

To Buy or Not to Buy:

Standards and practices of assessing environmental aspects of
sites and companies

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Abstract

This research set out to describe the current state of Environmental due diligence, how it evolved, current trends, and where it may be headed. The approach taken to accomplish this was a literature review, comparison of international Environmental due diligence standards, in particular ASTM E-1527 00 and ISO 14015, review of six case studies of environmental due diligence assessment reports, and interviews with actors involved in the environmental due diligence process, including those who conduct and those who purchase, the environmental due diligence assessment. The research identified commonalities and differences between the standards, and found that the standards ISO 14015 and ASTM E-1527 are not commonly followed in conducting assessments. Instead, consultancies and companies often have their own standards, but even these are not explicitly followed, but served as guidelines. Interviews as well as case studies indicated that areas covered by environmental due diligence assessments are largely consistent with the exceptions of corporate social responsibility and sustainability issues, which were covered less consistently. The manner in which the consistently covered issues are assessed and reported varies. Trends, potential future direction of the field, and ideas for further research are discussed.

Executive Summary

This research set out to describe the current state of Environmental Due Diligence (EDD), how it evolved, current trends, and where it may be headed. Environmental due diligence is a young field. The research questions addressed in this paper are:

- Who are the actors in EDD assessment, what are the methods they apply and what standards are they using in the due diligence process?
- How has the EDD practice evolved, what does it look like now, (i.e. what is expected and what is delivered in an EDD assessment) and are current practices consistent with the practices described in standards ASTM E-1527 and ISO 14015?
- What are the trends in the field of EDD, and what do actors predict for the future of EDD assessment?

The approach taken to accomplish this was threefold:

1. a literature review, comparison of international environmental due diligence standards, in particular ASTM E-1527 00 and ISO 14015;
2. review of six case studies of environmental due diligence assessment reports; and,
3. interviews with actors involved in the environmental due diligence process. Interviewees included those who conduct and those who purchase, the environmental due diligence assessment.

The research identified commonalities and differences between the standards, which can be explained to a large degree by the different purposes behind the two standards. While ASTM 1527 was developed in the United States as a means of achieving innocent landowner status as a defense against liability for contaminated property, ISO 14015 was developed after the field of environmental due diligence had some time to develop, and has a much broader scope, but also more flexibility.

Review of case studies and interviews revealed that the standards ISO 14015 and ASTM E-1527 are not commonly followed in conducting assessments. Instead, consultancies and companies often have their own standards, but even these are not explicitly followed, but served as guidelines. A set of common features in an EDD assessment was established in looking at the standards, and used as a basis of comparison for the case studies.

Interviews as well as case studies indicated that areas covered by environmental due diligence assessments are largely consistent with the exceptions of corporate social responsibility and sustainability issues, which were covered less consistently. The manner in which the consistently covered issues are assessed and reported varies. Interview results indicated that calling off a transaction as a result of environmental aspects is rare. The preferred method of risk transfer among the interviewees varied. Most interviewees indicated that it depended very much on the specifics of the individual deal.

Identified trends in, and the future of EDD assessment according to the interviewees included expansion of the EDD process to smaller and medium sized organizations, a broadened scope, more sophisticated risk modeling, and adjustments to a new all appropriate inquiry rule from the United States Environmental Protection Agency.

Introduction

“Look before you leap”
“Measure twice, cut once”
“Caveat Emptor”
-Common Adages

We have many sayings urging caution and planning, but often it takes something going wrong before one knows what to be cautious of, and how cautious. This paper looks at the practice and standards for exercising *due diligence*, or appropriate caution, in environmental aspects of the pre-purchase phase of corporate mergers and acquisitions. Although the corporate strategy often involves growth through acquisitions and mergers, it is not clear that acquisitions or mergers in and of themselves create added value, in fact the opposite may be true, as is illustrated below (Fig 1). These three studies showed that acquisitions and mergers are in fact not associated with value being created in a majority of cases.

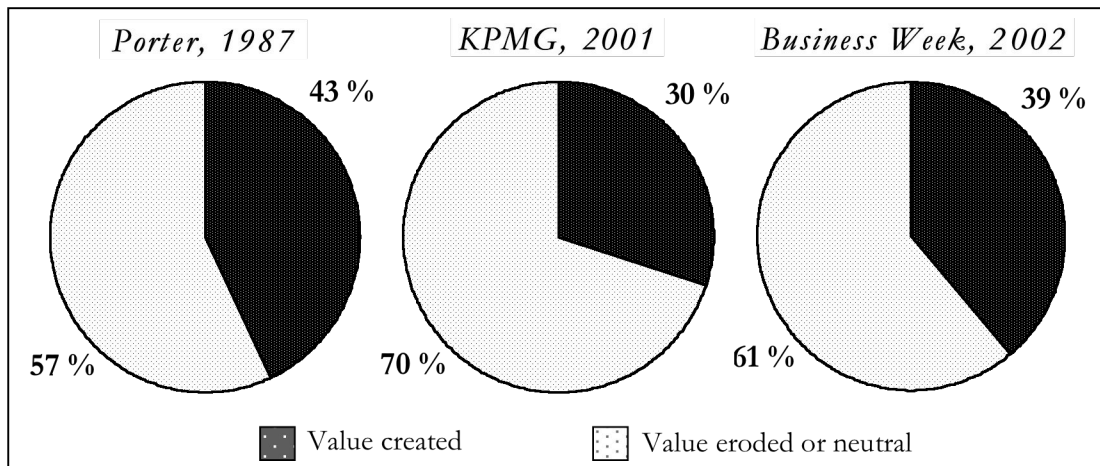


Figure 1: Three Studies on Adding Value Through Acquisitions and Mergers. (Adapted from Sevenius, 2003).

It is to increase the likelihood that an acquisition or merger will go smoothly and therefore add value, that due diligence is performed (Hendricks, 2000). Common sense and self-preservation dictate that you get to know something before you acquire it. Before buying a used car, you may drive it, look at consumer reports and technical specifications, and have an expert, maybe a mechanic, assess its functionality. The risks associated with acquiring a company or property may be more complex, but it also has a history with aspect unknown to you, and so the principles are the same; instead of driving a car, you visit the company you are going to acquire, and become familiar with how it functions. Instead of looking at product reviews, consumer reports and technical specifications, you review pertinent available documentation, and where in purchasing a car you may have a mechanic as the expert, the expertise needed in corporate mergers and acquisitions may be less clear-cut. This pre-acquisition process of assessing the state, including

strengths and weaknesses of a company, is referred to as ‘due diligence.’ As the worth of a company encompasses more than money, so does the audit need to cover more than just financial questions. It must consider social, environmental, and economic capital. In the end, each of these types of capital is reflected in monetary worth. Due diligence in mergers and acquisitions can consider a number of issues, including: finance, markets, competitions, investments, insurances, research and development, human capital, synergies, liabilities, environment, occupational health and safety, and corporate social responsibility.

Each issue has its associated aspects, experts and risks, but they are inter-related and over-lapping. The field of environmental due diligence (hereafter EDD), addressed in this paper, is relatively new. It has developed rapidly in the last two decades. While there were detailed environmental risk and liability assessment procedures established in the United States as early as the late 1980’s (Office of Regulatory Affairs, 1989), environmental due diligence is still developing. The role of environmental issues within the scope of corporate due diligence is expanding, as will be seen in this paper. In the due diligence process, consideration of environmental issues is currently limited primarily to transaction and integration phases. This is illustrated in the figure below, which outlines steps in the due diligence process.

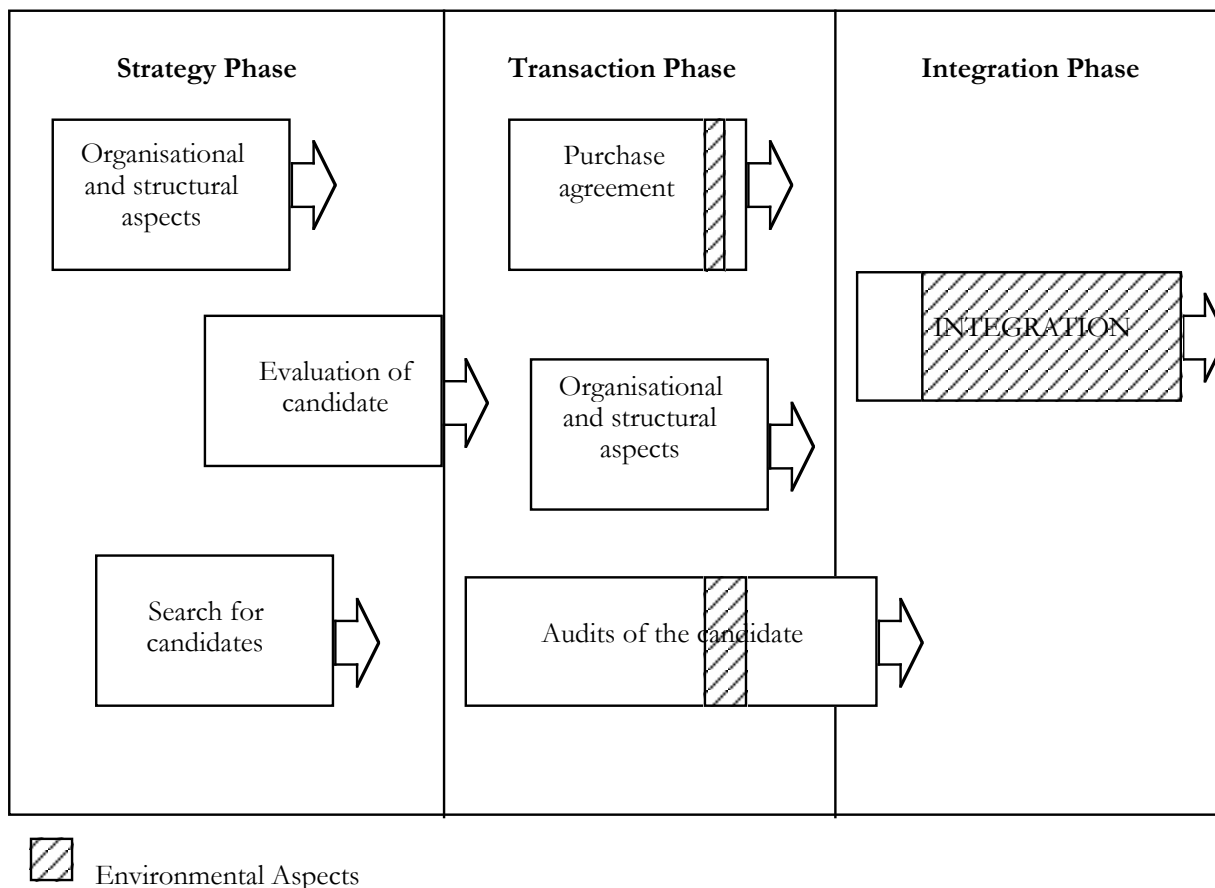


Figure 2: Environmental Aspects in the Transaction Process. (Adapted from Brorson, 2005).

