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Standard Guide for Estimating Monetary Costs and Liabilities for Environmental Matters¹

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1. Scope

1.1 *Purpose*—The purpose of this document is to provide a standard guide in the United States for estimating *costs and liabilities* for environmental matters.² Many possible uses for estimates of *costs and liabilities* for environmental matters exist, including but not limited to business decision making, communications and negotiations involving change of property ownership, regulatory requirements, third-party lawsuits, insurance premium calculation and claim settlement, change of property use, revitalization, compliance planning, construction, analysis of remedial alternatives, budgeting, strategic planning, financing, and investment analysis by shareholders. The use of estimated *costs and liabilities* developed in accordance with this standard may be subject to other standards applicable to the matter involved. For example, it is not intended to supersede accounting and actuarial standards including those by the Financial Accounting Standards Board and the U.S. Security and Exchange Commission. This standard does not address the establishment of reserves or disclosure requirements.

1.2 *Objectives*—The objective of this standard is to provide guidance on approaches for estimating *costs and liabilities* for environmental matters.

2. Referenced Documents^{3,4}

2.1 ASTM Standards:

E 1527 Environmental Site Assessments: Phase I Environmental Site Assessment Process

E 1739 Risk-Based Corrective Action Applied at Petroleum Release Sites

¹ This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment and is the direct responsibility of Subcommittee E50.05 on Wetland Ecosystems.

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² For the purposes of this standard, costs and values are defined as monetary estimates.

³ Appendix X1 includes citations for additional relevant documents and requirements from other organizations including FASB, SEC, and AICPA.

⁴ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

PS 104-98 Provisional Guide for Risk-Based Corrective Action⁵

2.2 Other Document:

EPA OSWER Directive 9610.17 concerning use of risk-based decision making, 1995.⁶

3. Terminology

3.1 Definitions:

3.1.1 *allocation or allocated share*—the portion of cost or liability for which a party is responsible for payment or reimbursement.

3.1.2 *environmental compliance*—operations, permits, equipment, facilities, products, records, documentation, reports, training, procedures, inspections, certifications, monitoring, controls, or other conditions or activities that must conform to environmental statutes including, but not limited to, CAA, CWA, OPA, RCRA, CERCLA, TSCA, FIFRA, SDWA, and state and local laws.

3.1.3 *costs and liabilities*—economic expenses, accrued liabilities, and loss contingencies.

3.1.4 *estimator*—an individual or entity that prepares and analyzes *costs and liabilities*.

3.1.5 *event*—a condition or incident which occurred, or may occur, with respect to an environmental condition and/or *environmental compliance* issue, that affects or leads to potential *costs and liabilities*. Examples of events include: a new requirement for air emission controls (e.g., NO_x), a hazardous waste site that requires remediation, a claim for personal injury related to an alleged environmental incident, or the need to comply with NPDES standards as a result of a process change.

3.1.6 *liability*—an actual or potential obligation that may or may not be accrued.

3.1.7 *orphan share*—liability assigned to a PRP that cannot be located or that is insolvent, or the liability associated with pollutants which cannot be attributed to a PRP.

3.1.8 *potentially responsible party (PRP)*—any individual, legal entity, or government—including owners, operators,

⁵ Withdrawn.

⁶ Available from U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW Washington, DC 20460.

transporters, or generators—potentially responsible for, or contributing to, the environmental impacts at an event.

3.1.9 *studies*—investigations such as regulatory interpretations and applicability studies, compliance analysis, operating scenarios study, engineering design and analysis, cost estimation, process hazard analysis, modeling, communication plans, preliminary investigation, sampling and analysis, site assessment, site characterization, Phase I and II studies, remedial action plan, remedial investigation, contamination assessment report, feasibility study, risk assessment, treatability study, ecological impact assessment, environmental impact report, work plans, ASTM Risk-Based Corrective Action (RBCA) analysis, RCRA facility investigation, RCRA facility assessment, report of waste discharge, corrective measures study, corrective action report, health and safety plan, quality assurance plan, and other studies.

3.2 Acronyms:

3.2.1 *AICPA*—American Institute of Certified Public Accountants.

3.2.2 *CAA*—Clean Air Act.

3.2.3 *CERCLA*—Comprehensive Environmental Response, Compensation and Liability Act of 1980 (as amended, 42 USC Section 9601 et seq.).

3.2.4 *CWA*—Clean Water Act.

3.2.5 *EPA*—United States Environmental Protection Agency.

3.2.6 *EV*—expected value; an estimate of the weighted mean value of an unknown quantity that represents a probability-weighted average over the range of all possible values.

