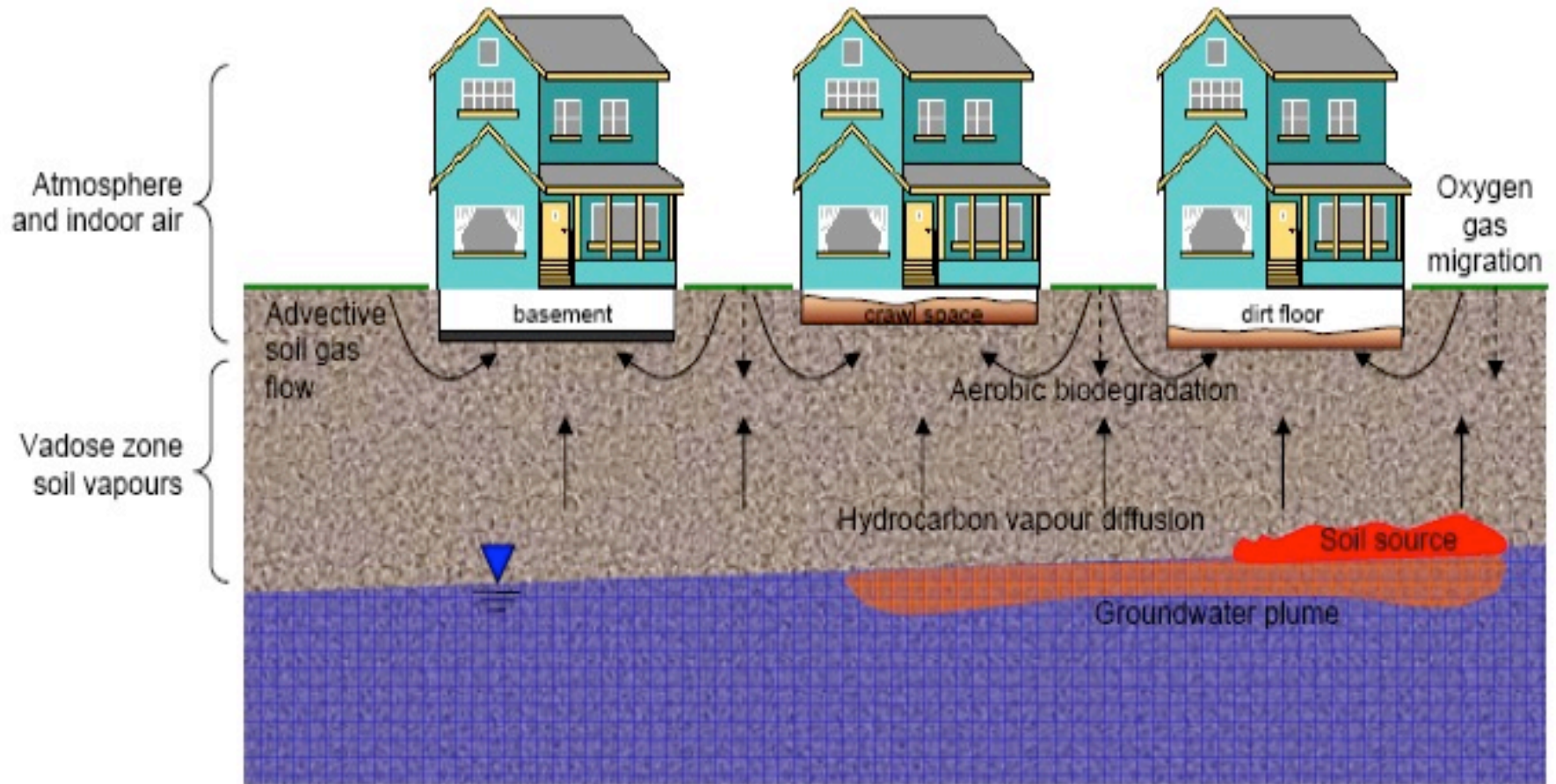
Outline

- Background history and perspective
- Risk Assessment as a management strategy
- Case study - Alberta
- Results
- Summary and implications
- Questions

Background

- Many stakeholders are managing numerous contaminated sites in regions of Canada across provincial boundaries
- Shell in Western Canada manages over 750 active sites
 - Retail and distribution – 447
 - Commercial (including airports) – 314
- Many urban facilities undergo risk assessment approaches to manage residual risks subsequent to source removal and delineation