History of environmental damage can be a huge financial liability. If a company purchases property and later discovers that there was severe environmental damage that happened previous to the sale, then, in most cases they, as the new owner of the property are liable for clean-up and/ or remediation of that damage. In cases of toxic spills or improper disposal of hazardous waste, this can be very expensive. An idea of just how expensive the clean up is, is reflected in the size of the United States' superfund (also known as CERCLA, or Comprehensive Environmental Response, Compensation, and Liability Act of 1980). This fund was set up to deal with environmental remediation in the worst cases of hazardous waste contamination, and spent over 2 billion US dollars a year (2003 equivalent) per year in the 1990's. Today it still spends over a billion US dollars per year (USEPA, 2004). This despite the fact that EPA officials estimate over 70% of remediation costs are now paid by the polluters (Borenstein, 2003). In fact, it is estimated that over 20.6 billion US dollars has been spent by companies, in conjunction with this act since it passed 25 years ago (Ryan, 2003). Liabilities and accidents on an enormous scale have shaped the field of environmental due diligence assessment. Environmental issues have come to be such an issue that there have even been claims that: "Anecdotal evidence indicates that more deals upon which preliminary agreements were reached were eventually terminated over environmental issues than any other" (Bing, 1996).

In a broader context, in addition to avoiding litigation and financial obligations inherited from a previous owner, due diligence can help to ensure that one is not buying into a bad legacy, and perpetuating bad practices. Particularly in the case of environmental audits, it can help to provide motivation for companies to maintain good practices, (good risk management) as the costs of poor environmental practice are likely to be reflected in the selling of the company or it's holdings, when and if the buyer performs a due diligence audit. This liability risk is increasing as more and more moneylenders have environmental due diligence audits as a prerequisite to their financial backing. Because of these things, common practice and standards for conducting EDD have sprung up. Investigating just how standard and common these practices are is the focus of this paper.

1.1 Purpose/ Aim

The purpose of this paper is to investigate the state of environmental due diligence audits today, to look at how they are changing, where they are succeeding, and where they can be improved.

1.2 Research Questions

The research questions addressed in this paper are:

- Who are the actors in EDD assessment, what are the methods they apply, and what standards are they using in the due diligence process?
- How has the EDD practice evolved, what does it look like now (i.e. what is expected and what is delivered in an EDD assessment,) and are current practices consistent with the practices described in standards ASTM E-1527 and ISO 14015?
- What are trends in the field of EDD, and what do actors predict for the future of EDD assessment?

1.3 Scope and Limitations

To answer the research questions, three steps were taken: Firstly, two standards created by standardizing organizations were outlined and compared to each other and to a sample corporate standard. Secondly, six case studies of due diligence audits spanning twelve years were examined to see how environmental due diligence was applied. Thirdly, interviews were conducted with actors involved in due diligence auditing. These actors included people involved in *creating* due diligence audits, and people involved in *purchasing* due diligence audits, including legal advisors.

Interview results were limited by the availability and willingness of the actors to be interviewed during the research period for this paper. One limitation of this thesis is research period coincided with Swedish summer holiday season. This meant that actors often were unavailable for interviews due to the nature of due diligence auditing, involving intense periods of work and much travel time. Results of this paper are a qualitative and quantitative look into how environmental due diligence has evolved, the state of it today, and where it may be going.

2 Research Methodology

2.1 Literature Review

In conducting background research for this paper, it became obvious that there is a lack of peer-reviewed or third-party information on this subject. Books, handbooks and peer-reviewed papers were reviewed, based on searches of materials available through the University of Lund, University of Minnesota, their extended lending systems and purchasing capabilities, and google searches using related keywords. There are a plethora of audits, audit systems and assessment tools marketed, in particular by consulting firms. However, the bias in this kind of information is obvious. These kinds of assessment or audit systems are biased toward lucrative schemes and audits to fulfill standards and mandates. Reports from such entities were reviewed based on reference to them by other documents recommendation, and a subjective valuation by the author.

2.2 Selection of Environmental Due Diligence Standards

The two primary standards used for comparison in this study were chosen on the following grounds: ASTM standard E-1527 was the first standard delineating conduct for conducting ‘all appropriate inquiry,’ in the process hereafter referred to as ‘environmental due diligence.’ According to the United States EPA, the ASTM E1527-00 standard is ‘The most prevalent industry standard for conducting Phase I environmental assessments’ (USEPA, 2005:2) and is the currently accepted standard for conducting ‘all appropriate inquiry’ in the United States¹. The ISO 14015 standard was selected because it is a predominant international standard.

¹ *ASTM E1527-2000 has been used to fulfill ‘all appropriate inquiry’ since federal interim standards established by congress became effective 11 January, 2002. The United States E.P.A. published a new rule to fulfill this requirement in November 2005, Compliance with this rule is required after 1 November, 2006 (USEPA, 2005:3).*

2.3 Selection of Case Studies

Case studies representing 6 countries, and assessments conducted between 1992 and 2004 were reviewed. Criteria for selecting the case studies were that the assessments were conducted in different countries by different assessors. The purpose of selecting them in this manner was to investigate trends in EDD assessment scope and methods over time, and a timeframe of about 15 years was selected.

2.4 Interviews

Two groups were chosen to be interviewed, representing users of due diligence standards, and purchasers (consumers) of the due diligence audits. Interviewees were selected from major consulting or engineering companies, and from large industry or contact with large industry as an environmental legal advisor. They were selected using criteria of being available and willing to respond during the time of study, and being near to the interviewer (Lund, Sweden) or being English-speaking (i.e. working in Great Britain or the US.). A total of twelve representatives of major actors in environmental due diligence auditing were interviewed.

2.5 Interview Questions

Interview questions were formulated to answer the questions this paper aims to address. In the multiple choice questions, options were in part based on standards including ASTM E-1527, ISO 14015, a sample corporate standard for Environmental due diligence audit (Trelleborg, 2000), and the United States Federal Aviation Administration Standard for EDD (FAA, 1994). Interviewees were contacted initially by phone or email, and interviews were done by phone, and when possible, in person.

Questions addressed experience, position, and role of the interviewees in environmental due diligence process. They also addressed what aspects the due diligence process does or should address. Specific yes/ no questions addressed scope of EDD audits. Several of the questions were designed to be open-ended to encourage description of the EDD process. Encouraging flexibility in the answers helped form a picture of the field as it is today, and insight into what actors perceive as its challenges, how they think it can improve, and what the future of due diligence assessments will look like.

3 Description of Subjects Addressed

3.1 Due Diligence

‘Due diligence’ is the intensive examination process that goes on before the acquisition or merging of a company or companies. Literally, *due diligence* means *just or advisable attention*. Due diligence audits have traditionally been conducted by financial officers, who examined the business and financial statements of a company, to make sure they are in order, and to detect problem areas.

The primary motivation for conducting a due diligence audit is to make a thorough assessment of the acquisition subject. This is done to take stock of the state of the company, its assets as well as its weaknesses, in order to have an idea both of the potential, and the

potential liability of acquiring the company, which helps to determine purchasing price, or even if the acquisition should be made at all. Consensus suggests that over half of A&M transactions are perceived as negative by the companies involved (Williams, 2004). The purpose of performing adequate due diligence is to increase the knowledge of the holdings, and thereby the chances that the A&M process will be successful.

As the worth of a company encompasses more than money, so does the audit need to cover more than just financial questions. It must consider social, environmental, and economic capital. Therefore, due diligence audits have expanded in their scope.

3.2 Environmental Due Diligence

Environmental due diligence (hereafter EDD) as addressed in this paper is the part of the due diligence process in which environmental characteristics of a business or asset are looked into. This can also be referred to as *corporate environmental due diligence*. However, environmental due diligence is often limited to real estate property assessment. The primary purpose of an EDD audit is to minimize environmental-related risks and liabilities associated with transferring of a business or asset.

3.2.1 History of Environmental Due Diligence

The process of conducting environmental due diligence is not new, but formal environmental due diligence audits have only become common in the past few decades. Drivers for making environmental due diligence more common were, among others, the highly publicized Love Canal case in the late 1970's.² Also, companies in the United States started to take out Environmental Impairment Liability Insurance in 1980 in response to the Superfund Act, (see section 4.2.1) which held them potentially responsible for clean-up cost of spills, The Seveso directive³ in Europe, which dealt with chemical accidents, including prevention and preparedness was also a driver for the development of the EDD process.

The EDD field as it is known today is generally understood to have developed in large part in the United States in the 1980's (Denton et al., 1991), (Farthing, 2005). These first environmental due diligence audits were focused on contamination of property that was being bought or sold. While there were detailed environmental risk and liability assessment procedures issued in the United States by the late 1980's (Office of Regulatory Affairs, 1989), environmental due diligence is still developing. The scope of EDD broadened in response to suits relating to human environment issues, including problems associated with past practices, exposure to asbestos being one notable example. A host of en-

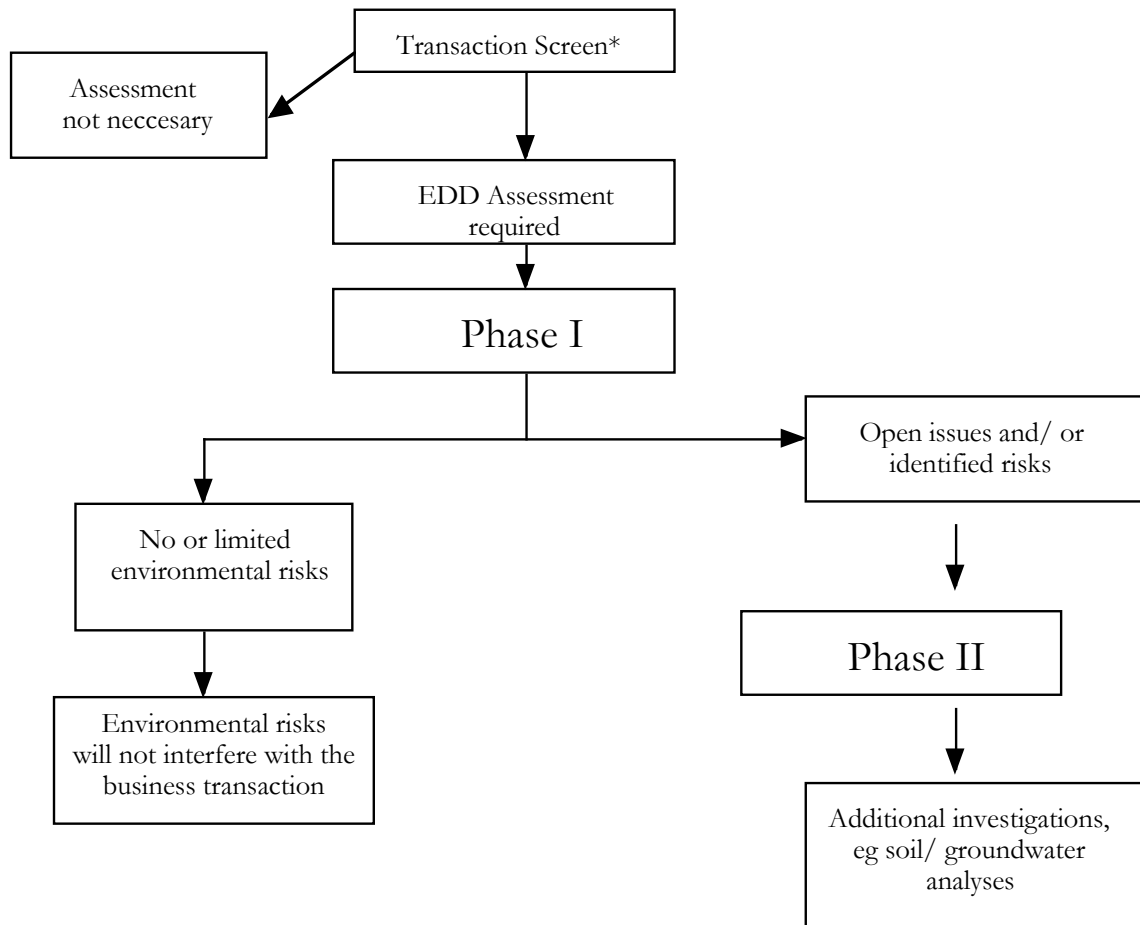
² Residents of a residential development named 'Love Canal' in New York, USA situated on a landfill, discovered that there was toxic material under them that had been disposed of in the 1940's- 1950's. The following highly publicized lawsuit resulted in 950 families being moved and \$130 million in clean-up costs.

