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Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process[1]

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1. Scope

1.1 This guide[2] covers a framework for employing good commercial and customary practices in conducting a Phase II environmental site assessment (ESA) of a parcel of commercial property with respect to the potential presence of a range of contaminants which are within the scope of CERCLA as well as petroleum products.

1.1.1 This guide is intended to provide practical procedural guidance for the continuation of an assessment conducted in accordance with the most recent edition of Practice E 1527 or E 1528, or both. Practice E 1527 is the practice for conducting Phase I ESAs for a parcel of commercial property and Practice E 1528 is the transaction screen practice. Both practices define a process that is intended to constitute "all appropriate inquiry into the previous ownership and uses of a property" to determine whether hazardous substances or petroleum products have been disposed or released there in order to satisfy one element of the innocent purchaser defense to CERCLA liability.

1.1.2 Because this guide for conducting Phase II ESAs describes a process for further evaluating a parcel of commercial property with recognized environmental conditions, as defined in Practices E 1527 and E 1528, users of this guide should understand the requirements and limitations of those practices. It is strongly recommended that the user refer to and apply the guide in concert with Practices E 1527 and E 1528.

1.1.3 This guide has multiple purposes. It is intended to provide assistance to users in satisfying the appropriate inquiry element of CERCLA's innocent purchaser defense, as defined in 42 U.S.C. § 9601(35)(B), where a previous assessment satisfying that element identified recognized environmental conditions. This guide also is intended to assist a user in gathering reliable information about a property's environmental conditions to guide the user's business decisions. However, this guide does not purport to include the level of specificity required of technical standards that govern full characterization of a site's environmental conditions.

1.2 *Objectives*—The primary objectives of conducting a Phase II ESA are to evaluate the recognized environmental conditions identified in the Phase I ESA or transaction screen process for the purpose of providing sufficient information regarding the nature and extent of contamination to assist in making informed business decisions about the property; and where applicable, providing the level of knowledge necessary to satisfy the innocent purchaser defense under CERCLA.

1.2.1 To achieve these objectives, it may be appropriate to perform more than a single iteration of assessment. The guide fosters an iterative approach to Phase II assessments and allows the user to terminate the Phase II ESA at the point where sufficient data have been generated to meet the user's objectives.

1.2.2 At the completion of a Phase II ESA, the environmental professional should be able to conclude, at a minimum, that either *(a)* the ESA has provided sufficient information to render a professional opinion that there is no reasonable basis to suspect the presence of hazardous substances or petroleum products at the property associated with the recognized environmental conditions under assessment, or *(b)* the ESA has confirmed the presence of hazardous substances or petroleum products at the property under conditions that indicate disposal or release. If the information developed in the ESA is insufficient for the environmental professional to reach either of these conclusions, the environmental professional may recommend additional iterations of assessment if warranted to meet the objectives of the user. If the environmental professional reasonably suspects that unconfirmed hazardous substance or petroleum releases remain but concludes that further reasonable assessment is not expected to provide additional information of significant value, he may recommend that further assessment is not warranted. In such circumstances, the recommendation for no further assessment should be accompanied by an explanation why a reasonable suspicion of releases remains and why further reasonable assessment is not warranted. Depending upon the work scope, the environmental professional may also be able to provide guidance on the nature

[1] This guide is under the jurisdiction of ASTM Committee E-50 on Environmental Assessment and is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions.

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[2] As used herein, a "Standard" is a document that has been developed and established within the consensus principles of the Society and that meets the approval requirements of ASTM procedures and regulations. A" Guide" is a compendium of information or a series of options that does not recommend a specific course of action. A guide increases the awareness of information and approaches in a given subject area. A "Practice," in contrast, is a definitive set of instructions for performing one or more specific operations that does not produce a test result. See Form and Style for ASTM Standards, 10th ed., 1996.

and extent of contamination in order to assist the user in making business decisions regarding the property.

1.2.3 This guide is intended to provide guidance for assessing recognized environmental conditions and developing technically sound data. It is not intended to satisfy the level of inquiry that may be necessary to support remedial solutions for a site. For further discussion of the use of this guide, refer to Section 4 on Significance and Use.

1.3 *Needs of the User*—Establishing the innocent purchaser defense may not be a realistic objective in some instances. Accordingly, the extent of assessment is based on the business objectives of the user as well as the degree of uncertainty acceptable to the user. In either case, the primary purpose of a Phase II ESA conducted in accordance with this guide is to assess and evaluate the recognized environmental conditions identified in the Phase I ESA or Transaction Screen Process.

1.3.1 The mere confirmation of contamination or the preliminary indication of the extent and magnitude of contamination may be sufficient for the purposes of many users. If a user desires a more complete characterization of the environmental condition of the property, further assessment may be undertaken. However, this guide should not be construed to require multiple iterations of assessments in all cases, either to establish the innocent purchaser defense or to meet other objectives. Many Phase II ESAs may in fact be restricted to only a single round of assessment, whatever the extent of contamination, if any, that might be revealed.

1.4 *Limitations*—The use of this guide is related to the scope as set forth in Section 1. For information purposes, Section 12 of this guide contains a non-exhaustive list of certain environmental conditions that are beyond the scope of this guide but that may warrant consideration by parties to a commercial property transaction. This guide provides an approach that may be employed to assess the environmental conditions listed in Section 12. Reference also should be made to 4.1.

1.5 *Organization of This Guide*—This guide has twelve sections and one appendix. Section 1 is the Scope section. Section 2 is Referenced Documents. Section 3, Terminology, contains definitions of terms and acronyms used in this guide. Section 4 is Significance and Use of this guide. Section 5 is Contracting Considerations. Sections 6-11 constitute the main body of the Phase II Environmental Site Assessment guide and include objectives (see Section 6), developing the scope of work (see Section 7), assessment activities (see Section 8), evaluation of data (see Section 9), interpretation of results (see Section 10) and recommended report preparation (see Section 11). Section 12 provides additional information regarding non-scope considerations. Appendix X1 provides a sample table of contents and report format for a written Phase II Environmental Site Assessment Report.

2. Referenced Documents

2.1 The references in this Section are for informational purposes. Although Phase II ESAs should utilize government- and industry-accepted practices and methods, this guide does not recommend the use of specific practices in the implementation of a Phase II ESA.

2.2 *ASTM Standards:*

D 5730 Guide to Site Characteristics for Environmental Purposes With Emphasis on Soil, Rock, The Vadose Zone and Ground Water[3,4]

D 653 Terminology Relating to Soil, Rock and Contained Fluids[3]

D 4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well. (Observation Well)[3]

E 1527 Practice for Environmental Site Assessments: Phase I[5]

E 1528 Practice for Environmental Site Assessments: Transaction Screen Process[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *aquifer*—as defined in Terminology D 653, a geologic formation that is capable of providing a significant quantity of water.

3.1.2 *ARARs*—an acronym for "applicable or relevant and appropriate requirements," a term used in CERCLA and interpreted by EPA regulations. Applicable requirements means "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site", 40 C.F.R. § 300.5. Relevant and appropriate requirements means "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site" 40 C.F.R. § 300.5.