3.2.7 *FASB*—Financial Accounting Standards Board.

3.2.8 *FIFRA*—Federal Insecticide, Fungicide and Rodenticide Act.

3.2.9 *MLV*—most likely value.

3.2.10 *NPDES*—national pollutant discharge elimination system.

3.2.11 *OPA*—Oil Pollution Act.

3.2.12 *PRP*—potentially responsible party.

3.2.13 *RBCA*—Risk-based corrective action.

3.2.14 *RCRA*—Resource Conservation and Recovery Act (as amended 42 USC Section 6901 et seq.).

3.2.15 *SDWA*—Safe Drinking Water Act.

3.2.16 *SEC*—Securities and Exchange Commission.

3.2.17 *TSCA*—Toxic Substances Control Act.

4. Significance and Use

4.1 *Use*—The standard is intended for use on a voluntary basis by an estimator of *costs and liabilities* for environmental matters. The user may elect to apply this standard for any or all uses outlined in the Purpose. Application of this standard for one use does not compel application of the standard for all or any other use.

4.2 *Principles*—The following principles are an integral part of this standard and should be used to resolve ambiguity or dispute regarding the interpretation of estimated *costs and liabilities* for environmental matters.

4.2.1 *Uncertainty Not Eliminated*—Even though an estimate of *costs and liabilities* for environmental matters is prepared in accordance with this standard, uncertainty remains

with regard to, among other things, the resolution of contractual, technological, regulatory, legislative, and judicial issues, which could affect the *costs and liabilities*.

4.2.2 *Periodic Review of Assumptions and Estimates*—Assumptions underlying these estimates should be reviewed periodically for the purpose of incorporating additional information that may become available. For example, changes in regulatory requirements, technology, property use, inflation, or other issues may affect the basis for the estimates, therefore necessitating revisions.

4.2.3 *Comparison with Subsequent Estimates*—Subsequent estimates based on additional information should not be construed as indicating the prior estimates of *costs and liabilities* for environmental matters were unreasonable at the time they were made. Estimates should be evaluated on the reasonableness of analyses and judgments made at the time and under the circumstances in which they were made. Subsequent improvements in estimates should be made as more information becomes available, but these improved estimates should not be considered valid standards on which to measure the reasonableness of a prior estimate based on hindsight, new information, use of developing analytical techniques, or other factors. However, information on trends in estimates over time may be of value to a user of financial statements or other users of the cost and liability estimates.

4.2.4 *Not Exhaustive*—Estimation of *costs and liabilities* for environmental matters does not necessarily require an exhaustive evaluation of all possible outcomes. A point exists at which the cost of obtaining information or the time required to gather it outweighs improvement in the quality of the estimate.

4.2.5 *Assessment of Risk*—The actual or potential risk to human health and the environment should be considered in assessing environmental matters. The degree of risk should be a factor in developing the cost and liability estimates associated with those matters.

4.2.6 *Estimator Selection*—An appropriate estimator or group of estimators will consist of those individuals or groups who possess sufficient knowledge, training, and experience to develop appropriate estimates for the *costs and liabilities* being estimated. It is the responsibility of the entity sponsoring the cost and liability estimates to select an estimator with the appropriate level of knowledge, training, and experience for the parts of the estimation effort for which that estimator is responsible.

5. Procedures for Estimating Costs and Liabilities for Environmental Matters

5.1 *Determination of Relevant Information and Types of Costs and Liabilities*:

5.1.1 There are many types of *costs and liabilities* for environmental matters, including, but not limited to:

5.1.1.1 Studies,

5.1.1.2 Response action,

5.1.1.3 *Environmental compliance*,

5.1.1.4 Defense and legal fees,

5.1.1.5 Fines and penalties,

5.1.1.6 Reimbursement of agency overhead.

5.1.1.7 Damages arising from resource damages, ecological damages, property damage, business interruption, bodily injury, or tort claims such as nuisance and negligence claims.

5.1.2 After identifying the conditions giving rise to potential *costs and liabilities* for environmental matters, existing relevant information should be considered to estimate *costs and liabilities* identified in 5.1.1, including, but not limited to:

5.1.2.1 Event type (for example, new EPA air emission control requirements, leaking landfill, site PRP notice, compliance audit findings),

5.1.2.2 Number and location of affected operations/facilities,

5.1.2.3 Use of surrounding property,

5.1.2.4 Past, current, and potential future site uses,

5.1.2.5 Studies,

5.1.2.6 Environmental risks posed by the event,⁷

5.1.2.7 Bodily injury or other claims related to the event,

5.1.2.8 Relevant state or other regulatory requirements and alternatives,

5.1.2.9 State or federal agency involvement,

5.1.2.10 Public involvement,

5.1.2.11 Planned or completed remedial activities,

5.1.2.12 Decision documents (for example, Records of Decision),

5.1.2.13 Litigation activities related to the event (for example, claims, suits, actions, demands, requests for payment, notices),