³ Council directive of 24 June 1982 on the major-accident hazards of certain industrial activities (82/501/ECC), aimed at preventing and minimizing consequences of spills. ('Prevention, preparedness and response'). Followed by 'Sevesno II,' *Council Directive 96/82/EC*.

environmental directives and legislation in Europe has led to major development of the field both in Europe and on a broader international level as companies and economies become increasingly multi-national. EDD is becoming very common; a recent surveys, conducted by a company conducting EDD assessments, of top UK companies showed that two thirds, of companies and up to 83 percent of companies from higher risk industry sectors normally conducted EDD in their A&M transactions (KPMG, 2003 & 2004).

3.2.2 How EDD is generally performed

Before looking more deeply into this field, it important to understand in what context a Phase I EDD assessment is undertaken, in other words, the logic behind the assessment. Below is a figure illustrating the logic behind the decisions and steps in the EDD process (Fig 2) and where the Phase I part of the assessment fits into this. The first step is a determining if an assessment is necessary, referred to in ASTM standards as a Transaction Screen. If an assessment is deemed necessary, a Phase I investigation is carried out, and if this assessment results in open issues or identified risks, then the purchasing party may want a Phase II, or quantifying investigation carried out to look into the aspects identified as risks in more depth. Further quantitative assessment and clean-up can be conducted according to the findings of the Phase II.



*See Sec. 4.3.4, “Steps in the Assessment Process”

Figure 3: Logic behind an EDD assessment. (Adapted from Almgren & Brorson, 2003).

From the point of view of the party making use of the assessment (hereafter “purchasing party”) these are the steps taken in the assessment process: First, need for the assessment must be determined. This need may exist for a number of reasons. Most often it is as a part of an acquisition or merger process. The assessment can be driven by the potential acquirer, but can also be driven by the divesting party. Next, a potential assessor must be identified. Then the assessor and the purchaser of the assessment must agree on the objectives and scope of the study.

The actual EDD assessment will often start with a data room review and management meeting. This may be done at the same time as looking into publicly available documents. Based on ‘significant aspects’ generally identified from this initial step, (also commonly referred to, particularly in the U.S., as Phase I⁴ of an environmental audit) a closer look at these aspects can be taken. Further studies and laboratory tests are likely necessary if a hazardous condition is identified (Bing, 1996). It is seldom, however, that the selling company allows ‘invasive investigation’ (Farthing, 2004) i.e. a ‘Phase II’ assessment. Figure 3, below illustrates the EDD assessment process.

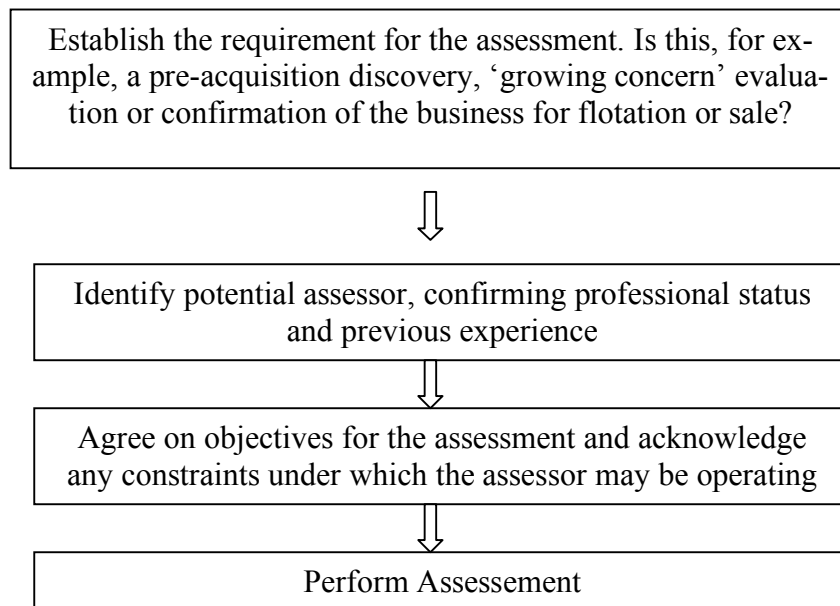


Figure 4: Performing an EDD Phase I Assessment. (Adapted from Carter & Wilde, 2004).

⁴ Commonly, environmental assessments are classified into three Phases. Phase I: Preliminary Site Assessment, Phase II: Contamination Profiling, and Phase III: Contamination Remediation. Notable users of this terminology are among others the United States' CERCLA Act, 1980 and ASTM).

3.2.3 Types of Environmental Issues

The scope of environmental issues⁵ that can be considered today in the EDD process is wide. Below are examples environmental issue categories that could generate liabilities (adapted from Carter & Wilde, 2004):

- Soil and groundwater contamination.
- Human health issues.
- Potential failures of large structures such as dams.
- The potential or actual release of hazardous materials and/or wastes.
- The need for significant investment to upgrade process and or add abatement equipment.
- Product streams that are reaching the end of their acceptability.
- Social impacts such as:
 - The identification of components or raw materials purchased from unethical sources (material produced from child labor or timber from unsustainably managed forests).
 - A history of persistent breaches of legislation, whether environmental or not, which would give rise to a loss of the ‘license to operate’ within the local community.
 - The use of strategic raw materials to which there is some risk of supply constraint or total loss of access.

The extent to which these issue categories are addressed in ISO 14015, in ASTM E-1527, and in practice, is examined in section 4.

3.3 Related and similar terms/ Audit vs. Assessment

The term ‘environmental due diligence’ used in this paper to describe the process that is also known as ‘environmental assessment of sites and organizations’ by ISO.

There are a few fundamental differences in the thought process behind the standards, which are reflected in differences in choice of terminology: ISO 14015 uses the term *assessment* and ASTM E-1527 uses the term *audit*. ISO14015 defines an audit as a ‘systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled’ (ISO 19011 Sec. 3.1, 2002). ISO 14015 does not prescribe criteria to be fulfilled, rather it describes what areas should be looked at. Therefore, ISO 14015 describes an environmental *assessment*, which is defined as a ‘process to identify objectively the environmental aspects, to identify the environmental issues and to determine the business consequences of sites and organizations as a result of past, current and expected future activities’ (ISO 14015 Sec. 2.7, 2002). ASTM E-1527 is specific and explicit in what following the standard does and does not include, making the term *audit* appropriate in that context. The term assessment is used in this paper, as it fits the process discussed.

⁵ *Environmental issue* is defined in ISO 14015, 2.9 as that ‘for which validated information on environmental aspects deviates from the selected criteria and may result in liabilities of benefits on the assessee’s or the client’s public image, or other costs.’

4 Standards

4.1 ASTM Standard Practice E-1527-00

4.1.1 Background and Purpose

The stated objectives of this standard, according to its scope statement are:

(1) To ensure the efficiency and integrity of commercial real estate transactions, (2) to facilitate compliance with applicable governmental requirements for environmental protection, (3) to improve the quality of environmental assessment, (4) to clarify the legal responsibilities associated with commercial real estate transactions, and (5) to ensure that the standard of inquiry is practical and reasonable.

ASTM E-1527 is the result of cooperation between major trade organizations and the American Society for Testing and Materials. It is a voluntary standard, and is widely accepted, as ASTM is the largest, and among the oldest, voluntary standard development systems in the world. The original participants who initiated the development of the standard included bank, realty and insurance associations (Jones & Hernandez, 1992) who were interested in developing such a standard as quality assurance in the rapidly developing environmental due diligence field of the late 1980's and early 1990's.

The ASTM subcommittee for creating this standard did so to “outline prudent business practices,” (scope statement of subcommittee, ASTM, 2004) and as a means provide defense to liability claims under the comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 1980) also known as the Superfund Act.

4.1.2 Superfund Act

The Superfund Act and the following Superfund Amendments and Reauthorization Act (SARA, 1986) created a funding and enforcement authority for cleaning up historic and current hazardous waste sites in the United States. They authorized the EPA to draw upon two types of funding resources: the superfund, and responsible parties. Responsible parties fall into three categories: present owners, past owners, and operators. CERCLA provides for ‘joint and several liability,’ meaning that any of the responsible parties can be required to pay for any or all of the expenses of clean-up, and the onus is on them to seek compensation from the other responsible parties.

The ‘innocent landowner’ defense (sections 107(b)(3), 101(35)(A) and (B) of CERCLA) provides for exemption from liability if the landowner has not contributed to contamination of the property, and has conducted ‘all appropriate inquiry’ into the previous ownership and uses of the property. Superfund liability and the possibility of exemption from such liability were driving forces behind the development of EDD (Denton et al., 1992).

4.1.3 “All Appropriate Inquiry”

ASTM E-1527 deals explicitly with ensuring that all appropriate inquiry has been undertaken and can be proved. The stated purpose of this standard (as well as Practice E 1528) is to ‘define good commercial and customary practice in the United States of America for conducting an *environmental site assessment* of a parcel of *commercial real estate* with

respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and *petroleum products*” (ASTM, 2000).

As one of the primary functions of ASTM E-1527 is to fulfill ‘all appropriate inquiry’ under CERCLA, the evolution of what this ASTM standard will look like and what it will be used for will be affected by what constitutes ‘all appropriate inquiry’ as this definition evolves. Even this year, the definition of all appropriate inquiry has changed as in November 2005, the USEPA published a new all appropriate inquiry rule. ASTM E-1527-00 is currently accepted for fulfilling all appropriate inquiry (USEPA, 2005:1), however, in order to qualify as all appropriate inquiry, EDD assessments must be conducted in compliance with the new rule by Nov. 1, 2006. The main differences between the all appropriate inquiry rule and ASTM 1527-00 are outlined in Appendix I.

4.2 ISO 14015

4.2.1 Background and purpose

This standard was created by the International Organization for Standardization, whose work it is to prepare international standards. ISO 14015 was created because there was a need for an international standard for this practice, as ASTM E-1527 was designed for use according to US law and resources, making it not necessarily appropriate for use in other places. Growing investment by US corporations in Europe in the 1980’s, introducing the practice of EDD (Farthing, 2004) no doubt sped up the introduction of this standard. The ISO 14015 standard uses the term ‘Environmental assessment of sites and organizations’ (EASO) for the process referred to in this paper as EDD. As mentioned previously, the term ‘assessment,’ rather than ‘audit’ is used because it connotes a measuring of the potential risks and liabilities. It covers the ‘roles and responsibilities of the parties to the assessment (the purchasing party, the assessor and the representative of the assessee) and the stages of the assessment process (ISO, 2002).

4.3 Comparison of Standards

The following comparison of the ISO 14015 and ASTM E-1527 standards is organized by characteristic of the standard.

4.3.1 Creators of the Standards

ASTM E-1527: There are regulations guiding who creates and approves these ASTM standards. No more than 50% of the vote can be made by engineering and consulting firms. Leadership is largely composed of lending and real estate investment industry. The ASTM subcommittee responsible for this standard is comprised of several hundred members, including regional, national and local engineering and consulting firms, real estate owners and developers, industrial concerns, oil companies, chemical companies, lending institutions, academics, members of governmental organizations. (Jones & Hernandez, 1992).