3.1.3 *business decision*—a decision based on various business risk management considerations relating to a specific property, such as a transfer of title or change in financing. Such considerations may also include the potential financial exposure associated with environmental risks, the value of the property compared with the cost of environmental assessment, and the participation and motivations of specific parties to the transaction (that is, owner, seller, buyer, lender, etc.).

3.1.4 *CERCLA*—the acronym for the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C.§ 9601, *et seq.*, the primary federal statute that governs the imposition of liability for environmental cleanups.

3.1.5 *C.F.R.*—Code of Federal Regulations.

3.1.6 *chain of custody*—a written or printed form which is used to document sample possession, condition and responsibility. This custody can include the time from sample container acquisition through transportation, sample collection and laboratory analysis.

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[3] *Annual Book of ASTM Standards*, Vol 04.08.

[4] Guide D 5730 covers the selection of the various ASTM Standards that are available for the investigation of soil, rock, the vadose zone, ground water, and other media where investigations have an environmental purpose.

[5] *Annual Book of ASTM Standards*, Vol 11.04.

3.1.7 *chemical phases*—the physical state of the chemical, (that is; solid, liquid, vapor/gaseous). A chemical's physical state can change from the one phase to another based on its physical environment.

3.1.8 *common law*—as distinguished from law created by the enactment of legislatures, the common law comprises the body of those principles and rules of action, relating to the government and security of persons and property, which derive their authority solely from usages and customs of immemorial antiquity, or from the judgments and decrees of the courts recognizing, affirming and enforcing such usages and customs; and, in this sense, particularly the ancient unwritten law of England.[6]

3.1.9 *cuttings*—soil, rock chips, fragments or other material that is brought to the surface by drilling or sampling, or both.

3.1.10 *disposal*—as defined by CERCLA and interpreted by EPA regulations, the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters. By judicial construction, the term also may include hazardous substances in repose in the environment, with the result that hazardous substances that have migrated to a site from an off-site source may nonetheless be considered to have been disposed at the site. See, for example, *United States v. Waste Industries*, 734 F.2d 159 (4th Cir. 1984). This construction is not universally accepted. See, for example, *United States v. Petersen Sand and Gravel, Inc.*, 806 F. Supp. 1346 (D.Ill. 1992).

3.1.11 *downgradient*—with respect to a given reference point, it is all points through which ground water originating at the reference point flows until reaching a surface discharge point or a distance or depth that ceases to be a matter of potential environmental concern; the direction of decreasing hydrostatic head.

3.1.12 *environmental media*—soil, rock, water, air, sediment.

3.1.13 *environmental professional*—a person or group of persons possessing sufficient training and experience necessary to prepare and implement a Phase II environmental site assessment in accordance with this guide, and from the information generated by such activities, having the ability to develop sound opinions and conclusions regarding recognized environmental conditions in connection with the property in question. An individual's status as an environmental professional may be limited to the type of assessment to be performed or to specific segments of the assessment for which the professional is responsible. The person may be an independent contractor or an employee of the user.

3.1.13.1 *Discussion*—Some jurisdictions may have licensing requirements for individuals who perform certain activities included in a Phase II ESA.

3.1.14 *EPA*—the United States Environmental Protection Agency.

3.1.15 *ESA*—environmental site assessment.

3.1.16 *fate and transport characteristics*—natural consequences that can be predicted based on the distinguishing characteristics of a substance and the media which carry the substance.

3.1.17 *ground water*—as defined by Terminology D 653, the part of the subsurface that is in the saturated zone. Loosely, all subsurface water as distinct from surface water.

3.1.18 *ground water flow*—as defined by Terminology D 653, the movement of water in the zone of saturation.

3.1.19 *ground water flow direction*—the compass bearing of the movement of water in the zone of saturation (vertical and horizontal components of ground water flow).

3.1.20 *hazardous substance*—a substance defined as a hazardous substance pursuant to CERCLA, 42 U.S.C. § 9601(14), as interpreted by EPA regulations and the courts. The term includes any substance designated pursuant to section 311(b)(2)(A) of the Clean Water Act, 33 U.S.C.§ 1321(b)(2)(A); any element, compound, mixture, solution or substance designated pursuant to section 102 of CERCLA, 42 U.S.C. § 9602; any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act, 42 U.S.C. § 6921, (but not including any waste the regulation of which under the Solid Waste Disposal Act, 42 U.S.C.§ 6901 *et seq.*, has been suspended by Act of Congress); any toxic pollutant listed under section 307(a) of the Clean Water Act, 33 U.S.C. § 1317(a); any hazardous air pollutant listed under section 112 of the Clean Air Act, 42 U.S.C. § 7412; and any imminently hazardous chemical substance or mixture with respect to which the EPA administrator has taken action pursuant to section 7 of the Toxic Substances Control Act, 15 U.S.C. § 2606. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance by EPA and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). Hazardous substances designated by EPA are listed in 40 C.F.R. § 302.4.

3.1.21 *petroleum products*—those substances included within the petroleum exclusion to CERCLA, 42 U.S.C. § 9601(14), as interpreted by the courts and EPA; that is, petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under Subparagraphs (A) through (F) of 42 U.S.C. § 9601(14), natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). (The word fraction refers to certain distillates of crude oil, including gasoline, kerosene, diesel oil, jet fuels, and fuel oil, pursuant to Standard Definitions of Petroleum Statistics).[7]

3.1.22 *Phase I environmental site assessments (ESAs)*—the process described in Practice E 1527.

3.1.23 *Phase II environmental site assessments (ESAs)*—the process described in this guide.

3.1.24 *property*—the property that is the subject of the ESA described in this guide. The term includes buildings and other

[6] *Black's Law Dictionary 250-251*, 5th ed., 1979.

[7] *Standard Definitions of Petroleum Statistics*, American Petroleum Institute, Fourth Edition 1988.

fixtures and improvements located on the property and affixed to the land.

3.1.25 *purged ground water*—water that is removed from a monitoring well prior to collecting a representative sample of the aquifer, including water generated during well installation and well development.

3.1.26 *quality assurance/quality control (QA/QC)*—the use of standards and procedures to provide reasonable assurance that samples collected and data generated are reliable, reproducible and verifiable.

3.1.27 *recognized environmental condition (REC)*—the presence or likely presence of any hazardous substances or petroleum products on property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

3.1.28 *release*—as defined by § 101(22) of CERCLA, 42 U.S.C. § 9601(22), "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but exclud[ing] (A) any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons, (B) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine, (C) release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954 [42 U.S.C. § 2011 *et seq.*], if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act [42 U.S.C. § 2210], or, for the purposes of section 104 of CERCLA or any other response action, any release of source, byproduct, or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978; [42 U.S.C. § 7912(a)(1) or 7942(a)], and (D) the normal application of fertilizer."

3.1.29 *sample medium*—the particular matrix that is sampled for laboratory analysis. Examples of commonly encountered matrices include: soil, rock, sludge, sediment, air, wastes, pure or mixtures of chemicals, ground water, drinking water, surface water, etc.

3.1.30 *self-evaluation privilege*—a privilege invoked to protect from disclosure confidential information resulting from a critical self-analysis undertaken by the party seeking to invoke the privilege.

3.1.31 *Superfund*—the common name for the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601, *et seq.*, as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), the primary federal statute that governs the imposition of liability for environmental cleanups.