Soil Vapour Transport Pathway (Atlantic PIRI, v.2)



Average Outdoor VOC Data (from Environment Canada, 2007) - presented by Maxxam Analytics

Compound	Schedule 11 (mg/m ³)	Kitchener n=48	Hamilton n=47	Maximum (mg/m ³)
Benzene	1.5	0.61	1.2	3.6
Carbon Tetrachloride	0.65	0.58	0.57	0.74
1,2-Dichloroethane	0.4	0.05	0.05	0.16
Trichloroethylene	0.5	0.07	0.08	0.32

Comparison of Regulator and Industry Implications

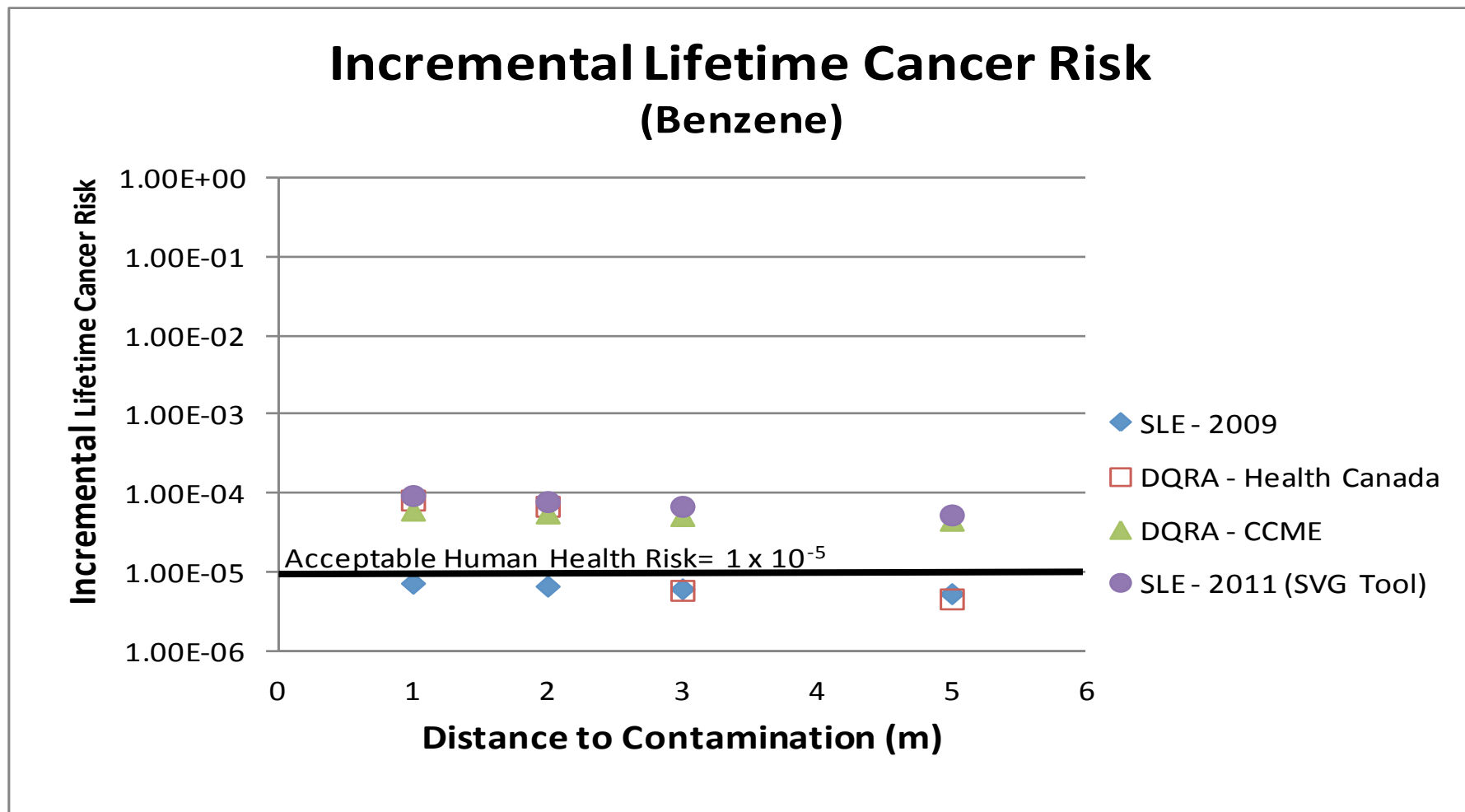
Regulator

- Precautionary approach to vapour transport assumptions
- Implications of policy for significant contaminant sources may differ for minor contaminant sources where risk assessment is more likely to be implemented
- Effects on management timelines
- Guideline redevelopment
- Implementation across management regions
- Understanding of details of exposure assessment at the regulator level