The requirements in composition of the ASTM voting body likely exist to balance the personal interests of the involved parties. Lending and real estate investment industry’s

interest most likely lies in having a standard that requires minimal time and cost, since they are paying for the audit. Conversely, engineering and consulting firms will benefit from having longer, more expensive and complex assessments/audits.

ISO, as stated previously, is the International organization for Standardization, and is a federation of national standard bodies. ISO 14015 was prepared by a subcommittee (*SC 2, Environmental auditing and related environmental technologies*) of ISO.

4.3.2 Scope of the standards and assessments described therein

4.3.2.1 ASTM E-1527

ASTM E-1527 covers “past, existing, or material threat of release into structures on the property, in the ground, ground water, or surface water” (ASTM, 2000). ASTM E-1527 expanded upon the scope of substances covered by CERCLA in that in addition to including hazardous substances, it also included petroleum products. This inclusion reflected the ‘good commercial and customary practice’ (Jones and Hernandez, 1992) that Phase I site assessments include petroleum products despite their exclusion from CERCLA. Phase I investigations only are included in this standard.

ASTM E-1527 is limited to commercial real estate transactions (excludes residential transactions). ASTM E-1527 is *site-specific*, (*ASTM E-1527 Sec. 4.4*) meaning that it is specific to a specific piece of property, and does address issues involved in corporate due diligence, or the acquisition of businesses or interests. This essentially means that ASTM E-1527 removes the real estate portion of EDD from its larger context. *Business environmental risk*, the environmental risk associated with corporate due diligence, are outlined in the ASTM E-1527 standard, which mentions that some situations may necessitate investigation of these issues, which are outside the scope of the standard.

4.3.2.2 ISO 14015

The scope of ISO 14015 includes environmental assessment of sites and organizations. Essentially, this is describing corporate due diligence, whereas ASTM E-1527 describes a more limited form of due diligence. ISO 14015 excludes initial environmental reviews, environmental audits (including environmental management system and regulatory compliance audits), environmental impact assessments or environmental performance evaluations from its scope. These are included in other ISO standards (ISO 14001: Environmental Management, ISO 14031: Environmental Performance Evaluation, ISO 19011: Guidelines on Quality and/ or Environmental Management). As in the ASTM 1527 standard, intrusive site investigations⁶ (a.k.a. Phase II and III audits) are also excluded. The standard also clearly states that its use does not imply legislation is imposed on the assessed party.

According to ISO 14015, the following should be considered in scoping the assessment:

⁶ ISO 14015 defines “intrusive investigation” as *sampling or testing using instruments and/or requiring physical interference*.

- Categories of environmental aspects to be assessed.
- Any environmental impacts that other sites and organizations may have on the assessed.
- Physical boundaries of the assessed (e.g. site, part of the site).
- Adjacent and nearby sites, where applicable.
- Organizational boundaries, including relationships with or activities involving contractors, suppliers, organizations (e.g. off-site waste disposal). Individuals, former occupants.
- Time period covered (e.g. past, present and/or future).
- Business consequence threshold, if applicable.

4.3.2.3 Comparison

Quite notably, the assessment described in ISO 14015 does not necessarily include ‘determination of business consequences’ in its scope, but leaves it up to the purchasing party to include this or not. In general, the scope of ISO 14015 is broader than ASTM 1527’s scope. This is both in terms of what kinds of environmental aspects the standards cover, and what the due diligence should cover.

The international accepted scope for EDD audits according to auditors (Farthing, 2004) includes land, compliance status, capital expenditure upgrades required to meet compliance or foreseeable future legislation requirements, ozone depleting substances and asbestos containing materials. ASTM E-1527 focuses on a less broad scope than this, and only includes commercial real estate, whereas ISO 14015 can be interpreted more broadly and clearly covers organizations (i.e. corporate due diligence) in addition to real estate.

The scope of an assessment is revealing in its intent, and a key factor for the success of transactions relying upon the assessment. One study showed that in cases where material issues had come to light post-transaction, almost half of them had been outside of the scope of the EDD assessment (KPMG, 2003). The differences in scopes of standards and of assessments clearly must reflect the purpose of the assessment and the situation in which it is being conducted. ISO 14015 addresses this issue of appropriateness of scope by creating a broad scope, almost a guideline, for what such assessments may include, and then allowing it to be adjusted according to the individual case. ASTM 1527 on the other hand established a more narrow scope, which is less flexible also fits more precisely a narrower range of situations and goals, as will be seen throughout this paper.

4.3.3 Principles of the standards

ASTM E-1527 00 has the following *fundamental principles*, as identified by the committee prior to the creation of the standard (ASTM, 2000):

- The standard is intended only to reduce risk, as no assessment can eliminate uncertainty.
- The standard is intended to be practical-limits of time and cost.
- “Appropriate inquiry” is not exhaustive assessment of a clean property.
- Properties warrant different levels of assessment.
- The standard should not be overly mechanistic to allow for professional judgment.

These principles exhibit a pragmatic, consciously limited approach to creating the standard, acknowledging limitations and shortcomings in the nature or such a standard. ISO 14015 lacks a statement of grounding principles, but does state that it was intended to be used by large and small organizations to conduct due diligence (ISO, 2002).

4.3.4 Structures of ASTM E-1527 and ISO 14015

ASTM E-1527 00: Based on a decision tree.

ISO 14015: Gives guidance to what areas may be relevant, and what the steps the assessment process should involve. Scope is determined to large degree on a case-to-case basis.

The way in which these standards are written is similar, both outlining definitions of terms, steps in the process, and roles of the actors. The assessments described in the standards however, including terms, steps, and roles of actors though, diverge on many points.

4.3.5 Steps in the assessment process

In this section, steps in standards ISO 14015 and ASTM E-1527 00 are compared in order to discover similarities and differences in their structures. They are compared to each other, to a generic set of steps, and to a sample corporate standard from a company with presence in 40 countries dealing with polymer technology.

In ISO 14015 and in the ASTM Phase I standard practice E-1527 the assessment processes consists of four steps. The four steps are however not the same. They are similar, but place emphasis on different parts of the process. In order to compare steps in the EDD assessment process as described by various standards, six characteristics (planning, records, review, site visit, interviews, evaluation and reporting) have been identified as common standard features. Table 1 on the following page presents how the three standards examined in this study compare to each other in these respects, and how they fulfill these standard features.

Table 1: Steps in the Assessment Process: Comparison of Steps in EDD Standards.

Standard Features	ISO 14015	ASTM E-1527 00	Corporate Standard
Planning	1.Planning the assessment		1. Determine if site contains significant environmental aspects: Site inspection, interviews and documented review
Records Review	2.Gathering and validating information (document and record review, observing activities and physical conditions, interviewing)	1.Review of records	
Site visit		2.Site reconnaissance	
Interviews		3.Interviews with current owners and operators	
Evaluation	3.Evaluating information	4.Evaluation and report preparation	2. Detailed analysis/ investigations of open points from initial due diligence audit. 3. Cost estimates of identified deficiencies for a facility, and potential future costs
Reporting	4.Reporting on the assessment		

Table 1 demonstrates that, although outlined in different ways, these three standards fulfill the same standard features. The table shows that ASTM E-1527 does not include a ‘planning step.’ While ASTM E-1527 00 does not include ‘planning’ as a step, the ASTM body of standards does include a ‘Transaction Screening Level’ in an associated practice, ASTM E-1528. This ‘transaction screen’ can take place before an assessment has actually been done, and in this process it can be determined via a checklist that no Phase I assessment needs to be completed. The “Transaction Screen has three parts:

1. Asking questions of the owner and/ or the operator of a property.
2. Site visit.
3. Government records and historical source check.

This clearly can also be seen as a sort of planning for the actual assessment described in ASTM E- 1527. While ISO 14015 places more emphasis in this case on planning, the processes are very similar. The sample corporate standard incorporates the planning step implicitly into determining if the site contains ‘significant environmental aspects.’

The steps in the sample corporate EDD standard are clearly comparable to the ‘standard features’ identified in EDD standards, and therefore also to the ISO and ASTM standards addressed in this paper. Once again, while not all the ‘standard features’ are explicitly stated in the same terms, the same basic steps plainly exist.

Table 2 below compares the ‘standard features’ to the steps in the case study standards. Explicitly fulfilled steps are represented with an “X,” steps that are implied but not explicitly stated in the standard are indicated with an “O.”

Table 2: Comparison of Explicitly Prescribed Steps in EDD Standards.

Standard Features	ISO	ASTM	Corporate Standard
Planning	X	O	O
Records Review	X	X	X
Site Visit	X	X	X
Interviews	X	X	X
Evaluation	X	X	X
Reporting	X	X	X

The most notable difference between the three example standards is that ISO 14015 is the only standard examined here that explicitly prescribes ‘planning.’ This may be a reflection of a key difference between ISO 14015 and the other standards, namely that it is meant to address a broader range of situations. This is not to say that the other standards do not require planning. However, the range of subjects they are meant to address is largely pre-determined by the nature of the projects, especially in the case of the sample corporate standard. Here the entity and the interests of the entity remain largely the same throughout the assessments that will be conducted, and therefore a good deal of the planning process has been accomplished previous to the point where the standard is used.

In addition to these standard steps, there are a number of features that differ between standards. Some of the notable differences are outlined in the table below. Features included in the standard are marked with an “X,” features not included in the standard are marked with an “O.” The reasons for these differences lie in part in the different goals of the standards. For example, health and safety issues are within the potential scope of an assessment conducted under the ISO 14015 standard, which is a broad standard allowing for some flexibility depending on the subject property. On the other hand, ASTM 1527-00 specifically excludes health and safety issues from its scope. The sample corporate standard, which is specific to the complete needs of the corporation, includes features, such as evaluation of business consequences, that the company deems important, but are not standard features in the two other standards. Other features, also addressed in the interview portion of this paper, are included less consistently in the standards addressed here.

Table 3: Comparison of Non-Standard Features in EDD Standards.

Features	ISO	ASTM	Corporate Standard
Legal / Regulatory compliance	X	O	X
Health and Safety	X	O	X
Evaluation of Neighboring Properties	X	O ⁷	X
Evaluation of Business Consequences	O (optional)	O (optional)	X
Defined Roles of Assessor/ Assessee	X	X	X
Objectives defined in standard	O ⁸	X	O ⁹
Environmental Aspects of products and services	O	O	O ¹⁰
Impact of future environmental legislation	X ¹¹	O	X
Organization, knowledge and competence of environmental managers/ coordinators of the acquisition object	O ¹²	O	X ¹³
Implementation and function of existing environmental management systems	O ¹⁴	O	X
CSR (Corporate Social Responsibility)	O	O	O
Sustainability issues	O	O	O

⁷ ASTM 1527-05 has stricter rules on review of neighboring properties than ASTM 1527-00, which it will replace. See Appendix I.

⁸ Objectives are defined by purchasing party.

⁹ Objectives are defined by purchasing party

¹⁰ Environmental aspects of creating the product are included, but environmental aspects associated with the final product are not.

¹¹ This is performed as a part of ‘determining business consequences,’ which is optional.

¹² Training records, which can be an indicator of organization, knowledge and competence, are included as an example of a document that may be considered. Interviews with these persons, also included, could also potentially be an indicator of knowledge and competence, but is not expressed as such.

¹³ Not explicit; this standard includes assessment of environmental training programs and structure and responsibility of in-house environmental specialists, which address the issues of organization and knowledge.

¹⁴ Environmental Management Systems are addressed in another ISO standard.

