

## DEXTRA MANAGEMENT CONSULTING – BUSINESS RISK EVALUATION

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Effective management of business risks is increasingly seen as a mandate from executives who have watched highly publicized and costly incidents, such as the Deepwater Horizon oil spill and the Fukushima nuclear disaster, destroy brands that took decades to build. Consensus is building that a key function of effective environmental program management is the assessment and mitigation of ongoing business risks. To assist in better managing risks facing their businesses, Dextra has worked with clients to develop a structured risk assessment program to identify, quantify, and mitigate a wide range of environment-related risks. Dextra's process is well grounded in traditional risk assessment methodology, building a highly customized view of the underlying risk factors that drive conditions that in turn ultimately trigger adverse events for the business.

Our projects have included assessment of risks in the following areas:

- Water-related risks to manufacturing operations in water-stressed areas.
- Energy-related risks in areas with unreliable supply.
- Risks across large remediation site portfolios, including impacts of community opposition, regulatory uncertainty, threat of litigation, and a host of environment-related risk factors.
- Sustainability program risks in the areas of carbon footprint, water use, human rights, and agriculture.
- Development of “expert systems” to automate identification of mitigation actions for commonly occurring risk factors.

We have found the companies that take the initiative to better understand their business risks benefit from that enhanced risk awareness and are better able to focus on risk prevention rather than more costly crisis management that typically follows an adverse incident.

### BUSINESS RISK MODELING

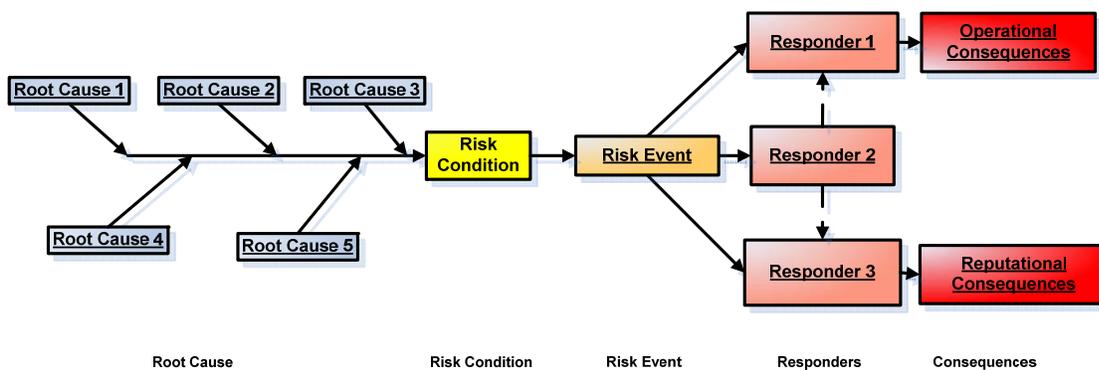
Typically Dextra will develop a sound risk framework in the planning phase of an environmental risk assessment project through a collaborative process with the client, building upon any work that has already been completed in identification of risk categories, risk factors, and root causes associated with risk events. After the framework is developed, Dextra will build an Excel-based risk model to use as a “proof of concept” for the framework and risk scoring algorithms. Clients will frequently pilot the Excel model to fine tune key assumptions and initiate the process of enhancing risk awareness across their organization. Follow-up phases might include the design and development of a web-based tool to support the ongoing needs of the risk

management program, and identification of mitigation measures that can be used to address the highest-ranking risks across the portfolio.

**The Process**

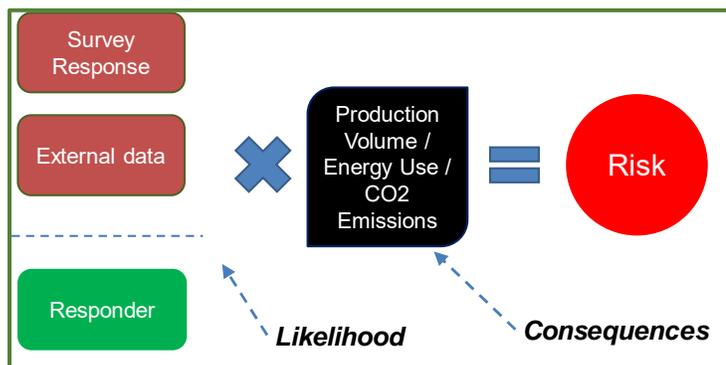
The approach we recommend addresses the three key elements of risk management: risk identification, risk assessment, and risk mitigation. A summary of the steps is provided below.

**Step 1 – Risk Identification:** Dextra works with the client to refine the risk categories, risk factors, risk event root causes, and consequences that will form the basis of the risk identification process. We use an “event tree” approach (depicted schematically below), to support the systematic analysis of how risk events develop and to help assign consequences to those risk events.



We typically start with client interviews to tap into the institutional knowledge of the risk events that have transpired across their portfolios; however, we can also pull from Dextra’s past experience to jump-start the event tree building process. At the completion of Step 1, we provide fully-developed event trees for each of the risk categories to be covered in the risk assessment.

