It is an important task to determine the soil background values for a contaminated site, particularly for chemical parameters that can be elevated in background and exceed the risk-based guidelines. In Alberta, for salt-contaminated sites, the background values of electrical conductivity (EC) and sodium adsorption ratio (SAR) are used directly to determine the remedial objectives.

A common method to determine the background values is to select a value, such as the 95th percentile value, representing the background. Challenges can be encountered in practice in order to determine proper background locations, collect a sufficient number of background samples, and decide whether and how to remove the outliers. There are alternative methods to calculate the background value, such as the 95th upper confidence level (UCL), which has certain theoretical advantages over the percentile method. However, it may not work if probability distribution of the background values cannot be determined or is too complex.

Fundamentally, the background values are not constant. The background values vary spatially and changes of the parameter of concern can be associated with other parameters that may be better to represent the background variations. Examination of these associations may allow us to use patterns rather a single value to represent the background. For salt-contaminated sites in Alberta, the correlations between EC/SAR and the naturally occurring sulphate may provide a practical alternative to describe the background variations. However, there is also a need to examine the correlations between the other parameters.

Based on a number of case studies, this presentation will discuss the challenges in characterization of background for contaminated sites in Alberta and explore the alternative methods to determine the background values. The presentation will focus on how to utilize the correlations between different chemical parameters to describe the background and determine the remedial objectives for a contaminated site.

Yong Li, BSc, MSc

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.

Sherri Dixon, PEng

Ms. Dixon is an engineer with 14 years of experience as a contaminated sites specialist, providing technical guidance for site characterization, assessment, risk management and remediation on projects throughout Alberta and prairie provinces. She is currently a project manager at Parsons.