5.1.2.14 Resources, tasks, and deadlines,

5.1.2.15 Available technologies and designs,

5.1.2.16 Type and extent of contamination,

5.1.2.17 Number of operable units (CERCLA) or solid waste management units (RCRA),

5.1.2.18 Involvement of various parties at the event, and

5.1.2.19 Information on prior experience with similar events.

5.1.3 The organization and application of the foregoing information may be further subject to corporate, accounting, or regulatory policy decisions. The user will need to determine what these policy decisions are, and assess their effect on the cost estimate. Examples of such policy decisions include, but are not limited to:

5.1.3.1 Measuring and recording of contingent liabilities,

5.1.3.2 Technical policy decisions or interpretations to be made by regulatory agencies,

5.1.3.3 Acceptable levels of risk (for example, business risk, human health risk, ecological risk),

5.1.3.4 The degree to which societal or external costs and benefits are considered,

5.1.3.5 Whether or not life cycle costs are considered,

5.1.3.6 The degree to which sustainability/sustainable development are considered,

5.1.3.7 Local environmental management system criteria, including trade-off of emissions across environmental media,

alternative methods and permitting options, auditability, and performance oriented metrics.

5.1.3.8 Level of organizational involvement and scrutiny,

5.1.3.9 The degree of communication and involvement with the public.

5.1.4 In the absence or insufficiency of such information, an assessment should be made of the applicable regulatory and industry standard requirements, and a determination made as to whether based on these requirements, significant *costs and liabilities* for environmental matters may be incurred that would indicate the need for further data creation and analysis in the future.

5.2 *Selection of Estimation Approaches*—A decision framework for estimating *costs and liabilities* for environmental matters is required. For purposes of naming various estimating methods, the following terminology is used:

Expected Value (EV)
Most Likely Value (MLV)
Range of Values
Known Minimum Value

5.2.1 The decision to use one or more of these four estimating methods or another method for a particular purpose is not arbitrary. The informational value of the estimate supplied by any one method is not equivalent to the others. When the uncertainties are great (for example, when an event is first identified) it may not be possible to make a reasonable cost estimate.

5.2.2 The robustness and comprehensiveness of an estimate and the quantification of uncertainty about the estimate, given adequate information, generally decreases moving from top to bottom of this list of methods. (See Fig. 1.) Depending on availability of information and circumstances, the level of

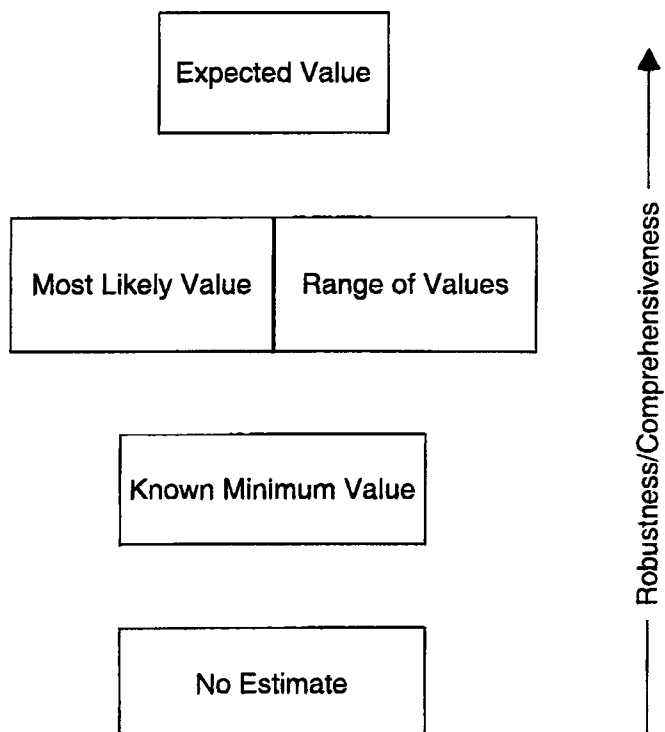


FIG. 1 Hierarchy of Approaches for Estimating Costs and Liabilities for Environmental Matters

⁷ See Guide E 1739; PS 104-98; EPA Risk Characterization Program; The Presidential/Congressional Commission on Risk Assessment and Risk Management; and EPA OSWER Directive 961.17 concerning use of risk-based decision making, 1995.