4.3.6 What depth is Due diligence

4.3.6.1 ASTM E-1527

As ASTM E-1527 was developed in part to satisfy ‘all appropriate inquiry,’ it addresses directly the level of inquiry necessary. In accordance with the principle that the standard be practical, information sources only need to be reviewed if they are “reasonably ascertainable.” “Reasonably Ascertainable” information is information that is publicly available and obtainable within reasonable time and cost constraints, and is “practically reviewable.” “Practically Reviewable” is information “provided by the source in a manner and in a form that, upon examination, yields information relevant to the property without the need for extraordinary analysis of irrelevant data” (ASTM E-1527 – Sec. 3.3, 2000). This standard, in accordance with its fundamental principles limits due diligence to be practical, while the terms ‘reasonable,’ ‘extraordinary’ and ‘irrelevant’ leave room for interpretation and for flexibility.

4.3.6.2 ISO 14015

On the other hand is the ISO 14015 standard, which leaves a great degree of determination of the necessary depth of the assessment up to the assessor. The purchasing party is also responsible to a degree for this aspect. ISO 14015 includes “providing instructions to the assessor(s)” and “defining the objectives of the assessment” in the Roles and Responsibilities (ISO 14015, Sec. 3, 2002) of the purchasing party.

4.3.6.3 Comparison

Here again, the history of the audit standards means that there is a difference in the thought process and principles behind them; where ASTM E-1527 clearly limits and defines due diligence, ISO 14015 expands upon this and leaves more room for interpretation.

4.3.7 Qualification and Role of EDD Auditor/ Assessor

4.3.7.1 ASTM E-1527

ASTM E-1527 Sec 6.5 sets the requirements for who may conduct a Phase 1. They can be an independent contractor (e.g. consultancy). Here, the assessor is termed an “Environmental Professional,” a title that has no specific training or education requirements. The definition of an “environmental professional” is simply “a person possessing sufficient training and experience necessary to conduct... [the assessment and] develop opinions and conclusions regarding recognized environmental conditions in connection with the property in question.” Guidance for selection of an ‘Environmental Professional’ is however included in the standard, and addresses the need for training and experience. A list of factors to consider is also included. These include formal education, specific training, experience, references, and sample reports prepared by the individual. Recommendations regarding the firm for which the assessor works are also included.

4.3.7.2 ISO 14025

ISO 14015 allows the assessor to be either external or internal to the assessed organization (ISO 14015 Sec. 2.2.2, 2002). The standard further identified a qualified auditor only as a person, possessing sufficient competence, designated to conduct or participate in a given assessment. Criteria for selecting an auditor are: education, training and relevant work experience. There is no education, specific training or certification requirement for this role. However, there are a number of professional organizations for example, the Institute of Environmental Management and Assessment (IEMA). The standard states that the assessor should be competent in the following (ISO 14015 Sec. 3.3, 2002):

- Relevant laws and regulations and related documents.
- Environmental science and technology.
- Economics and the relevant business area.
- Technical and environmental aspects of commercial operations.
- Facility operations.
- Assessment techniques.

4.3.7.3 Sample Corporate Standards

The sample corporate standard includes a suggestion for a ‘typical audit team’, which includes an ‘environmental auditor/ environmental specialist’ in addition to a representative of the company’s environmental affairs division, and an expert on local country legislation. This environmental specialist position has suggestions for minimum requirements for the auditor, including an unspecified level of training, and “competence” in areas including: environmental management systems and operations being audited, regulations and policies, techniques for examining, interviewing, verifying, evaluating reporting, and communication. A minimum education level for an auditor is established as a technical/ science college degree.

For the sake of contrast, let us also look at another corporate standard, that of the US Federal Aviation Administration (FAA, 1994). The FAA standard requires that the auditor have at least 16 hours of EDD assessment training, and either have taken part in or reviewed at least 5 EDD assessments, or possess a degree ‘in a scientific discipline relevant to the EDDA process’ (FAA, 1994). Criteria for contractors performing the work are far more stringent (Appendix 5 of FAA, 1994). Interestingly, the FAA standard dictates that the auditor should “under no circumstances” discuss the purchase price of the property. This is reserved for realty specialists.

4.3.7.4 Comparison

Neither ISO 14015 nor ASTM E-1527¹⁵ have specific training, experience or educational requirements built into them for the person conducting the assessment. However, such schemes exist, for example in Sweden. The Swedish Association of Environmental Auditors (MIS) use established a guideline for the interpretation of the requirements of ISO 19011 (MIS, 2005). Similar schemes exist in a number of countries.

¹⁵ The USEPA’s newly released *all appropriate rule* and revised 1527 give a new definition of ‘environmental professional,’ see Appendix I.

5 EDD Report Case Studies

To look at how EDD assessing is conducted in practice, six case studies of EDD reports conducted between 1997 and 2004 and six countries were reviewed. The reports covered industrial sites in Australia, Brazil, France, Ireland, Malta, and the United States. In five of the six cases, the assessments were carried out by external assessment companies, the remaining assessment was conducted by internal environmental specialists. The case studies are evaluated below according to how well they fulfill their own objectives, scope and tasks, and to what extent they cover the steps in an assessment process.

The steps in an assessment process they are compared against are a combination of the ISO 14015 and ASTM E-1527 steps, the same common features identified in 4.3.4, here denoted as ‘criteria steps.’

1. Planning.
2. Review of records.
3. Site reconnaissance/ interviews with current owners and operators.
4. Evaluating and reporting.

5.1 Case Study 1

The earliest review was conducted in Brazil and used an ‘appropriate level of effort’ consistent with ASTM E-1527 and 1528. Risks are identified in terms of non-compliance issues and potential issues, and evaluated using undefined terms such as *medium*. This assessment is not signed by the assessor.

5.1.1 How the criteria steps were fulfilled

1. **Planning-** The assessment plan was based on a consultant’s proposal that was authorized by the purchasing party.
2. **Review of records-** No contact was made with local agencies due to the confidential nature of the project. No central environmental records were reviewed, as none existed. Information on possible past human health liabilities was not available. Small scale maps and federal and local regulations were reviewed.
3. **Site reconnaissance/ interviews:** This step was severely limited, in that less than three hours were allowed for inspection, while normally six hours would be needed for the inspection. Also, only the site owner was interviewed.
4. **Evaluating and reporting-** The limited available data appears to have been evaluated, and is contained in the report, which is 29 pages including appendices. The report covers key findings, potential environmental liabilities, and non-compliance issues

5.1.2 Assessment objectives/ assessment results

Objectives as stated in the report are in italics. How these objectives were fulfilled in the report is summarized, and overall fulfillment of the objectives is subsequently evaluated.

OBJECTIVE: Evaluate current and past manufacturing and related practices at the facility with respect to their potential to impact the environment.

RESULT: Current practices were evaluated, but this evaluation was severely constrained by short time for the audit, lack of supporting data on, for example, how much hazardous waste is produced per annum, and not being able to interview key management personnel.

OBJECTIVE: Assess compliance of the current site activities with current Federal and State environmental legislation and regulations.

RESULT: Current site activity was not documented, and legislation was unclear. Compliance status was therefore not determined.

OBJECTIVE: Identify potential sources (“Recognized Environmental Conditions”)¹⁶ of soil and surface/ groundwater contamination at the site.

RESULT: Soil and groundwater condition are reported on a very hypothetical basis, as waste, wastewater and groundwater is not monitored. However, two potential sources for contaminated wastewaters are identified.

OBJECTIVE: Identify potential environmental liabilities associated with the change of ownership or company name.

RESULT: Potential liabilities are identified, called recognized environmental conditions. How serious these potential liabilities are, and which are most serious, is not immediately clear but can be inferred.

OBJECTIVE: Identify significant liabilities associated with worker health and safety issues and accidents at the facility.

RESULT: The report does identify potential liabilities associated with worker health and safety, but it determines that the potential liabilities are not significant.

OBJECTIVE: Identify foreseeable future environmental legislation or regulations which would have a significant impact on operations at the site.

RESULT: No foreseeable future environmental legislation or regulations are mentioned in the report. As the subject is not even mentioned outside of the objectives section, it is not clear whether the auditor did not foresee any regulations that would have an impact or if they failed to consider this point. The report does note regulations for which the require-

¹⁶ ASTM defines *Recognized Environmental Condition* as “ the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release or material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. It 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.

ments are unclear and unspecific, implying that if compliance with the regulations were made quantifiable and enforced, the site may not be in compliance with them.

OBJECTIVE: Where additional Phase II investigations are recommended: identify scope of services, methodologies and costs for undertaking such additional services.

RESULT: Phase II investigations are recommended, scope is included, methodology and costs are not covered.

Although this study outlined steps that were consistent with the steps that should be taken in an EDDA, according to our 'criteria steps,' major portions of these steps were not covered. General lack of verifiable information, both historical and present, was exacerbated by the confidential nature of the project, which limited access to the site, its personnel, and to data from authorities. Although there are more objectives outlined in this report than in any of the others serving as case studies, the objectives are also only partially fulfilled. Perhaps this is in part because the objectives are based upon a standard (ASTM) that relies heavily on databases not available in the country where the assessment took place. It is not clear whether or not this report had the benefit of someone who was familiar with local laws.

5.2 Case Study 2

This project took place in 1999 in Northern Europe. The assessment was conducted by a large consultancy. The report includes disclaimer and limit of responsibilities, and is signed by the director. It does not specify that the report is based on any specific standard. Risk is assessed on a material/ immaterial threshold basis of \$50,000 US equivalent.

5.2.1 How the criteria steps were fulfilled

1.Planning- Level of materiality, scope and that it is a "Phase I" assessment were agreed upon in advance.

2.Review of records- documents, lists and site maps were reviewed during the site visit and again afterwards. Documents for raw material consumption and material disposal were available. Information on past liabilities was available. No databases were reviewed.

3.Site reconnaissance/ interviews with current owners and operators- one assessor visited the site over a period of two days, made a visual inspection, reviewed available documentation and interviewed the operations manager and engineering manager.

4.Evaluating and reporting- evaluation and reporting was conducted by the assessor. Reporting includes detailed site description, geological description, description of activities and environmental issues, potential issues. The report is 16 pages in total.

5.2.2 Assessment objectives/ assessment results

OBJECTIVE: Assess the regulatory operating compliance status of the site to identify whether there are any material compliance issues in excess of \$50,000 US equivalent associated with existing relevant environmental (excluding health and safety) regulations

RESULT: There is no specific regulatory operating or compliance section of this report, status of the site is reported in terms of immaterial, medium and high concern levels. No

material concerns were identified with respect to any of the environmental aspects assessed, besides soil and groundwater contamination.

OBJECTIVE: Characterize the environmental setting, surrounding and use, historical land use and related issues concerning the environmental context.

RESULT: A detailed characterization of the surrounding use, historical land use, and hydrology/geology of the site and surroundings is included in this report.

OBJECTIVE: Evaluate current and past manufacturing activities and related practices at the site to establish known or potential sources of material soil, groundwater and/ or surface water contamination.

RESULT: Current and past manufacturing activities at the site are evaluated. The report reports no current sources of on site soil or water pollution. Potential sources of contamination are not identified as such, although past contamination sources are mentioned.

This assessment appears to cover the outlined *criteria steps*. The report itself is relatively short, and focuses on process description, also mentioning potential issues. As the American term “Phase I” is used, and an ASTM-like scope of environmental issues, the absence of database searches (not available within the timeframe) stands out.

5.3 Case Study 3

This assessment took place at a site in Australia in 2002, by a large consultancy. It is signed by the consultancy, and includes a disclaimer of responsibility outside of the scope and to third parties. The report does not specify that it follows any specific standard, however it uses language (“Phase I”) associated with ASTM and also includes occupational health and safety in its scope. The minimum level of material issues identified was set at \$20,000 US.