3.1.32 *surface water*—water above the surface of the ground, including but not limited to lakes, ponds, reservoirs, artificial impoundments, streams, rivers, springs, seeps and wetlands.

3.1.33 *target analyte*—a chemical substance or class of chemicals that is selected for laboratory analysis or field analysis.

3.1.34 *Transaction Screen Process*—the process described in Practice E 1528.

3.1.35 *U.S.C.*—United States Code.

3.1.36 *user*—the party seeking to use this guide to guide performance of an ESA of the property. A user may include, without limitation, a purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager.

3.1.37 *water table*—as defined in Test Method D 4750, the surface of a ground water body at which the water pressure equals atmospheric pressure. Earth material below the ground water table is saturated with water.

4. Significance and Use

4.1 *Uses*:

4.1.1 This guide is intended for use on a voluntary basis by parties who wish to assess the recognized environmental conditions ("RECs") identified in a Phase I ESA or transaction screen process for the purpose of establishing the innocent purchaser defense, where applicable, or to support business decisions about the property. The level of assessment can, and most likely will, vary depending on the needs of the user and the business situation driving the assessment, as described in 1.3. No implication is intended that a person must use this guide in order to be deemed to have conducted inquiry in a commercially prudent or reasonable manner in any particular transaction. Nevertheless, this guide is intended to reflect good commercial and customary practice for appropriate inquiry sufficient to satisfy the innocent purchaser defense.

4.1.1.1 CERCLA provides that a purchaser of real property qualifies for the innocent purchaser defense if the purchaser acquires a contaminated site after the disposal or placement of hazardous substances at the site, and the purchaser neither knew nor had reason to know that any hazardous substance which is the subject of the release was disposed at the site. 42 U.S.C. § 9601(35)(A)(i). To establish that a purchaser had no reason to know of the disposal or release of any hazardous substance at the site, CERCLA requires the purchaser to show that at the time of acquisition the purchaser undertook all appropriate inquiry into the previous ownership and uses of a property consistent with "good commercial or customary practice". 42 U.S.C.§ 9601(35)(B). To determine whether a purchaser made "all appropriate inquiry", the courts are directed by statute to consider any specialized knowledge or experience on the part of the purchaser, the relationship of the purchase price to the value of the property, if uncontaminated, commonly known or ascertainable information about the property, the obviousness of the presence or likely presence of contamination at the property, and the ability to detect such contamination by appropriate inspection.

4.1.1.2 This guide is intended to meet the business community's need for a written, practical reference describing procedures that constitute" all appropriate inquiry" once recognized environmental conditions are identified. This guide is intended to be a practical reference document which can be used to assess whether good commercial or customary practice (that is, appropriate procedure) has been followed in a particular environmental assessment.

4.1.1.3 This guide does not address the business judgments that follow from the interpretation of data collected through the Phase II process. Assessment of the business risks reflected by such data is dependent upon numerous site- and transaction-specific variables which cannot be adequately anticipated in this guide. Proper analysis of the legal, business and environmental risks associated with a particular site and business transaction is best conducted on a case-by-case basis by legal, business and environmental professionals assessing the known data relating to the particular site and transaction.

4.1.1.4 Likewise, this guide does not assess the legal risks associated with a transaction involving property where hazardous substances or petroleum products are present at levels above those occurring naturally but below those generally considered to be of regulatory concern, that is, *de minimis* levels. What constitutes a *de minimis* level of contamination is an evolving regulatory concept which may vary from jurisdiction to jurisdiction and may turn on site-specific factors.

4.1.1.5 If a Phase II ESA conducted in accordance with this guide provides sufficient information from which the environmental professional can render a professional opinion that there is no reasonable basis for suspecting the disposal or release of hazardous substances at the site, then further assessment is not warranted to establish the innocent purchaser defense. If the Phase II ESA confirms the presence of *de minimis* quantities of hazardous substances on the site under circumstances that suggest these hazardous substances have been released or disposed, the availability of the innocent purchaser defense is not assured as a matter of law. A review of reported case law as of January 1996 revealed no judicial decision concerning the availability of the innocent purchaser defense when *de minimis* quantities of hazardous substances are present on a site. This guide, therefore, does not address the availability of the innocent purchaser defense in those circumstances. Because petroleum products are excluded from the hazardous substances subject to CERCLA, the innocent purchaser defense is inapplicable to petroleum product releases.

4.1.2 *Use Not Limited to CERCLA*—This guide is designed to assist a user in developing information about the environmental condition of the property and has utility for a wide range of users including those who may have no actual or potential CERCLA concerns.

4.1.2.1 Where fewer than all recognized environmental conditions identified in a Phase I ESA or transaction screen are assessed in the Phase II ESA, the conclusion that no further inquiry is warranted applies only to the recognized environmental conditions assessed. However, this guide should not be construed to require Phase II assessment of all recognized environmental conditions identified in a Phase I ESA or a transaction screen. Where the user's objectives may be otherwise satisfied (for example, establishing the innocent purchaser defense is not the user's objective), a recognized environmental condition identified in a Phase I ESA or transaction screen may be eliminated from further assessment in the Phase II ESA.

4.1.3 *Site- and Transaction-Specific*—A Phase II ESA is site-specific in that it relates to assessing recognized environmental conditions as identified in a Phase I ESA or transaction screen. A Phase II ESA is also transaction-specific. This guide is intended to set forth a level of diligence that will satisfy the innocent purchaser defense where it is sought. The level of diligence set forth in this guide is also intended to generate information of sufficient quality to satisfy different or additional objectives of the user.

4.1.4 *Use by Other Parties*—Transaction-specific assumptions and limitations, based on the user's objectives, will be built into the implementation of this guide for any specific site to the extent the user's objectives go beyond establishing the innocent purchaser defense. Any person who seeks to rely on a Phase II ESA conducted for someone else is cautioned to understand these assumptions and objectives prior to review and use of the findings of the Phase II ESA.

4.2 *Principles*—The following principles are an integral part of this guide and are intended to be referred to in resolving any ambiguity or exercising such discretion as is accorded the user or environmental professional.

4.2.1 *Elimination of Uncertainty*—No ESA can eliminate all uncertainty. Furthermore, any sample, either surface or subsurface, taken for chemical analysis may or may not be representative of a larger population. Professional judgment and interpretation are inherent in the process and uncertainty is inevitable. Additional assessment may be able to reduce the uncertainty.

4.2.1.1 *Failure to Detect*—Even when Phase II work is executed with an appropriate site-specific standard of care, certain conditions present especially difficult detection problems. Such conditions may include, but are not limited to, complex geological settings, the fate and transport characteristics of certain hazardous substances and petroleum products, the distribution of existing contamination, physical limitations imposed by the location of utilities and other man-made objects, and the limitations of assessment technologies.

4.2.1.2 *Inadequate Phase I ESA or Transaction Screen*—If Phase II work is based on an inadequate Phase I ESA or an inadequate transaction screen (for example, one that fails to identify all recognized environmental conditions) there will be an increased risk that the disposal or release of hazardous substances or petroleum products on the property may go undetected and jeopardize the availability of the innocent purchaser defense and the quality of data on which judgments are made. A Phase I ESA or transaction screen, or both, conducted in accordance with the latest edition of Practice E 1527 and Practice E 1528 should provide an adequate basis for a Phase II ESA.