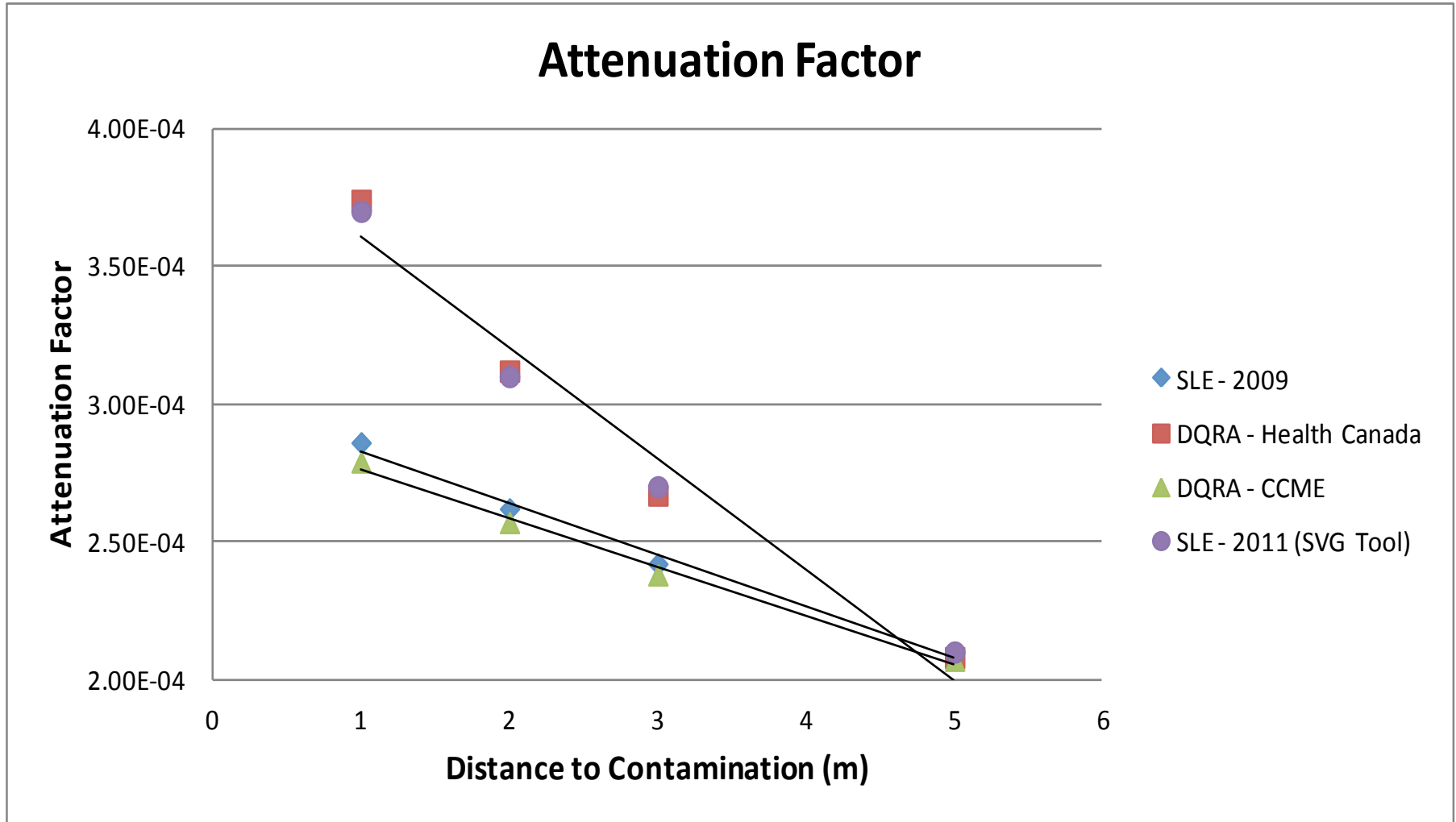
Industry

- Precautionary approach may expend resources and result in misaligned resource allocation
- Implications of policy transferred to multiple sites has significant resource impacts
- Affects management strategies and remediation options
- Significant time and resource commitments when applied to numerous sites

