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Get Enviro Liability Estimates With A Decision Tree Model

Law360, New York (February 13, 2013, 1:52 PM ET) -- Estimating environmental liabilities is a necessity for many businesses. Financial staff may be asked to work with technical personnel and legal counsel to quantify environmental liabilities for financial reporting. Technical staff may be asked to estimate these same costs to strategically manage single sites or portfolios of sites as part of the budgeting process.

Also, a company may need to estimate its potential environmental liabilities for any number of risk transfer or evaluation purposes, including due diligence for acquisition or divestiture, insurance recovery efforts and financial restructuring (such as within the context of bankruptcy).

Separate efforts are generally undertaken to estimate environmental liabilities for each of these various purposes, many times because companies believe this to be a more cost-effective and faster way to derive the needed estimates and because the various purposes may involve different departments within the company.

However, our experience suggests that probabilistic cost analysis (PCA) can be used to produce a single set of environmental liability estimates for all of these different contexts in a cost-effective manner (both in terms of time and human resources).

Furthermore, while independent efforts may produce a single estimate of a response scenario, PCA is especially useful since it supports an economic analysis of the "what-if" scenarios often needed by decision-makers.

This article introduces the concept of using PCA to evaluate environmental liabilities, identifies the different types of estimates that are produced by such an analysis and explores how this single analysis may be used in various contexts.

What Is Probabilistic Cost Analysis?

PCA, sometimes referred to as decision tree analysis, is an analytical methodology that utilizes probabilities assigned to inputs to derive an expected value cost and distribution of cost outcomes. PCAs are often developed specifically to address the uncertainty inherent in the process of estimating costs or liabilities.

In the context of estimating environmental liabilities, the inputs are typically the types of response activities, unit costs and volumes. These uncertainties may include:

- Extent or scope of contamination (i.e., quantity of material contaminated across various media)
- Need for a response (i.e., risks presented by contamination, regulatory interest, etc.)
- Nature or type of response (i.e., remedial technology utilized to address contamination)
- Cost of remedial technology (i.e., unit costs charged by contractors, overhead, etc.)
- Timing of the remedy

Often, engineers or other technical staff may be asked to develop a cost estimate for a response scenario at a site. However, PCA has many benefits over developing a single-cost estimate for a specific remedy scenario (referred to as a deterministic approach). These benefits include:

- Flexibility in that the analysis produces results useful in multiple contexts
- Robustness of the analysis as concluded by ASTM International
- The cost-efficient use of corporate resources in performing and updating the analysis

PCA is a single analysis that has the flexibility to be used in many contexts. It allows for the generation of a range of statistics and a distribution of cost outcomes that are also of use depending on the circumstances within which the estimate is being used. PCA yields an expected value cost (mean), a distribution or range of cost outcomes and a most likely cost (mode), among other statistics.

PCA is the generally recognized standard for sites or groups of sites when quantifying environmental liabilities if cost uncertainty exists. ASTM International's E2137-06 guidance shows that short of certainty, an expected value approach is the most rigorous methodology for estimating the cost of future environmental liabilities.

ASTM further notes that the decision tree approach (i.e. PCA) is one of the tools used to derive an expected value. As the ASTM hierarchy of estimation approaches shows, the expected value approach provides the most robust and comprehensive estimate with the greatest quantification of uncertainty.[1]

Properly performed PCAs can capture the input of technical, financial and legal personnel so that corporate resources are used efficiently, as opposed to having these individual groups create separate estimates, each for the purpose it needs.

While involving these various resources in the development of a PCA may increase the time and cost of its initial preparation, the benefits from gaining the various perspectives vastly improves the quality of the analysis, its usefulness within the many contexts discussed below and its ability to be easily updated in the future.

One Robust Cost Analysis for Use in Many Contexts

PCA can be used as the basis of environmental liability estimates in many contexts, including:

- Risk transfer (bankruptcy, due diligence and insurance recovery)
- Financial reporting
- Budgeting

The actual cost estimate that a company uses is dependent upon the context in which the estimate is needed and the rules governing the type of estimate required in that context. For instance, the liability estimate provided by a company as part of its financial reporting obligation is likely to differ from the liability estimate used in support of activities involving the transfer of risk.

Below is a discussion of the various contexts in which PCA can and has been used and the benefits of using this type of analysis within that context.

Bankruptcy

When a company enters bankruptcy, it may need to determine the value of its environmental liabilities in order to address creditor claims submitted as part of the bankruptcy process. The value of environmental liabilities for the portfolio of sites and businesses for which the company may have responsibility can be evaluated. These sites are likely to be in varying stages of investigation and/or response and may have substantial uncertainty regarding the cost to remediate the sites.

PCA is particularly useful in evaluating the liability of a large portfolio of sites because the characteristics that make its results robust within the evaluation of a single site apply across independently evaluated sites as well. It also allows for evaluation of similar issues across sites in a consistent and structured manner.

One example of when PCA was used to evaluate a large number of sites was in the ASARCO bankruptcy. In that case, testifying experts for the defendants (ASARCO LLC) used PCA to evaluate environmental response costs at more than 20 sites.[2]

PCA is also useful in that it facilitates the use of sensitivity analyses to examine and test key assumptions. Sensitivity analyses serve three key purposes. They:

- Allow one to understand what the primary cost drivers are underlying the estimate
- Allow one to test the robustness of the estimate to changes in assumptions
- Can be used to quantify and explain the difference between types of cost estimation methodologies

Due Diligence

One of the benefits of using PCA for due diligence is that in addition to the expected value cost, PCA produces a distribution of cost outcomes. Examining this cost distribution, particularly the upper end of the distribution (maximum or 95th percentile) can allow a company to understand the risk of assuming an environmental liability and help inform negotiations.