5.3.1 How the criteria steps were fulfilled

- 1. Planning-** Materiality level and scope were agreed on in advance.
- 2. Review of records-** Aerial photographs were reviewed, as were available EPA databases, historical Land Titles, bore logs and a 1:100,000 geological series sheet. Which records were reviewed was not explicitly stated; References to previous assessments and reports infer a thorough review of records available on site. References to regulation infer that legislation/regulation was looked into. Review of records appears to be thorough.
- 3. Site reconnaissance/ interviews with current owners and operators-** The site was visited and inspected by the consultant, interviews were held with General Manager, Manufacturing Manager, Quality Systems Manager, and Company Secretary/Controller.
- 4. Evaluating and reporting-** The report is 27 pages in its entirety. Known and potential material liability issues were identified and reported. The report is organized by environmental issue.

This assessment appears to be thorough, with access to pertinent historical documentation and personnel. The major limitation of this study appears to be the unavailability of a previous sale and purchase agreement between current and previous owners of the site.

5.3.2 Assessment objectives/ assessment results

There is no explicit ‘objectives’ section in this report. It is a Phase I environmental and key occupational health and safety (OHS) pre-acquisition due diligence assessment. It describes current practices at the facility, reviews historical data and draws conclusions about historical use which may have current impacts, reviews geological and hydrological data, describes environmental issues present and gives recommended actions, and estimated costs of these recommended actions based on these, including cost of updating machinery. The results of this study appear to be congruent with the objectives typically outlined in the other case studies, with the minor exception that potential future legislation is not mentioned.

5.4 Case Study 4—pages, 8, 11, and appendices missing.

This assessment took place in 2004 in southern Europe. It was conducted and signed (authorized) by a consultancy, not to any specified standard, and is signed by a representative of the consultancy. This assessment appears to have been sponsored by the divesting party, in contrast to the previous three case studies, which appeared to have been sponsored by prospective purchasers. Risk/issues are reported on a material/immaterial basis.

5.4.1 How the criteria steps were fulfilled

- 1. Planning-** Planning is implicit. Scope of work and terms and conditions were agreed upon with the purchasing party.
- 2. Review of records-** ‘Relevant documentation’ and publicly available information were reviewed. The ‘Database Review’ section of the report was missing and therefore cannot be commented upon further.
- 3. Site reconnaissance/ interviews with current owners and operators-**The site was visited and inspected one day, and description of potential contamination is reported. EHS Manager and EHS Assistant were interviewed, no other representative of the subject property, such as owner or operations manager, was interviewed.
- 4. Evaluating and Reporting-** The report is 26 pages in its entirety, of which 21 pages were available for review. Among others, on-site reconnaissance and ‘reports reviewed’ were missing and unable to be reviewed. Reporting included historical and neighboring land use, site description, key processes undertaken at the facility, and geology, emissions. No significant issues with compliance or otherwise are reported.

5.4.2 Assessment objectives/ Assessment results

Historical site use is missing from the report

OBJECTIVE: To assess the site facility operations in respect to the potential for current or foreseeable environmental liabilities associated with land contamination, regulatory compliance or other relevant environmental issues

RESULT: The site facility and operations were assessed, and no material issues were identified. Determining thoroughness of this assessment is limited because parts of the report are missing.

5.5 Case Study 5

This assessment took place in 2003 in central Europe. It was conducted by an Environment and Safety Manager from the prospective purchasing party, but it is not signed or 'authorized' as such, which would be superfluous in this context. The assessment was most likely conducted according to the prospective purchasing party's EDD standard, as such a standard exists. However, this is not explicitly stated in the report. Risk is evaluated on a scale of low/medium/ high.

5.5.1 How the criteria steps were fulfilled

1. **Planning-** Planning is implicit.
2. **Review of records-** There was a general paucity of records. The plant did not hold an operations license or permit, and no register environmental and safety legislation was on site. The assessment includes a list of environmental laws in France, but no indication as to whether or not the laws are applicable, or if the site may be in compliance with said laws.
3. **Site reconnaissance/ interviews with current owners and operators-** Interviews were conducted with the managing director and production manager. It seems that site reconnaissance was focused on description of the site and its activities. Description is very thorough. Low awareness of documentation, legislation, environmental issues, and lack of documentation may have hindered more conclusive assessment.
4. **Evaluating/ Reporting-** The report is only 15 pages in total. It is descriptive to a large degree, and evaluates the environmental aspects in terms of strengths and weaknesses, detailing even those aspects considered 'low risk.' Risk is rated on a low/medium/ high scale.

5.5.2 Assessment objectives/ Assessment results

OBJECTIVE: To assess the presence and likely extend and nature of any potential environmental hazards associated with the site and surrounding areas, and to assess the financial and operational implications of any environmental risks and liabilities with the... site...to enable...[informed] legal advice on the implications of those findings.

RESULT: This assessment is unique among those reviewed in that the overview of activities and background of the company is much more detailed than in the other assessments. Also, product application, market, and market share are considered. Environmental risk is not described in terms of materiality, but on a scale, which seems to imply an interest not only in what may be large monetary risks, but also potential issues that may arise after acquisition. The systematic evaluation of several aspects means that this assessment would likely be useful in subsequent implementation of an environmental management system.

5.6 Case Study 6

This assessment was conducted in 2004 in the United States by a large consulting firm. It was done in accordance with the ASTM E 1527-00 standard.

5.6.1 How the criteria steps were fulfilled

- 1. Planning-** The consultancy planned a Phase I ESA, and proposed a scope that was agreed upon by the purchasing party.
- 2. Review of records-** previous reports/investigations and local government files, were reviewed. Historical land use was researched, but was only available for about the most recent 25 years. Aerial photographs and topographic maps were reviewed.
- 3. Site reconnaissance/ interviews with current owners and operators-** An interview was conducted with the EHS Manager. Interviews were also conducted with relevant local authorities. Adjacent properties were described, the property, environmental aspects and storage practices, previous releases, compliance, were described.
- 4. Evaluating and reporting-** All told the report is 45 pages. It is organized into the following chapters: property description and history; environmental setting; site reconnaissance; material compliance evaluation; off-site contingent liabilities; environmental/regulatory agency inquiries; conclusions; statement of qualifications, and signatures (of assessors). The bulk of the report is dedicated to property description and history, site reconnaissance, and material compliance. Site reconnaissance is organized by environmental aspect. Description of the site focuses on physical description. Nature of work, processes and activities conducted on the site are described briefly.

The report identifies the steps taken in the following manner: “(i) Obtaining a working knowledge of facility operations including material usage, onsite operations, resulting by-products and wastes and management efforts, (ii) reviewing environmental regulations at the federal and state level to identify those that are applicable to the property and to facility operations, and (iii) reviewing appropriate facility environmental files.” This is very consistent with ‘criteria steps’ identified in this paper.

5.6.2 Assessment objectives/ Assessment results

To evaluate the subject facility for material compliance with primary environmental regulatory programs, and to identify areas of material non-compliance, if any.

A significant portion of the report is devoted to assessing material compliance. This covers air emissions, SARA/ Community right-to know, Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), Toxic Substances Control Act (TSCA), CERCLIS in terms of off-site liabilities, and environmental and regulatory agencies. This constitutes ‘primary environmental programs.’ The report also identifies areas of material non-compliance. It appears that this assessment fulfils its objectives. Characteristic the of ASTM E-1527 standard, the emphasis on database searches and explicit statement of pertinent regulation in this report was unique among the case studies.

5.7 Trends and Conclusions from Case Studies

The reports reviewed vary in content, length, and structure. However, they also have commonalities. EDDA *planning* was difficult to assess, as it can only be inferred by looking at the report. According to ERM (Environmental Resource Management, 1999) the planning should include 1) the type of deal concerned (i.e. merger, takeover, share/ asset deal or divestiture) 2) scope and 3) assessment of the purchasing party’s needs. The trend in EDDA planning supported by the results from the interviews done for this thesis seems

to be that the purchasing party communicated to the auditor what their needs were, the auditor then proposed a scope based on this, which was then approved by the purchasing party.

Records reviews varied greatly. This variation seemed to be mostly related to the state of record keeping in the country where the site was located.

6 Interview Results

The people interviewed for this thesis mainly worked for large international consultancies, but also came from industry. Despite the fact that they were all involved in what they overwhelmingly described to be an established field with established practices, they had enormously varying experience and opinions of the field. The interview questions focused on eliciting the present state of the EDD field.

Topics addressed in the questions included experience levels of the interviewee, their role and roles of others in the EDD process, what topics an EDD assessment should include, what they do include, preferred methods of risk transfer, trends in, and the future of, EDD assessment.

6.1 Experience

The interviewees had a wealth of experience in the EDD assessment field. They were typically in leadership positions, meaning that they managed an EDD, coordinating assessments at multiple sites for a project. While representatives from the purchasing sector had participated in typically around ten EDDAs as the EDD process as it has evolved over one to two decades, the assessors themselves typically estimated the number of assessments they had participated in, in the hundreds, having worked in the field for at least a decade. Typically, the assessors expressed the number of companies they had provided such services for as “too numerous” to give an exact figure. There was some difficulty eliciting the number of EDDs those with the longest work experience had, as, outside of the United States, environmental due diligence may have been taking place in some form according to one interviewee, but it was not treated explicitly or separately as such until the 1990’s.

6.2 Issues of Multi-nationality

With the exception of single-country business and to some degree, U.S.- based consultants who were local specialists, those involved with EDDs had been involved with them on a highly international and inter-continental basis. Several stated that it was important to have someone with ‘local knowledge’ (of customs, laws, etc.) working on the assessment team, but at the same time, they had experience working in many countries with highly varying circumstances. As seen in the case studies, awareness of regulation, environmental and otherwise, varied greatly between sites and between countries.

More than one interviewee cited cultural nuances as key factors in determining the success of an assessment. These cultural nuances may be anything from style of asking questions and who to ask questions from, to understanding the relationship between policy/documentation/compliance. For example, in some cases there may be legislation that

is not regulated, and non-compliance is widespread. It would be important to be aware of this in this situation, and evaluate the risk associated with the non-compliance accordingly, and in consideration of the likelihood of enforcement in the foreseeable future. Even within the EU, this can be an area of much uncertainty, as compliance with EU directives have been enforced differently in different member states, making case law an unreliable reference in making such estimations. For example one interviewee stated that in Sweden, while regulation and compliance are high, documentation is comparatively less thorough than what would be expected in a compliance audit in the United States. An assessor or auditor in this situation would have different interpretations of the situation depending on their background and experience. Situations such as these emphasize the importance of understanding the context in which the assessment is being made.

6.3 EDDA Process

The process described by the interviewees was consistent throughout, as well as being consistent with the process described in standards and previously in this paper (Figure 1). This indicates that although results, written standards, and immediate goals may vary, there is a well-developed standard code of conduct in practice, if not on paper, in the EDDA field. This sentiment was overarching, stated both explicitly by some interviewees, and easily inferred from others. The process they described follow:

6.3.1 Described Process

A site owner or prospective purchaser, who determines the need for an EDDA, assigns the job to an internal specialist or, more commonly, hires a consultancy they deem appropriate for the job based on previous experience, reference, or reputation. In cases where the subject is large, it is important that the consultancy be capable of performing several site inspections simultaneously around the world. In some cases it is a legal expert who leads the due diligence process, in some cases it is a representative of the party who is purchasing the EDDA.