4.2.1.3 *Chemical Analysis Error*—Chemical testing methods have inherent uncertainties and limitations. The environmental professional should build quality control and quality assurance tests into the work description, as outlined in 7.1.

The environmental professional should require the laboratory to report any potential or actual problems experienced, or non-routine events which may have occurred during the testing, so that such problems can be considered in evaluating the data. The environmental professional should subsequently identify such problems in any requested reports or documentation provided to the user.

4.2.2 *Level of Assessment*—Phase II ESAs do not generally require an exhaustive assessment of environmental conditions on property. There is a point at which the cost of information obtained and the time required to obtain it outweigh the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. If hazardous substance or petroleum releases are confirmed on a parcel of property, the extent of further assessment is related to the degree of uncertainty that is acceptable to the user with respect to the real estate transaction.

4.2.3 *Comparison With Subsequent Inquiry*—For purposes of the innocent purchaser defense, Phase II ESAs should be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made.

4.2.4 *Data Usability*—Measurements and sampling data only represent the site conditions at the time of data collection. Therefore, the usability of data collected as part of a Phase II ESA may have a finite lifetime depending on the application and use being made of the data. An environmental professional should evaluate whether previously generated data are appropriate for any subsequent use beyond the original purpose for which it was collected.

5. Contracting Considerations

5.1 *Contracts*—The content and form of the contractual relationship between an environmental professional and user are outside the scope of this guide. The outcome of a Phase II ESA may be adversely affected if the environmental professional and the user do not adequately define their relationship. This guide identifies some of the issues that should be resolved prior to initiation of a Phase II ESA. This guide does not purport to identify all issues that may arise in the course of implementing a Phase II ESA. Nor does it specify how these issues should be resolved. Where the user utilizes the services of an in-house environmental professional, contracting considerations may or may not arise.

5.1.1 *Reporting Obligations*—A requirement to report observations from a Phase II ESA to a governmental entity or third party may be imposed by various authorities, including statutes, regulations, common law, and professional standards. In most cases, statutory, regulatory and common law requirements impose reporting obligations only on the owner, operator, or person in charge or control of the facility or property being assessed. In some circumstances, however, reporting obligations may be legally or voluntarily imposed upon a broader group, including the environmental professional. To avoid disagreement, misunderstanding, or unexpected reporting, the contract between the user and the environmental professional should clearly define the obligations of and protocol for both the user and environmental professional to report to governmental entities or third parties.

5.1.2 *Production of Written Reports and Documentation*—The production of written documentation reflecting the findings of a Phase II ESA raises issues of concern to the user and the environmental professional. The user may be concerned, for example, about the potential for disclosure of sensitive information to the government or third parties and the conflicting interest of ensuring documentation to support an innocent landowner claim. The environmental professional may be concerned that the assessment is well documented to minimize misinterpretation, document uncertainty, and clearly present findings to the user. As a result, the agreement between the user and environmental professional should address the type and scope of written documentation that will be developed to reflect the findings of the Phase II ESA. In this regard, consideration should be given to issues such as the attorney-client, work product and self-evaluation privileges, whether recommendations should be provided separately from the Phase II report, whether the report should be written or oral, and the extent to which the user wants to review a report prior to its becoming “final”. An example format is attached in Appendix X1.

5.1.3 *Confidentiality*—Agreements for confidential treatment of the Phase II ESA, if any, should be included in the contract. This agreement should include any subcontractors used in performance of the assessment.

5.1.4 *Work Performed by Others*—During the implementation of the Phase II assessment, the environmental professional may employ others (for example, drillers, laboratories) to carry out portions of the work. The contract between the environmental professional and the user may specify whether the environmental professional or the user is to be responsible for selecting subcontractors. The contract also may specify that only qualified subcontractors with current and appropriate certifications and licenses may be employed. The contract also may specify the qualifications required of subcontractors.

5.1.5 *Limitation on Scope of Work, Data, Information, or Time*—Any limitations on the information, data collected or the work to be performed during the Phase II ESA, including time allowed for completing the work, and their effect on the results of the assessment, should be clearly understood by the environmental professional and user. Such limitations may be made part of the contract.

5.1.6 *Third Party Reliance On Reports and Other Documentation*—Responsibility for the use of Phase II ESAs by third parties may be governed by the contractual relationship between the user and environmental professional.

5.1.7 *Generation of Waste*—Wastes may be generated during the assessment implemented as part of the Phase II ESA (for example, drill cuttings and purged ground water). The contract between the environmental professional and the user should clearly address the manner in which such wastes are to be handled and disposed. Techniques that minimize the generation of waste should be utilized to the extent feasible, consistent with the information and data quality objectives of the planned assessment and applicable regulatory requirements.

5.1.8 *Damages Caused by Explorations*—Exploration activities risk damaging structures such as utility lines and underground storage tanks when such are present. Intrusive

explorations may also create additional pathways for pollutant migration. Responsibility for identification of subsurface structures may be governed by the contractual relationship between the user and environmental professional. Where the user is not the owner of the property, the owner should be consulted about the location of such structures.

5.1.9 Many states have statutory obligations for contacting utilities through "one-call" programs. Coordination with utility companies or locator services should also be addressed in the contract documents.

5.2 *Responsibility of User*—The following list of responsibilities of the user is not intended to be exhaustive:

5.2.1 The user should provide access to appropriate areas of the site for the environmental professional. The user should provide the environmental professional a site contact name and phone number.

5.2.2 The user should provide to the environmental professional all pertinent documentation and information regarding the site that is reasonably and practicably available, including but not limited to: previously prepared ESAs, other environmental studies, reports, or permits; property appraisals; site plans that identify site features, including buildings and other above ground structures, property boundaries, and underground structures and buried utilities (for example, sanitary and storm sewers, water, gas, telephone, and electric systems, underground storage tanks, oil/water separators, sumps and drywells); site specific health and safety information; and known or suspected environmental conditions.

5.3 *Responsibility of Environmental Professional*—The following list of responsibilities of the environmental professional is not intended to be exhaustive.

5.3.1 The environmental professional should conform to the precepts of this guide and accepted industry practice. The environmental professional should document and explain significant deviations.

5.3.2 The environmental professional should provide the user prompt notice of environmental conditions observed.

5.3.3 The environmental professional should communicate to the user limitations resulting from any time and cost constraints imposed by the user.

5.3.4 The environmental professional should verify with the user, prior to implementation, any substantive deviations from the original scope of work.

5.3.5 The environmental professional should ascertain and observe all site health and safety considerations and regulations applicable to the activities of the environmental professional.

5.3.6 The environmental professional should provide the user a written statement of qualifications, including the qualifications of the individual environmental professional(s) responsible for the Phase II ESA on request.

5.3.7 The environmental professional should not undertake any activity that he or she is not qualified or licensed (where applicable) to perform.

6. Phase II ESA

6.1 *Objective and Purpose*—The objective of conducting a Phase II ESA is to evaluate the recognized environmental conditions identified in the Phase I ESA or transaction screen process. The purpose of conducting a Phase II ESA depends on the objective(s) of the user. Typically, the purposes of a Phase II ESA are to:

6.1.1 Develop sufficient information from which the environmental professional reasonably can render a professional opinion that, with respect to the recognized environmental conditions assessed, hazardous substances have not been disposed or released at the property, thereby satisfying the innocent purchaser defense under CERCLA as to those recognized environmental conditions; or

6.1.2 Develop sufficient information about the presence of a recognized environmental condition at a site to meet the business objectives of the user and to provide sufficient data to assist the user in making informed business decisions, or both.

