



## Challenges in Development and Application of Remedial Guidelines

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Environmental regulators in jurisdictions across Canada set out generic remedial guidelines (in Alberta referred to as Tier 1) for soil and groundwater remediation at contaminated sites. Adjustment of these guidelines based on site-specific conditions is also allowed (in Alberta referred to as Tier 2). Compliance to either Tier 1 or Tier 2 guidelines is the prime objective at many sites, and guides site investigation, remediation, risk management and long-term monitoring.

There are a number of challenges in the development and application of these remedial guidelines. Environmental fate and transport models currently used to develop these guidelines do not explicitly take uncertainty into account and as a result they may produce overly conservative guidelines by combining, through multiplication, several conservatively biased parameters. These guidelines also are typically applied using a deterministic approach which compares a single-value measurement of contaminant concentration in individual samples to a single-valued regulatory guideline. This deterministic application ignores important information in the determination of overall environmental risk, such as the overall size, magnitude, and distribution of the contaminant. This can result in isolated pockets of contamination driving a remediation, and overly conservative site remediation.

This presentation provides a review of guideline development and application in Alberta and focuses on the challenges in development and application of the guidelines. Case studies will be presented to examine the problems as well as potential solutions. The presentation will also propose further studies that may be required to address these challenges.

### Yong Li

Mr. Yong Li has more than 30 years of experience in hydrogeology and contaminant hydrogeology. He is currently a project hydrogeologist at Parsons. His environmental consulting experience includes contaminated site investigations at numerous sites throughout Canada. Mr. Li specializes in site characterization, site-specific risk assessment, guideline determination and modification, environmental modeling, environmental statistics, remediation option evaluations, and application of geographic information system in environmental projects. Mr. Li holds a Bachelor of Science in hydrogeology, a Master of Science in hydrogeology, and a Master of Science in Geographic Information System.

### Anne Way

Ms. Anne Way is a senior environmental scientist at Parsons with over 18 years of experience. She works on projects across Canada specializing in contaminated site risk assessment, environmental data management solutions, sampling designs, statistical analyses, and contaminant transport modeling. Ms. Way holds a Bachelor of Science degree in Chemistry from the University of Calgary and is a registered Professional Chemist with the Association of the Chemical Profession of Alberta.