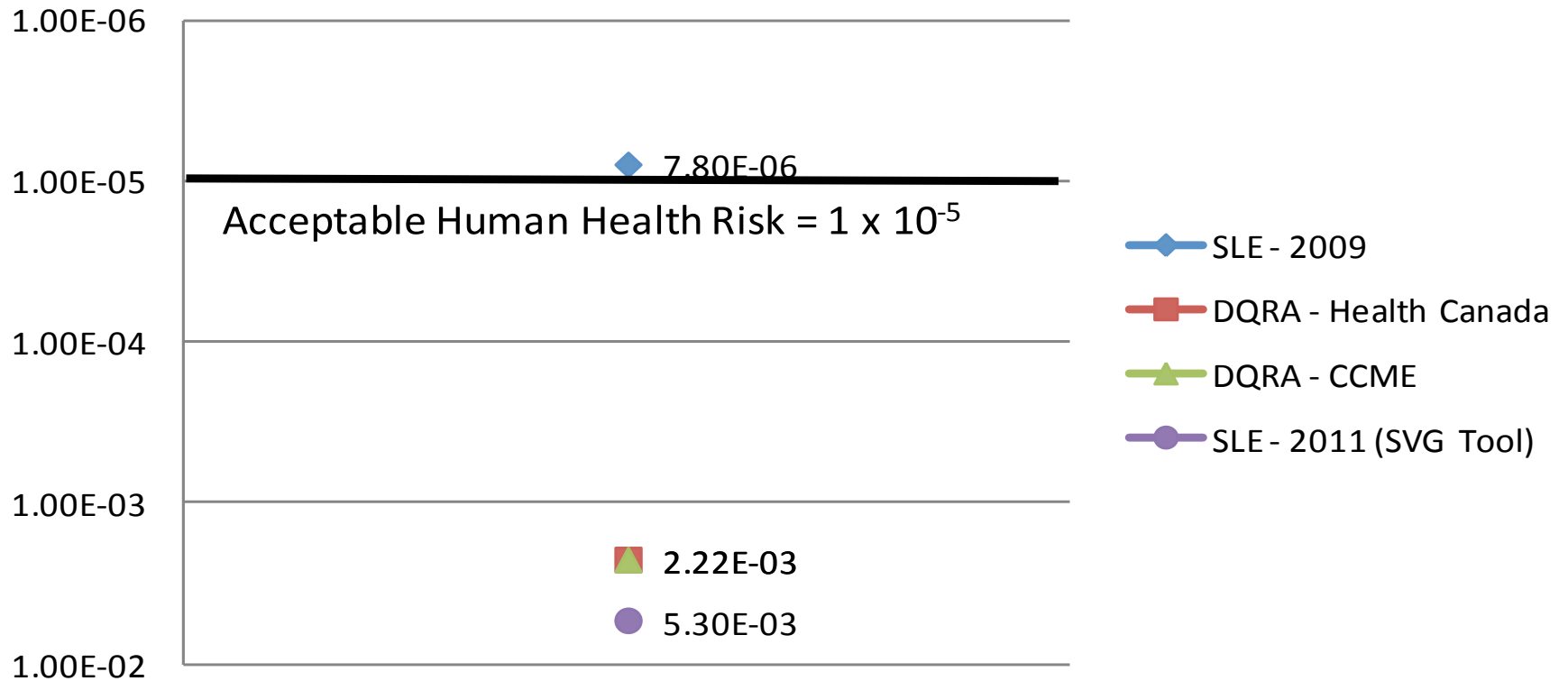
Site Example – Shell Commercial Distribution Facility