6.1.3 The Phase II work scope may consist of several iterations and may be terminated at any point, once the objectives of the user have been satisfied.

6.2 *Components*—The components of a Phase II ESA are as follows:

6.2.1 Developing the scope of work,

6.2.2 Assessment activities,

6.2.3 Evaluation and presentation of data, and

6.2.4 Presentation of findings and conclusions.

7. Developing the Scope of Work

7.1 A description of the work to be performed should be developed by the environmental professional to establish the methods and work tasks that achieve the user's Phase II objectives. The description should provide the rationale for planned sampling locations and testing parameters along with identification of selected methodologies and appropriate QA/QC measures. The description may provide for minor field modifications where appropriate. The description should be organized to facilitate the orderly, objective-focused implementation of the plan in the field. A formal written description may not be required or appropriate in all circumstances and may be substituted by another document that contains the same elements, such as proposal or scope of work. Likewise, the sampling, health and safety and chemical testing programs need not be formal, stand-alone documents. In general, there are seven main tasks in developing a description of the work, as described in 7.2 through 7.8

7.2 *Site Limitations*—The environmental professional is responsible for anticipating foreseeable physical and logistical impediments which interfere with, or limit the ability to conduct explorations, analyses and sampling, for example, low ceilings, narrow alleyways, soft ground, steep slopes, known subsurface structures, such as utilities, etc.

7.3 *Review Existing Information*—Readily available existing information should be reviewed to identify or establish those characteristics of the site and its vicinity which:

7.3.1 Constitute the recognized environmental condition(s) being assessed in the Phase II;

7.3.2 Affect the potential distribution and mobility of hazardous substances or petroleum products in structures, on the ground, in ground water, in soils, or in surface water and environs at the site; and

7.3.3 Affect the manner in which the presence of hazardous substances or petroleum products may be assessed.

7.3.4 The review of readily available existing information

should serve as the basis for evaluating the likely distribution of hazardous substances or petroleum products at the site, identifying appropriate sampling locations, and selecting appropriate sampling and analytical methodologies. Readily available information may be gained in review of Phase I ESAs conducted in accordance with Practice E 1527 and transaction screens conducted in accordance with Practice E 1528. Other ESAs or reports may be used where the information, in the judgment of the environmental professional, can be reasonably relied upon.

7.3.5 The environmental professional may review additional sources of information as is appropriate to the property, or as required by the judgment of the environmental professional. Information developed at this stage of the assessment may eliminate recognized environmental conditions identified in a Phase I ESA or transaction screen from further Phase II assessment where, in the judgment of the environmental professional, the additional information adequately demonstrates that hazardous substances or petroleum products associated with a previously identified recognized environmental condition are unlikely to be present at the property. See 10.1.

7.4 *Potential Distributions of Contaminants*—The environmental professional should consider the likely distribution of potential contaminants. This requires that the environmental professional consider the properties, behaviors, and fate and transport characteristics of the contaminant in a setting like that being assessed.

7.5 *Sampling*—A sampling program should be designed to provide collection of potentially contaminated environmental media, if they occur, at locations and depths where the highest concentrations are likely to occur, as determined pursuant to the provisions of this section.

7.6 *Health and Safety*—The work description should include personnel health and safety precautions to be followed in accordance with applicable federal law or state or local equivalents and any requirements imposed by the owner or occupant of the property or by the user.

7.7 *Chemical Testing*—The chemical testing program should be designed to detect the contaminants suspected to be present in the samples collected in implementing 7.5 above. The chemical tests should be appropriate for detecting the indicator constituents of the hazardous substances and petroleum products identified in the review performed under 7.3 above (for example, target analytes), consistent with 7.4 above. The chemical testing program should include tests which provide quality assurance (QA) and techniques that provide quality control (QC) over the chemical analyses. QA/QC, including detection limits of the chemical testing plan, should be consistent with the intended use of the data. The chemical testing program may include both field analytical and laboratory analytical techniques.

7.7.1 The environmental professional should specify in advance the analytical methods to be used as well as the requirements for data deliverables (for example, tabulated results, individual analysis sheets, chromatograms, spike recoveries, instrument calibration data, etc.) and quality control information (that is, project-specific or only laboratory batch-specific QC sample analysis).

7.7.2 An extensive body of methods is available for the analysis of environmental samples gathered in the course of a Phase II ESA. Several distinct compilations of methods for the analysis of environmental samples have been developed, principally by EPA and ASTM, for different purposes, primarily for hazardous waste management, industrial and municipal wastewater monitoring, assessment and cleanup of potential Superfund sites, and monitoring of the public water supply. An example is the compilation titled *Test Methods for Evaluating Solid Waste* (SW-846) prepared by EPA.

7.7.3 For each specific medium and target analyte, a variety of methods may be appropriate, depending upon the particular circumstances. The environmental professional should select methods for the analysis of samples giving consideration to the intended end-use of the resulting data, the user's data quality objectives, the statutory, regulatory, or policy framework applicable to the sample in question, and any limitations or allowances associated with the level of effort as understood by the environmental professional and user. The selected analytical method should be appropriate for the sample medium, target analyte, and detection limits. The choice of analytical methods will influence conclusions regarding recognized environmental conditions.

7.8 *Quality Assurance/Quality Control Procedures*:

7.8.1 Appropriate quality assurance/quality control (QA/QC) procedures should be included in the Phase II ESA to allow for assessment of the quality of the data collected. The QA/QC measures may include, for example, written field sampling protocol, decontamination procedures, instrument calibration, the preparation and analysis of trip blanks, equipment blanks, duplicate samples, and holding times for sample analysis. The data quality objectives of the user will influence the decision whether to include QA/QC samples and the selection of particular QA/QC procedures.

7.8.2 Any analytical laboratory used in the course of the Phase II ESA should have an established QA/QC program sufficient to allow assessment of the precision and accuracy of the data it generates. The environmental professional should verify the certification or licensing of the analytical laboratory where applicable, or otherwise evaluate the appropriateness of the QA/QC program of the analytical laboratory prior to engaging its services. Environmental professionals should use laboratories that hold appropriate licenses and certifications for the analyses to be performed.

8. Assessment Activities

8.1 The assessment activities to be conducted under the Phase II ESA may range from field screening methods to intrusive multi-media sampling and laboratory analysis. This section references an overview of recognized intrusive and non-intrusive site assessment methodologies and common field screening activities and analytical protocols. The selection of one or a combination of these methods will be based on the stated objectives of the user and the judgment of the environmental professional. Appropriate QA/QC measures should be implemented according to the work plan.

8.2 *Field Screening and Field Analytical Techniques*:

8.2.1 Field methods may be used for the purpose of characterizing certain physical attributes of a site and for the

assessment of the presence and distribution of a specific chemical or chemical classes at a sampling location. Field screening and field analytical techniques include methods of data gathering which may result in real-time acquisition of data. Field screening and field analytical techniques generally allow rapid, multiple measurements at relatively low cost. Because the accuracy and reliability of data produced by field instruments varies, the selection of particular field instruments and methods is influenced by the data quality objectives of the assessment. The quality of the data generated should be consistent with the intent of the assessment.