In order to determine the needs of the purchasing party and the scope of the project, the purchasing party and the assessors consult and agree upon objectives and scope. Interviewees indicated that this process is variable. In some cases, the purchasing party has very clear ideas of what they want or need accomplished, for example they may have a goal of conducting ‘all appropriate inquiry’ to achieve ‘innocent landowner’ status under CERCLA. In other cases the assessment is part of the risk-management that is the due diligence process. Or, if a company is planning to divest, they may require a product that is, according to various interviewees; more descriptive in nature, focused on compliance rather than best practice, more thorough to discourage buyers from conducting their own assessments, and generally “the same information, but in very different language.” This product used for divestment purposes is generally created using the same standard as that for investment.

Site visits are variable, depending on how much the assessor is allowed to access the site, and to key documents and key personnel for interviews and review of records. Often key documents are collected in a ‘data room’ and following review of these, a walk-through of the site is conducted, and a report is created.

6.3.2 Assessment Products

Although the process of EDDA is agreed upon, quality of assessment and quality of variable data vary greatly between assessments, assessors, sites and countries. This variability was shown both in the review of EDDA case studies outlined in Section 6, and cited by several of the interviewees. The degree to which these studies can vary is reflected in their continuing usefulness.

An assessment team felt confident enough with the previous assessment work done by a competing consultancy firm to review their previous assessments/audits and not need to look at any other sources (Anonymous, 2005). The other extreme includes warnings about such ‘lack’ of due diligence, as ‘ the same pair of eyes will see the same problem’ (BING, 1996).

Purchasers of the EDDAs expressed their preference to work with a purchasing party they were familiar with and trusted for this reason, and a few assessors stated that much of their clientele were repeat clients, with whom they had established working relationships. This minimizes the time and energy needed to communicate the needs and motives of the purchasing party to the assessor. This preference combats weaknesses in the EDD process described in literature: According to Carter & Wilde (2004), an inherent problem in the EDD process arises from the fact that the purchasing party is constrained by their lack of understanding of the risk assessments and process undertaken, and in turn, the consultancy undertaking the actual EDD and estimating ‘business consequences’ is constrained by their limited knowledge of the business or commercial intentions of the purchasing party.

6.4 Motives and Requirements

The interviewees were asked what the motives were for conducting an EDD assessment, and what is required by purchasing parties from the finished EDD assessment product. They responded consistently to the effect that the primary motivation for conducting an EDD assessment is to protect against liability, or “get a true picture of [potential liabilities] in the future.” (Anonymous, 2005). Protection against liability that may have a financial impact on their company, leads the purchasing party to look particularly at contamination, regulatory compliance issues, and often occupational health and safety. Company image was also cited several times a strong motivation for conducting EDD. Even if an environmental aspect would not incur costs in the country where the site is, some companies were particularly sensitive to key issues (i.e. child labor, or asbestos) and what association with these things would do for their corporate image.

What purchasing parties expected and required from the assessments corresponded to their understanding of what would fulfill their needs. The interviewees varied in their response on this subject. Purchasing parties expect an assessment of potential liability issues, at a minimum, issues of compliance and contamination (i.e. ASTM scope at a minimum). The extent of the issues covered depending and varying to a large degree based on the needs of the purchasing party, their understanding of the possible issues, possible liabilities depending on the place, and company policy or culture. Some purchasing parties want risk analysis outlining the potential problems in certain key areas,

whereas others are only interested in issues with potential costs over a certain monetary amount (materiality threshold).

6.5 What an EDDA Should Address

All interviewees thought agreed that the following topics must be addressed during the EDD process: Site use (historical), environmental licenses, applicable legislation, results and actions from authority's inspections, complaints from neighbors or authorities, chemical / hazardous substances inventory, air emissions and wastewater discharges, noise and vibration, and waste disposal including landfills on property.

Nearly all of the interviewees expressed that the following "always must" be included in the EDD process: neighboring properties, sensitive environmental areas in the surroundings, current and future town planning, soil and groundwater pollution issues, water and energy use. More than one interviewee did not think that the following "always must" be included in the EDD process: natural hazards (wind floods, rivers, etc.), raw material use, preparedness for emergency situations, environmental impact of products and packaging materials, environmental impact of transport, existing environmental management system health and safety, and corporate social responsibility.

Existing environmental management systems and corporate social responsibility were the topics with the largest number of negative responses. Interviewees who responded in the negative indicated that this was because there was not always demand for assessment or reporting on these areas, but that these are topics that are becoming more common. Response in the negative to this question indicated only that the topic should not *always* be assessed. This does not exclude usefulness in *some* or even *most* situations.

Some of the difference between the responses can be accounted for by variations in what the interviewees perceived as within the scope of an EDD assessment. For example, two of the four interviewees who expressed that current and future town planning should *not* be included in EDD assessment added that this is part of *legal* due diligence. A majority of the interviewees clearly thought that this was within the scope of EDD. This indicates that opinion of what should be covered in due diligence may be more uniform than the results of this study show, and some of the inconsistencies may instead lie in determining what part of a due diligence team: legal, environmental, financial or otherwise, is responsible for such issues.

The interviewees were also given a list of items and asked if they already include, or plan to include, those issues. Their responses were largely consistent, indicating that EDD assessments include the same features, with the exception of, as above, sustainability and CSR, which only about half of the interviewees included. 'Environmental aspects of products and services' was also shown to be a less standard part of the EDD process. Responses 'generally' and 'usually' were counted as affirmative. The issues and responses are shown in Table 4. One reason given for not including some aspects in an EDD assessment was a plan on the part of the purchasing party to make substantial change upon acquisition, making investigation of the current state of the issue a mute point.

Table 4: Issues included or planned to be included in EDD by interviewees.

ISSUE	Issue included in EDD by interviewee
Health and Safety	100%
Environmental aspects of products and services,	70%
Business opportunities and threats that are associated with the environmental aspects of the company,	100%
Impact of future environmental legislation,	100%
Organization, knowledge and competence of environmental managers/coordinators of the acquisition object,	90%
Implementation and function of existing environmental management systems,	100%
CSR (Corporate Social Responsibility) issues,	40%
Sustainability issues,	30%

As Table 4 shows, what EDD assessments actually *do*, or will include, was not entirely consistent between the interviewees. They differ, just as pinions of what issues *should* be included in an EDD assessment differed between interviewees. What was more consistent were the descriptions by individual interviewees of *should* be included in an EDD assessment and what they actually *do* include in an EDD assessment. An example of this was those individuals who performed CSR as a part of an EDD assessment were those who thought that CSR *should* be performed. Thus, this series of questions failed to elicit how interviewees would change their current practices to make them more ideal.

Possible reasons for this are that the difference between the questions was not clear to the interviewees or that interviewees did not perceive a difference between the questions, that they were representing their company in their answers, that they had a lot of influence over what issues they included in assessments, that believed that their company's way was best, or simply that many had not given much thought to this issue.

6.6 Professional Judgment

A reoccurring theme in the interviews was the importance of flexibility and space for professional judgment. Professional judgment relies on the experience of the assessor, and the interviewees also expressed that experienced assessors were a key factor for success. An issue that an interviewee from the purchasing side cited was that although lead auditors are generally experienced, frequently it is junior team members who are doing the actual walk-through of the site, despite the fact that this site-visit is best done by a more experienced eye.

This importance of flexibility and space for professional judgment was reflected in a number of statements by the interviewees, for example their use of standards; Interviewees generally expressed that they did not use international EDD standards as a basis for their assessments unless they were explicitly requested. ASTM 1527 was mentioned by half of the interviewees. This standard was followed when requested by US companies, and one consultancy indicated that their EDD standard was based on ASTM 1527 but modified to reflect the specific needs of a particular transaction. Outside of this, the interviewees indicated that they did not follow any international standard, but that they had

internal or company standards, in some cases based to some degree on the international standards, and these company standards were adjusted according to the needs of the purchasing party. If a purchasing party had specific needs, such as adherence to a corporate standard, or preference for specific style, scopes, expression of risk, etc., this would affect the result. The purchasing parties stated that the consultancies used a standard that they liked. As stated in section 6.3, they generally, but not always, applied the same standard for divestitures, with key differences in terms of purpose of the document, and length of time available to complete the assessment. It was also mentioned by one consultant that divestiture EDDs are increasingly common. Issues, liabilities may come to the surface in divestment, motivation for performing a divestment EDD is much the same as for performing an EDD assessment in the acquisition process.

6.7 Deal-Killers and Risk Transfer

6.7.1 Are Environmental Issues Deal Killers?

The interviewees were asked if at times their findings result in that they strongly recommend cancellation of the potential business transaction. The response was very mixed, with answers ranging from “We never say ‘cancel’” to “Definitely yes.” Those who responded in the positive expressed that this was the point of conducting environmental due diligence. However, from the interviews conducted for this thesis, it does not appear that environmental issues are often the cause of canceling a business transaction. Most interviewees who responded in the positive expressed that they *would* advise a purchasing party to cancel a business transaction in the event that there were serious issues uncovered. However, only two of the interviewees stated that this had ever actually been the case in their many years of experience, across hundreds of site assessments. Even in these cases, the interviewees expressed that it was a combination of factors and not only environmental risk, which led to the transaction being cancelled. That is, the entire package, aided by the environmental liability, was unattractive in this situation. Therefore, according to the interviews in this study, the event of environmental issues causing a business deal to collapse is more myth than reality. This finding is in direct conflict with existing ‘anecdotal evidence’ (Bing, 1996) suggesting that environmental due diligence causes A&M transactions to be cancelled. One interviewee expressed it in this way: “[We] wouldn’t buy into a major liability, [but there are fewer] major liabilities around then you’d think.”

Those who responded in the negative indicated that it was not part of their role in EDD to make decisions about the business transaction, but merely to evaluate and communicate the environmentally-related risk. These parties expressed that it is the role of the client rather than the assessor to make the decisions based on the information provided by the assessment. Another reason was that even if a site was very unattractive, usually a deal could be adjusted to compensate for the assessed risk, or re-constructed to exclude the undesirable site or business. This means that risk if properly identified and quantified, can be accounted for prior to and in the transaction, transferring risk away from the acquiring company.

6.7.2 Methods of Risk-Transfer

The interviewees were asked what their preferred means of risk transfer were: legal agreement, price adjustment, or if there was a better alternative that existed. The preferred methods of risk transfer varied between situation and person interviewed. There was not a simple solution. Most interviewees indicated that it depended very much on the specifics of the individual deal. Price adjustment is easiest, they expressed, but also has pitfalls. The pitfalls of price adjustment include the fact that after the transaction occurs, the sum of money that the total purchasing price was reduced for, is not itemized, earmarked, or necessarily allocated for these purposes. The strength of price adjustment is that it does not involve a complicated document that may have holes in it. Also, in a situation where a property or business is being purchased from a smaller entity, or being bought out entirely or merged, then price adjustment is preferable to legal agreement because the party held responsible in the legal agreement may not be in a position to pay for potential legal responsibility in the future, or it may simply not exist. It was generally agreed upon among the interviewees that legal agreements are messy, complicated, and not a sure thing. Legal agreements are subordinate to national legislations, Polluter Pays Principle (in Europe) and it is not certain that the indemnity is transferable.

Environmental insurance, according to the interviewees, is becoming increasingly common as the available insurance policies become more comprehensive, but still are not as common as price adjustment, and, according to one interviewee, is “a poor tenth” behind price adjustment and legal agreements.

One interviewee expressed that in their practice, the method of risk avoidance is not [necessarily] up to the assessor, but a decision generally made by the business managers and attorneys. Generally, however it is a combination of tools that are employed in risk transfer and avoidance.

