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## Development of an Environmental Risk Management and Sustainability Model Using Chemistry, Geology, Human Activity, and Response Inputs

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In most urban areas of the world, a basic understanding of the near-surface geologic environment and contaminant behavior for environmental purposes lacks sufficient data to evaluate risks posed by human activity. This is source of poor performance in evaluating environmental risk and ultimately contributes to environmental degradation and negatively impacts human sustainability. To address this deficiency, we propose a model that evaluates two concepts. The first on environmental risk and the second on human response to the risk.

The first concept evaluates and quantifies environmental risk by in three steps that include evaluation of (1) chemicals stored, used, and generated, (2) geological and hydrogeological vulnerability, and (3) applicable environmental regulations that a specific facility is subjected to. The evaluation of chemicals present at each facility for toxicity, persistence, and mobility is a fundamental step in assessing environmental risk; if there are no hazardous chemicals or substances at a given location the associated environmental risks are very low or do not exist. The geological and hydrogeological environment is important because every chemical behaves differently in different physical environments. Environmental regulations applicable to a specific facility provide vital and necessary policy framework on the chemicals emitted into the environment, the media used (air, water, the ground), and the types and volumes of chemicals stored, wastes generated, and handling and disposal practices.

The second concept examines the facility response to the identified environmental risks, and is measured by how the facility has responded to lower or address the risks identified and utilizes over 100

variables such as; level of professional attention and experience, compliance history, engineering controls, and sustainability inputs.

The integers developed in the two concepts are multiplied together and the result represents the Environmental Risk/Response Index. The ERRI is a relative value with a higher value indicating higher risk and a lower value indicating lower risk. The value of creating the ERRI is to identify risk and highlight controlling factors to more effectively lower or eliminate risk. Moreover, this method can be used within any urban area to assess and prioritize environmental risk and response to any identified risk at the parcel and watershed scale.