PCA can be used to estimate a risk transfer premium or other mechanism to account for the risk of low probability, high-cost outcomes.

Another advantage of PCA in this context is that when a portfolio of sites is analyzed, the cost distributions of the individual sites can be combined to create a cost distribution for the entire portfolio — this process is called convolving distributions.

Convolving is most relevant when the range or percentiles of a cost distribution are being used, rather than the expected value cost. If a company wanted to estimate a reasonable upper-end cost estimate for a portfolio site using the deterministic approach, it might have its engineers develop an upper end cost estimate for each site and then add these cost estimates together to get an estimate for the portfolio as a whole. However, this would result in an estimate far more extreme (e.g., higher) than a true reasonable upper-end cost for the portfolio.

A utility company engaged in acquisition discussions used PCA to determine the environmental liabilities at approximately 12 sites owned by the target company. The analysis and the convolving of cost distributions (specifically the high-end of the cost range for the portfolio of sites) was used to estimate the risks associated with the acquisition.

Insurance Recovery

PCA is frequently used for estimating environmental costs in an insurance recovery context, in which environmental liabilities are to be transferred from one party to another. Environmental insurance claims are often evaluated for portfolios of sites, and estimates may be comprised primarily of future costs where the value is, by definition, uncertain.

When submitting or reviewing an insurance recovery claim, it is essential for companies and insurers to consider the full range of cost outcomes in their analysis as a settlement is absolute. By using PCA to evaluate the full range of reasonable outcomes, a better measure of the expected value, as well as the distribution of possible outcomes, can be determined.

These are then used in the valuation of the liability and the examination of any possible risk premium related to the transfer of these liabilities.

Financial Reporting

PCA can help companies navigate the types of cost estimates that may be required for the financial reporting of environmental liabilities. Accounting for environmental liabilities is governed by the Financial Accounting Standards Board (FASB) in the United States and by the International Accounting Standards Board (IASB) internationally.

Each of these organizations has its own processes and rules governing estimation of environmental liabilities. Companies should develop these estimates in conjunction with financial reporting advisers to ensure that the respective requirements are met.

The FASB requires that companies recognize environmental liabilities when they are probable. The American Institute of Certified Public Accountants states, "[t]he probability threshold for recognition of contingent liabilities is higher than "more-likely-than-not," and is typically interpreted to mean about 80%." This percentage is readily evident on the decision tree used in a PCA.

The IASB requires that companies accrue environmental liabilities when they are more likely than not, and typically, those liabilities are measured as the expected value of all outcomes (in certain circumstances, companies may also use the midpoint of the range). Again, both the midpoint and expected value cost are provided by a PCA.

Budgeting

PCA is also helpful in forecasting environmental expenditures for a variety of internal purposes, such as budgeting, human and capital resource allocation or setting a site response prioritization. By producing expected cash flows over time, PCA can be a useful tool for companies' internal management purposes.

PCAs incorporate both the current status and circumstances at each site, as well as predictions of future events, schedules and factors, both certain and uncertain, that would affect expenditures in the future. These factors may include regulatory changes, performance of the response (including the possibility of response failure), uncertainty in the volume of contaminated material and timing and duration of the response.

The results of the PCA conducted on a portfolio of sites allow one to optimize management of the portfolio's expected cash flow using site prioritization. Understanding which sites are the key drivers in company cash flow is critical for strategic decisions such as when to start investigation or remediation of sites and how to negotiate with regulators.

Moreover, these key drivers can allow companies to understand where they face the most significant risks or potential exposure and formulate strategies to mitigate those risks.

Conclusion

PCA is a single, rigorous, cost-effective analysis of environmental liabilities that can be used in multiple contexts and is easily updated.

It has many benefits over a deterministic approach often used to estimate the cost of a single remedy scenario for a site. It is also the generally recognized standard for sites or groups of sites when quantifying environmental liabilities if cost uncertainty exists.

Finally, a properly performed PCA can capture the input of technical, financial and legal personnel so that corporate resources are used efficiently, as opposed to having these individual groups create separate estimates, each for the purpose it needs.

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[1] ASTM International is a globally recognized leader in the development of international consensus standards. See ASTM website at: http://www.astm.org/ABOUT/aboutASTM.html [accessed January 16, 2013]. See Also ASTM International, Designation: E2137 – 06 (Reapproved 2011), Standard Guide for Estimating Monetary Costs and Liabilities for Environmental Matters (2011) at page 4, ¶ 5.2.2, 5.4.2.1.

[2] In re: ASARCO LLC (S.D. TEX). Defendants' testifying experts regarding valuation of environmental liabilities were Jeff Zelikson and Rick White of Gnarus Advisors LLC. The experts for the plaintiffs (US DOJ) also used probabilistic cost analysis to evaluate environmental response costs.

[3] AICPA Website, IFRS for SMEs – U.S. GAAP Comparison Wiki, available at: http://wiki.ifrs.com/Provisions-and-Contingencies [accessed January 16, 2013].

[4] IFRS Foundation, International Accounting Standard 37 – Provisions, Contingent Liabilities and Contingent Assets (Revised October 2010), at pp. A1018, A1020.