8.2.1.1 Some common field screening instruments, such as portable flame and photoionization detectors, have higher detection limits and lower precision and accuracy compared to field or laboratory analytical instruments and are most suited to general qualitative analyses and health and safety monitoring.

8.2.1.2 Field analytical methods include all chemical analysis methods capable of providing chemical-specific quantitative data in the field or non-laboratory setting. More reliable data than obtained through field screening may be obtained in the field or laboratory through the use of portable gas chromatographs or mobile field laboratories. The highest degree of data accuracy can generally be obtained by use of EPA and ASTM analytical methods.

8.2.2 Field screening and field analytical techniques may be used in Phase II ESAs for: qualitative and quantitative confirmation of the presence of contaminants constituting a recognized environmental condition, preliminary mapping of the areal and vertical distribution of contaminants, guiding the collection of samples for more rigorous analysis, and guiding the placement of monitoring wells. The environmental professional should establish standard procedures and protocols prior to the implementation of field screening and field analytical efforts.

8.2.3 Common field methods may assess soil, soil gas, surface water and ground water. Field screening and field analytical methods include use of ion-selective electrodes, detection of volatile compounds using field gas chromatographs, and detection of inorganic constituents and semi-volatile organic chemicals using colorimetric wet chemistry methods, including enzyme immunoassay tests. Section 5.1.5 and Section 12 in Guide D 5730, further address the use of field screening and field analytical methods (see 2.1).

8.3 *Environmental Media Sampling*:

8.3.1 Phase II ESAs generally require environmental sampling and field or laboratory analysis, or both, to determine whether hazardous substances or petroleum products are present on a property. The selection of sampling locations and analytical parameters should be consistent with the work description developed at the onset of the project. Deviations from the description of work to be performed should be noted and justified in the final report. Sampling locations should be documented to allow the sampling event to be reproduced later. The need for surveyed locations is subject to the agreement between the user and the environmental professional.

8.3.2 The Phase II sampling activities should be conducted to avoid the introduction of contaminants into the sample from the sampling equipment, and from environmental factors and to avoid, if feasible, and minimize the spread of contaminants in the environment.

8.3.3 Sampling methods should be selected based on requirements of the local jurisdiction, where applicable. Sampling methods that may be employed during a Phase II site assessment are among the standards identified in Guide D 5730. See 2.1. New technologies are frequently introduced.

8.4 *Sampling Handling*:

8.4.1 Sample handling includes sample collection and containerization, filtration, and preservation. Sample handling procedures should be selected based on requirements of local jurisdictions, where applicable. Sample containerization and preservation techniques are among the standards identified in Guide D 5730. See 2.1. Sample handling methods approved or recommended in the applicable analytical protocol should be used.

8.4.2 A completed chain of custody record should accompany each shipment of samples to the analytical laboratory, and should be included in the written report of the assessment. Chain of custody records provide written documentation regarding sample collection and handling and identify the persons involved in the chain of sample possession. Chain of custody records also provide a written record of requested analytical parameters.

8.4.3 The environmental professional should take appropriate measures to deliver the samples such that the analysis can be completed within the appropriate sample holding times.

9. Evaluation of Data

9.1 The implementation of the work that was planned under Section 7 will generate information and data on environmental conditions at the property that must be evaluated. To complete the Phase II ESA, this information and data must be analyzed to qualify the adequacy of the work performed, and evaluate whether a release or disposal of hazardous substances or petroleum products has occurred.

9.2 *Verification of Assumptions*[8]—The first step in analysis of data is to consider whether the assumptions upon which the work description was based were valid. That is, one asks whether samples were collected of the appropriate media (for example, soil, ground water) at the right location and depth (that is, where the highest concentrations of contaminants should be, if the potential release had actually occurred).

9.2.1 A work description is typically based upon assumptions as to subsurface physical conditions, for example, relative soil or aquifer permeabilities, depth to the water table, ground water flow direction and characteristics of potential contaminants. Actual information on these conditions is usually gained through the explorations, sampling, and observations completed under the work description (at least for those studies where subsurface conditions are of concern). The environmental professional should evaluate whether the assumptions were valid, in light of the actual conditions encountered. If an assumption was not valid, then the work performed may not

[8] In some jurisdictions, the evaluation and analysis of the subsurface conditions may require a licensed individual (for example, registered geologist, professional engineer).

have verified the recognized environmental conditions and additional iterations may be appropriate.

9.2.2 For example, the work description may have called for the installation of a number of observation wells, some of which were intended to be downgradient of areas where releases may have occurred. However, the water levels measured in the wells might have indicated that ground water flowed in a different direction than that inferred for development of the description of work to be performed. Hence the wells were not downgradient of the potential release areas and their purpose was not met. This would indicate that additional site work would have to be done to successfully complete the Phase II ESA. On the other hand, water levels may have confirmed that the wells were downgradient, as intended. They are then qualified as meeting their purpose, and the analysis and interpretation of data relating to them can proceed.

9.3 *Verification of Data*—The second step is to evaluate whether any target analytes detected in the samples are in fact attributable to the site. This requires the environmental professional to determine whether the analytical results should be questioned based on the QA/QC procedures described in 7.8. When data quality is determined to be acceptable, test results should be interpreted.

10. Interpretation of Results

10.1 The results of the Phase II explorations, sampling and testing should be interpreted to determine the significance of the data as they relate to the user's objectives. The data should also be evaluated to determine if other sources of contamination or more highly contaminated media may exist at the site but were not assessed in accordance with this guide. If chemicals that occur in nature are detected, the data must be interpreted to determine whether they are naturally occurring or are present as a result of human activity. For example, lead occurs naturally in soils and waters, at a range of concentrations. Mere detection of lead does not necessarily reflect lead disposal or release. The environmental professional must judge the likelihood that the lead level detected exceeded the naturally occurring lead level in the site vicinity and must evaluate potential sources (for example, fill materials present on the property in an area where use of mine tailings as fill was prevalent) to determine whether disposal or a release has occurred.

10.2 *Elimination of Recognized Environmental Conditions*—If hazardous substances or petroleum products were not detected, and the Phase II ESA information and data has been evaluated and found by the environmental professional to provide sufficient information from which the environmental professional can render a professional opinion that there is no reasonable basis for suspecting the disposal or release of hazardous substances at the site, then no further work is necessary to satisfy the "all appropriate inquiry" element of the innocent purchaser provision of CERCLA with respect to the recognized environmental conditions assessed.

10.2.1 Where fewer than all recognized environmental conditions identified in a Phase I ESA or transaction screen are assessed in the Phase II ESA, the conclusion that no further inquiry is warranted applies only to the recognized environmental conditions assessed. However, this guide should not be construed to require Phase II assessment of all recognized environmental conditions identified in a Phase I ESA or a transaction screen. Where the user's objectives may be otherwise satisfied (for example, establishing the innocent purchaser defense is not the user's objective), a recognized environmental condition identified in a Phase I ESA or Transaction Screen may be eliminated from further assessment in the Phase II ESA.