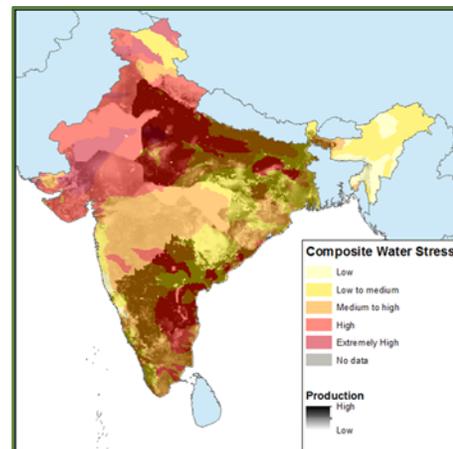
**Step 2 – Risk Assessment:** Dextra will identify the data inputs needed to assess each element in the event trees. The sources for the data inputs may be client internal databases, external datasets on factors such as production volume for manufacturing sites, water stress or climate conditions, and responses to internal surveys. The primary source of data is usually responses to survey questions for each risk area that help assess the likelihood of triggering the risk event as well as the consequence if it is triggered. The answer to each of these questions can then be converted to a numeric risk score by multiplying the likelihood of a risk event by the potential consequence if the risk event occurs.



**Step 3 – Risk Mitigation:** For facilities or projects that exceed a target risk score or threshold, a process for mitigating the risks is developed. This might include working with the client to develop a set of default mitigation measures or initiatives for certain risk factors, such as establishing backup power or water supply in cases where supply reliability is a high risk. We have also used an expert systems approach to partially automate the selection of mitigation measures based on the risk profile of the site or project.

### Example Projects – Water Risk Assessment

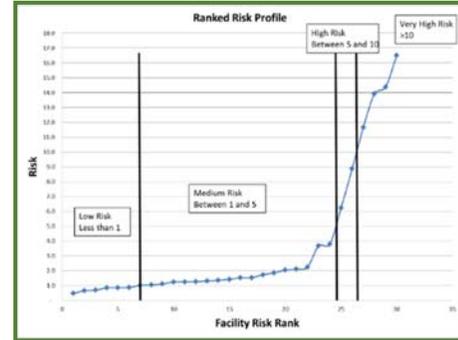
- To assess the viability of ongoing manufacturing operations in water stressed areas, Dextra has developed water risk models to score the likelihood of adverse water-related risk events such as drought, flooding, source infrastructure vulnerability, competition for water, legal access to water, and a variety of factors related to community opposition to industrial water use. The results of these risk models have been valuable in prioritizing investments for new/expanded operations and for developing backup plans in cases of water supply interruption.
- In these projects, thematic maps, such as the water stress map for India shown at right, help visually depict risk factors such as water stress along with key consequence measures such as plant production rates. This is a powerful communication vehicle to show where the most valuable assets of the company are located and the water stress challenges they face now and in the future.



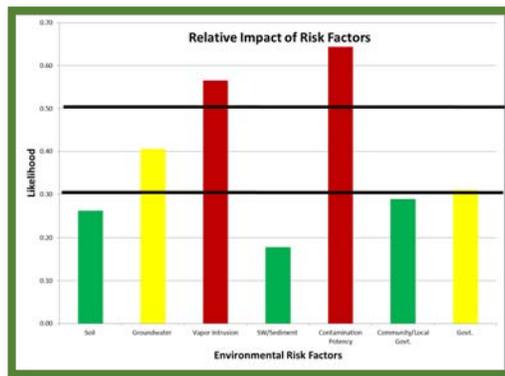
### Example Projects – Remediation Portfolio Risk Assessment

- Remediation sites face a wide range of uncertainties that can flare up and cause unexpected cost escalation and company reputational damage. While this can be alarming on an individual site, it is especially problematic on a large portfolio of remediation sites. Dextra has developed risk models to score the key factors that trigger uncertainty in remediation sites, typically related to environmental setting, extent of contamination, nature of contaminants, regulatory climate, and community acceptance. The risk modeling process helps identify the risks facing the portfolio and drives dialogue on risk mitigation strategies that can be used at various altitudes within the client organization.

- A key visual for your remediation portfolio is a ranked risk profile which shows the risk scores for the entire portfolio of sites. The profile helps to call out the higher risk sites so that mitigation actions can be prioritized and leveraged for the biggest risk reduction benefit. The ranked risk profile is also helpful in “tiering” sites and setting thresholds for immediate action



- Deeper insights can also be gained from drilling down into the risk contribution of individual risk impacts, either from a portfolio-wide perspective or for an individual site. For example, in the risk factor chart shown below, the Vapor Intrusion and Contamination Potency risk factors are scoring above the established thresholds which would trigger further evaluation of risk mitigation measures that address these issues.



Contact Dexra for more information about customized environmental business solutions, including tools for business risk assessment.

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