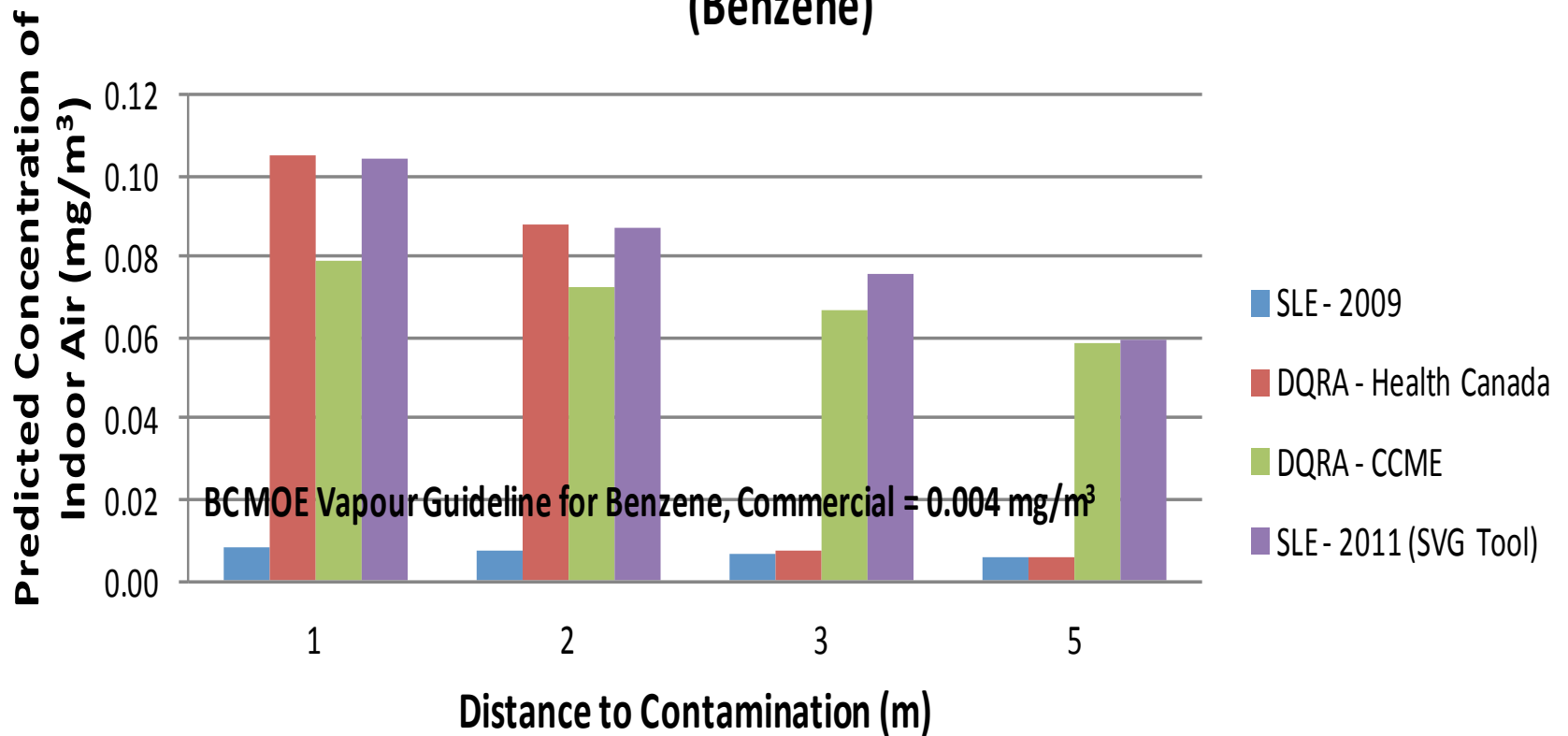
Various Application of Attenuations Factors



ILCR for subsoil (shallow) vapours using preferential flow (0.3 m) (Benzene)



Predicted Indoor Air Concentration (Benzene)



Implications

- **Implications of biodegradation guidance will significantly impact remediation and management requirements**
- **Regional changes to risk based approaches may result in significant financial changes and time allocations for the management of multiple sites**
- **Stakeholders may be impacted differently across jurisdictional boundaries**
- **Resultant risk management alternatives may vary between provinces**
- **Future changes need to be implemented consistently, resulting in resource planning**

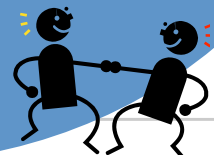
Summary of Issues

- consistent attenuation guidance
- biodegradation requires guidance for quantitative application
- accuracy of representative vapour data to mitigate against unnecessary site specific investigation
- receptor focus - limited value



R&D

- rational risk based direction to multiple contaminated site management
- consistent risk-based decision making
- cost-effective timely means of source relationship identification
- sustainable risk management solutions



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QUESTIONS





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WE CARE about the health and safety of our employees, of those who work under our care, and of the people our projects serve.



WE CARE about our employees, their personal growth, career development and general well-being.



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WE CARE about the environment and about conducting our business in an environmentally responsible manner.



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