10.2.2 A recognized environmental condition identified in a Phase I ESA or transaction screen may also be eliminated from the full scope of Phase II ESA procedures by developing further information not included in the Phase I or transaction screen. For example, the user may obtain a tank closure report not included in the Phase I report that confirms there were no releases from the tank that was identified as a recognized environmental condition in the Phase I or transaction screen. This new information may eliminate the need for additional Phase II tasks with respect to that recognized environmental condition. Similarly, a recognized environmental condition identified in the Phase I or transaction screen due to off-site conditions (for example, a nearby CERCLIS or LUST site) may be eliminated from a Phase II ESA if the records associated with such sites confirm that hazardous substances or petroleum products have not migrated or are not likely to migrate onto the property.

10.3 *Confirmation of Recognized Environmental Conditions*—If the Phase II ESA was conducted in accordance with this guide and the presence of hazardous substances or petroleum products at the property is confirmed under conditions that indicate disposal or a release, then the innocent purchaser defense may not be supportable with respect to these confirmed substances. See 4.1.1. If hazardous substances or petroleum products were detected, and if requested by the user, the Phase II information and data may be interpreted to determine what further work is required or desirable to assess the nature and extent of the release. This guide should not be construed to require additional assessment.

10.3.1 Additional assessment may be requested by the user if further information is desired. The objectives of the user will determine the scope of additional assessment, if any.

10.3.2 In order to guide the decision whether to conduct an additional assessment and to form the objectives of that assessment, data which confirms the presence of hazardous substances or petroleum products may be compared to applicable or relevant and appropriate requirements ("ARARs") to determine whether such standards are exceeded. The identification and interpretation of ARARs may be assisted by consultation with legal counsel having environmental expertise and other environmental professionals.[9]

10.3.3 This guide does not address the multitude of factors, in addition to environmental data, that may be considered by a user in determining whether additional assessment is warranted where the presence of hazardous substances or petroleum products under conditions that indicate disposal or release has

[9] *ASTM Book Reference No. DS 64* is a compilation of cleanup criteria for contaminated soil and ground water in the fifty states and in selected countries outside the United States. Because such criteria continue to evolve, care should be taken to determine the current status of such criteria.

been confirmed. This guide should not be construed to elevate the consideration of environmental data above economic or other business considerations in business decisions. Such considerations and their impact on transactional decisions are properly within the purview of the parties to the transaction and are beyond the scope of this guide.

11. Phase II ESA Report Preparation

11.1 *Purpose*—The purpose of a written report, when one is prepared, is to describe the work performed and provide documentation of the data and evaluation that *(a)* constitutes the factual findings, *(b)* supports the conclusions of the environmental professional, *(c)* facilitates decisions about the transaction, and *(d)* documents the basis for the decision whether further assessment is warranted. Although generally prepared, a written report is not required of all Phase II ESAs and is subject to the agreement between the user and the environmental professional (see 5.1.2).

11.2 *Characteristics*—A written Phase II ESA report generally has three characteristics: the components of a scientific report, good technical writing, and clear and accurate presentation of the results and conclusions, and, if requested, recommendations to the user. Scientific reports generally contain the following sections: an introduction, a summary of background information, a description of site conditions, a description of work performed and methods used, data presentation and evaluation, and findings and conclusions. The report is typically supported by appropriate tables, figures and appendices. Good technical writing is consistent, accurate, concise, clear and complete. The whole report needs to stand on its own.

11.3 *Format of Report*—An example report format for a written Phase II ESA report is presented in Appendix X1.

11.4 *Content of Report*:

11.4.1 *Introductory Components*—The introductory components of a Phase II ESA usually include a transmittal letter, executive summary, cover page, and table of contents.

11.4.1.1 *Signatures*—The environmental professional(s) responsible for the Phase II ESA should sign the report. Signatures, along with typed names and titles may appear in the transmittal letter, on the cover page, or on a signature page at the end of the main text of the report. Where required by the local jurisdiction, professional seals, license type and license number, as applicable, should be affixed.

11.4.1.2 *Transmittal Letter*—A transmittal letter documents the date of a report's delivery and identifies the intended recipients of the report. It also may contain other important information including a description of the report as draft or final and a designation that the report is confidential or subject to attorney-client privilege, or both. The transmittal letter also may identify the staff responsible for the work.

11.4.1.3 *Cover Page*—The cover or title page identifies the following items: the subject property name and address, the preparer of the report, the person for whom the report was prepared and the date of the report. It may also include a statement of confidentiality. If appropriate, it also may include a statement identifying the document as subject to certain legal privileges, such as attorney-work product and attorney/client privileges.

11.4.1.4 *Table of Contents*—The table of contents refers the reader to the location of the major sections of the report and to the figures, tables and appendices. All section, figure, table and appendix titles should match those of the text. See Appendix X1 for a sample table of contents.

11.4.1.5 *Executive Summary*—An executive summary provides a concise overview of the findings of the ESA and is considered optional. As a summary, it should generally be brief and should not discuss material not included in the text of the report.

11.5 *Main Text*—The main text of the report generally contains an introduction, a discussion of background information, a description of work performed during the Phase II ESA and methods used, data presentation and evaluation, and a discussion of findings and conclusions.

11.5.1 *Introduction*—The introduction should generally include: the purpose and scope of the Phase II ESA; any special terms, conditions, or limitations; the date of authorization of the project and any changes. The introduction also should identify items not included within the scope of the Phase II ESA that might have been expected to be included, for example, recognized environmental conditions not included and the reasons for eliminating them.

11.5.1.1 The introduction also references the guiding standards including contracts/service agreements, regulatory requirements, and the description of work to be performed. The introduction generally identifies the specific tasks comprising the work performed in the order in which they will be described later.

11.5.2 *Background Information*—This section should include a description of the site and its features, a description of the physical site setting, a brief discussion of the site's history and use and the use of adjacent properties, and a summary of previous environmental site assessments. Reference to existing ESA reports may convey this information.

11.5.2.1 This section should identify the data and conclusions that led to the performance of the Phase II ESA. If the Phase II ESA is based on earlier environmental site assessments, the earlier ESAs should be precisely identified (for example, by reference to report title, project number, author and date of any report). Where appropriate, prior ESAs may be included in an appendix. If recommendations for further work were included in a referenced prior ESA but were not followed in the Phase II ESA, an explanation in this section is appropriate.

11.5.3 *Phase II ESA Activities*—This section should summarize the work conducted. This section should describe what was done, identify the methods that were used, identify the location of the Phase II ESA activities and pertinent site conditions. This section also should explain the rationale for the work performed, including the review of supplemental records and the selection of sampling locations, analytical parameters and methodologies. Deviations from the work description and deviations from standard methodologies also should be explained.

11.5.3.1 Methods used should be identified by reference to a specific published standard or method such as ASTM, state protocols, or EPA methodologies. Other methods used (for

example, standard operating procedures for a particular company) should be described in detail. Where appropriate, the details of methods and procedures used can be included in an appendix.

11.5.4 *Evaluation and Presentation of Results*—Results of the Phase II ESA should be presented in a logical order and should be summarized to allow the reader to more readily follow the discussion of findings and conclusions which appears in the next section of the report. Results may be presented in text, in tables, and/or in figures. Reference to the location of data in the appendices is appropriate. Results should be presented consistently and accurately.

11.5.4.1 *Evaluation*—Evaluation of data involves verifying assumptions underlying the scope of work as they relate to meeting objectives and determining whether chemical constituents detected in samples were attributable to site conditions or to QA/QC failures. See Section 9 for a detailed discussion of data evaluation.

11.5.4.2 *Presentation*—The presentation of results should be organized to assist the reader's understanding of the interpretation of the chemical analysis data that follows in the next section of the report. Organizational divisions may be by media (for example, soil data presented separately from ground water data), contaminant type (for example, organic vs. inorganic contaminants), source (for example, contamination from leaking underground storage tank versus contamination from drum storage area), or other factors.

11.5.4.3 The specific information presented will depend on the activities performed. Although Phase II ESAs can involve the full range of environmental media, they most typically involve sampling and chemical analysis or screening of soil, vapors and/or ground water.

11.5.5 For purposes of illustration, the following information should generally be presented for the referenced activities:

11.5.5.1 *Soil Sampling*—The locations of sampling points in relation to potential sources; the depths of sampling; the depth to pertinent horizons, such as the water table and the fill/natural soil contact; the sampling and analytical methods used; and the results of chemical analyses.

11.5.5.2 *Soil Gas Sampling*—The locations of sampling points in relation to potential sources; the depths of sampling; the depth to pertinent horizons, such as the water table and the fill/natural soil contact; the sampling and analytical methods used; and the results of chemical analyses.

11.5.5.3 *Ground Water Sampling*—The locations of sampling points in relation to potential sources; water level data (for example, depth to water or water table elevation, screened interval elevation, filtered interval elevation); the sampling and analytical methods used; and the results of chemical analyses.

11.5.6 *Discussion of Findings and Conclusions*—Where a written report of a Phase II ESA is prepared, it should have a findings and conclusions section that includes:

11.5.6.1 A statement that the Phase II ESA was conducted in substantive accordance with the guidance contained in this guide and in accordance with the description of work to be performed, and a description of any deviations from the assessment activities that were planned;

11.5.6.2 A summary description of: the nature of the recognized environmental conditions identified in previous work, the assessments performed to evaluate the identified recognized environmental conditions, the data generated from the assessments, the geologic and hydrogeologic conditions encountered, and any limitations of the data produced and their impact on conclusions;

11.5.6.3 The environmental professional's interpretation of the significance of the data as they relate to the user's objectives. Appropriate citations and references to standards, guidelines and sources for background concentrations should be included. See Section 10 for a detailed discussion of interpretation of results;

11.5.6.4 A statement whether, in the judgment of the environmental professional, the data provides sufficient information to support a professional opinion that there is no reasonable basis for suspecting the disposal or release of hazardous substances or petroleum products at the site with respect to the recognized environmental conditions assessed, and that no further assessment is necessary; or that with respect to the recognized environmental conditions assessed, hazardous substances or petroleum products have been released or disposed at the property; and

11.5.6.5 Where applicable, a specific explanation of data insufficiencies that prevent a conclusion that hazardous substances or petroleum products were or were not released or disposed at the property.

11.5.7 *Recommendations*—Recommendations for further work may be included at the option of the user.

11.5.8 *Concluding Components*—The report should contain tables, figures and appendices as necessary or appropriate to explain and support the main text of the report.

11.5.8.1 *Tables and Figures*—Tables and figures may be used as a summary presentation of data. Guidelines for data presentation in 11.5.4 apply to tables and figures as well as to text.

11.5.8.2 Figures that show potential sources of contamination, sampling points, locations of other activities and surface and subsurface structures can significantly aid the understanding of the reader. Figures should be dated and should include a north arrow, a scale as appropriate to the level of accuracy of the drawing (or notation that the figure is not to scale), a legend, a title, and other appropriate identification. If figures are based on the work of others, the source and its date should be referenced.

11.5.8.3 *Appendices*—The following is a non-exhaustive list of materials that may be appropriate for inclusion in appendices to a Phase II ESA report: photographs, subsurface exploration logs, laboratory reports, with quality control information, chain of custody forms, identification of specific methods, and reports of previous environmental site assessments.

11.6 *Additional Services*—Any additional services including a broader scope of assessment, more detailed conclusions, liability/risk evaluations, recommendations for additional Phase II assessment, remediation techniques, etc., are beyond the scope of this guide, and should only be included in the report if so agreed by the user and the environmental professional.

12. Non-Scope Considerations

12.1 *General*:

12.1.1 *Additional Issues*—There may be environmental issues or conditions at a property that parties may wish to assess in connection with commercial property transactions that are outside the scope of this guide (the non-scope considerations). As noted by the legal analysis in Appendix X1 of Practices E 1527 and E 1528, some substances may be present on property in quantities and under conditions that may lead to contamination of the property or of nearby properties but are not included in CERCLA's definition of hazardous substances (42 U.S.C. § 9601(14)) or do not otherwise present potential CERCLA liability. In any case, they are beyond the scope of this guide.

12.1.2 *Outside Standard Guide*—Whether or not a user elects to inquire into non-scope considerations in connection with an ESA implemented in accordance with this guide or any other ESA, no assessment of such non-scope considerations is required for appropriate inquiry as described by this guide.

12.1.3 *Other Standards*—There may be standards or protocols for assessment of potential hazards and conditions associated with non-scope conditions developed by governmental entities, professional organizations, or other private entities, including ASTM.

12.1.4 *List of Additional Issues*—Several considerations that may be important in property transactions but that are outside the scope of this guide include asbestos-containing materials, radon, lead-based paint, lead in drinking water, and wetlands. No implication is intended as to the relative importance of such considerations, nor is this list intended to be all-inclusive.

APPENDIX

(Nonmandatory Information)

X1. EXAMPLE TABLE OF CONTENTS AND REPORT FORMAT

Where a written report is desired by the user, a Phase II ESA report that includes the sections described below, is suggested:

Transmittal Letter
Cover Page
Table of Contents

X1.1 Executive Summary

X1.2 Introduction
- X1.2.1 Purpose
- X1.2.2 Special Terms and Conditions
- X1.2.3 Limitations and Exceptions of Assessment
- X1.2.4 Limiting Conditions and Methodology Used

X1.3 Background (may be by reference to prior environmental reports):
- X1.3.1 Site Description and Features
- X1.3.2 Physical Setting
- X1.3.3 Site History and Land Use
- X1.3.4 Adjacent Property Land Use
- X1.3.5 Summary of Previous Assessments

X1.4 Phase II Activities
- X1.4.1 Scope of Assessment:
  - X1.4.1.1 Supplemental Record Review
  - X1.4.1.2 Conceptual Site Model and Sampling Plan
  - X1.4.1.3 Chemical Testing Plan
  - X1.4.1.4 Deviations from the Work Plan
- X1.4.2 Field Explorations and Methods
  - X1.4.2.1 Test Pits
  - X1.4.2.2 Test Borings
  - X1.4.2.3 Monitoring Well Installations
    - 1) Ground water elevation measurement
    - 2) Ground water flow direction
  - X1.4.2.4 Other
- X1.4.3 Sampling and Chemical Analyses and Methods
  - X1.4.3.1 Soil
  - X1.4.3.2 Ground water
  - X1.4.3.3 Other

X1.5 Evaluation and Presentation of Results
- X1.5.1 Subsurface Conditions