6.8 Issues and Barriers in EDD Assessment

Interviewees were asked to choose from a list the most challenging issues they encountered in conducting EDD assessments. The prevailing response for the most challenging issue was a general lack of time. Some said this ‘comes with the territory’ while others attributed it to environmental issues being brought into the picture so late in the process, something that can be changed. Access to information was also a commonly cited issue, with reasons varying from badly organized data rooms to confidentiality-related constraints. The other issue cited was problems in communicating risk; the margins of error associated with estimating potential costs of for example remediation, especially prior to invasive investigation, are very large.

6.9 Trends and Future of EDD Assessment

Not surprisingly, the interviewees had different ways of expressing what trends they saw in the EDD field, and what the future of EDD assessment will look like. This was a reflection both of their experience in the field, their personal position, and their understanding of the question. In the immediate future, the interviewees involved in conducting predicted that the scope of EDD would expand to include among other things, safety issues, carbon-related issues, such as CO₂, and more modeling. A few mentioned *all appropri-*

ate inquiry. One believed that the new *all appropriate inquiry* standard from the US EPA will cause changes to make EDD assessments in accordance with this standard, while another saw the increased requirements associated with this standard as either creating longer “lead-in times” for the assessments prior to the transaction happening, and/or influencing the EDD practice to move away from *all appropriate inquiry*.

Trends in EDD assessment that the interviewees mentioned included consolidation of consulting firms, meaning that large firms capable of conducting assessments for large-scale acquisitions and mergers. These large firms can provide assurance that they can be conducted in a consistent manner over multiple sites simultaneously. On the other end of the spectrum, very small firms specializing and conducting assessments for small acquisitions or working in conjunction with large firms will survive, while medium-size firms either expand or disappear. Another size-related trend predicted was that smaller and medium-size companies will conduct EDD assessments with increasing frequency, as simpler and less costly assessments are available, and the risks and benefits associated with EDD assessment become more widely understood.

In terms of reporting, database-type reporting tools, probabilistic and statistical modeling that can be compatible with financial risk assessment models are becoming, and will become increasingly common. One assessor expressed this as more “sophisticated” assessment. Via this usage of common reporting tools and models, assessors from different fields working within the field of due diligence are able to communicate with one another in a common language. At least this was the prevailing sentiment among the assessors interviewed, who expressed the cooperation between environmental and financial and managerial functions of the process to be very good, and that companies are “increasingly aware” and have a “broader view” of how EDD can be used. There were consultants who expressed that environmental issues were marginalized in the scope of most due diligence audits, but this view was the exception.

7 Discussion, Conclusions and Recommendations

In the research including literature review, case studies, and interviews described in this paper, the research questions have been answered in such a way that some patterns emerged that the research had not intended to address. Namely, that the personalities of the countries, local climate, and assessors themselves play a large and vital role in the EDD process. The research questions were answered in the following ways:

7.1 Research Question 1

The first question addressed in this paper was: *who are the actors in EDD assessment, what are the methods they apply and what standards are they using in the due diligence process?*

7.1.1 Actors, their roles, and communication in EDD Assessment

The actors identified were the parties purchasing the EDD assessment, including their legal representation, and the assessor, who could be internal to the company, but most often was a consultant. The interviews showed that it could be a number of people from purchasing party who were involved in the EDD audit, depending on the company’s

structure and size. Often, a legal representative is responsible for the due diligence process. The responsibility was also shared by environmental managers and by top management. While it may be clear in each individual situation who in the purchasing company is responsible for EDD issues, it appears that the role can be delegated in a number of ways, so the role of EDD, perceived importance, and what communication channels it uses, varies from case to case.

Appropriate communication of risk is therefore a potentially problematic area. As the purchasing party may be represented by people in a number of different positions, the communication between the auditor(s) and the purchasing party can take on different forms. This form of communication varies according to not only the needs of the purchasing party, but also how those needs are understood by the person representing the purchasing party. This representative understands and communicates issues according to the nature of their position; An environmental manager is likely aware of potential environmental aspects which carry high risk, a business manager may be able to calculate statistical financial risk and be aware of the context in which these aspects will exist, and a legal advisor knows pertinent legislation and liability or appropriate protection from liability, but all of these are necessary simultaneously in order to make the most of an EDD assessment. This is illustrated in that a frequent complaint (from legal council) is that risk assessments and the reasons for them are not explained clearly enough.

That communication of risk presents a significant problem in EDD assessment was reflected in the results of the interviews conducted for this paper, a majority of the interviewees cited 'communication of risk among the top five most challenging issues they encounter when conducting an EDD assessment. A solution to this is that "great emphasis should be placed in the opening rounds of the transaction in ensuring clarity of the purchasing party's intention for the assessment as well as the assessor identifying constraints that may arise in attempting to obtain validated results" (Carter and Wilde, 2004).

The methods applied in conducting EDD assessments may have been based on the international standards looked at in this study, but clearly the prevailing trend was to employ company standards. This was the case both according the EDD assessment case studies, looked at in this study, and to the people who conduct and use EDD assessments, who were interviewed. The prevailing sentiment among the interviewees was that the international standards were a good starting and guidance point, but were generally not practically applicable, as they aren't flexible enough to adjust to the needs of many situations. As international standards represent not only cooperation of ideas but also compromise and generalization, several interviewees expressed frustration with their inability to specifically address some situations they are needed for.

This is not to say that the standards aren't used; ASTM E 1527 00 was used by some American companies, for sites both in and outside of the United States, and ISO14015, if not strictly or explicitly followed, is a basis upon which other, more specific standards are developed.

7.2 The Current and the Future States of the EDD Practice

The second question addressed in this study was; *how has the EDD practice evolved, what does it look like now? I.e. what is expected and what is delivered in and EDD assessment, and are current practices consistent with the practices described in the international standards?* This was researched through literature review and review of a selection of case studies, and in the interviews. The EDD practice has and is changing and evolving, as is repeatedly stated both in literature (Bing, 1996; Carter and Wilde, 2004; KPMG, 2004) and is reflected in the increasing breadth reflected in standards, from the 1993 liability- based ASTM 1527 concerned chiefly with issues of contaminated property, to ISO 14015 a few years later, which reflected a substantially expanded scope of EDD. And the practice is evolving even from these standards, to include issues not limited to liability, remediation and upgrading costs, but also including issues such as the commercial impact (including sales, operations, customer relations and reputation, (KPMG, 2004) of environmental issues, including corporate social responsibility as they relate to brand reputation risks.

Current practices, if the case studies reviewed in this study are any indication, have similar steps and purposes, but vary in content and quality of data. The reasons for this discrepancy in reporting methods and data quality can be partially accounted for by circumstantial factors. Factors such as corporate culture, reporting practices in the company or country, time allowed for the study, and accessibility of the site and other information sources due to issues like confidentiality. Another reason for this difference in content may be the motives behind the EDD assessment, and the way in which the scope was decided. Although they have some consistency in approach and steps undertaken, neither the case study reports reviewed nor the interviews conducted in this study indicate that current practice directly follows either of the international standards reviewed.

This partially addresses the last issue raised in this paper, which is; *What are the trends in, and the future of EDD assessment.* The EDD assessment report case studies reviewed did not show definitively any trends developing over the course of time covered in the case studies. Limitation of liability statements and signatures became de facto in the more recent assessments conducted by consultancies. According to interviewees, risk is handled largely through price adjustment. Actors in the EDD field interviewed for this study gave some insight into trends of globalization and specialization of the field. Predictions fit together to paint a picture of increasingly aware companies and an expanding, cooperative EDD field. But this rosy picture of the future of EDD was not universal. Potential issues such as the new *all appropriate inquiry* standard making the possibility of achieving *innocent landowner* status, one of the great drivers in the development of the field, that much more difficult to achieve, may prove to have unexpected results. Maybe this will encourage more divesting parties to take the initiative in the EDD process to allow the necessary time to conduct a more thorough assessment.

That consultants saw divestment assessment as a growing part of their work supports this scenario. On the other hand, it could, as suggested by one interviewee mentioned previously, mean that the field moves away from *all appropriate inquiry*. The expanding scope of EDD, and the inclusion of issues such as corporate social responsibility and

sustainability, as well as the incorporation of such issues into overlapping sectors of due diligence (market due diligence, financial due diligence) could mean that EDD has different emphasis than what it does today. This depends on the motivation behind the assessment. Shift away from *all appropriate inquiry* environmental due diligence can consist of EDD of materials, social responsibility and sustainability issues for their own sakes or in a context of public perception, or for their impact on sales or operations due to availability and cost. How EDD issues are allocated and incorporated into EDD, which are different from case to case, also has a big impact.

This brings us back to the underlying theme in the responses of the interviewees, as well as the comparison of the case studies: The purpose of due diligence is to assess the present, and thereby the future liabilities of an entity. Inherently this only needs to be done because the entities and situations that are assessed are unique and diverse. Therefore, it is vital that any effort to standardize the assessments is broad and flexible enough to encompass and accommodate very different situations, and the challenge is to keep the standards and assessments specific enough to be useful. It seems that the international standards currently don't provide this to the degree that the interviewees would like. Instead, the international standards, in lieu of being strictly followed, are a point of departure from which other standards, or even assessments can be scoped and conducted according to the specific needs of the situation.

As EDD is still a relatively new field and the needs it fulfils are changing, EDD and the standards that define it will also continue to evolve. In the research done for this thesis, two opposing movements have become clear: a movement towards the departmentalized, clearly defined, small-scope EDD that characterizes AAI, and a movement towards a broader definition of EDD. This second movement is particularly interesting, in that it incorporates issues outside the scope of the traditional physical liabilities of contamination. It begins to grapple with issues such as communicating risks associated with social responsibility in financial language, and depends on a common language between the actors in the due diligence process. Perhaps the lines between the various disciplines within due diligence will continue to blur and due diligence practices between the disciplines will be combined in a single standard much as quality and environmental management were recently combined by ISO into a single standard. In this way, issues that currently are in overlapping areas or 'fall between the cracks' between law, environment and finance could be absorbed into a single, better-defined due diligence practice with common language and guidelines.

7.3 Areas for further research

In the process of answering the questions addressed in this paper, other interesting related questions were uncovered; How much deals are actually affected or cancelled because of issues uncovered in the EDD process is a question that is hard to quantify, but potentially very interesting and revealing question. Literature consistently states that deals are affected (Bing, 1996; KPMG, 2004) but it is unclear how much. This study suggests on the experience of its interviewees that environmental issues, if identified, aren't causing deals to be cancelled, but that they can be restructured. Previous publications (Bing, 1996) have suggested otherwise, but also on an uncertain basis. Has the EDD field evolved to a

point where purchasers are confident enough in risk calculations to go forward despite significant material issues?

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Abbreviations

AAI:	All Appropriate Inquiry
ASTM:	American Society for Testing and Materials
USEPA:	United States Environmental Protection Agency
CERCLA:	Comprehensive Environmental Response, Compensation and Liability act, as amended, 42 U.S.c.9601 <i>et seq.</i>
CERCLIS:	Comprehensive Environmental Response, Compensation and Liability Information System (maintained by USEPA)
EDD:	Environmental due diligence
EASO:	Environmental assessment of sites and organizations. Also, EDD.
FAA:	Unites States Federal Aviation Administration

Appendix I: Main Differences between EPA's All Appropriate Inquiries Regulation and the ASTM E- 1527-00 Standard

Main Differences	ASTM E 1527-00	Final AAI Standard
Definition of Environmental Professional	No specific certification, licensing, education, or experience requirements -Applies to all individuals involved in conducting AAI	Specific certification/license, education and experience requirements for supervising professional
Interview with Current Owner and Pccupants of the Subject Property	A reasonable attempt must be made to interview key site manager and reasonable number of occupants	Mandatory
Interview with Past Owner and Occupants	Not required, but must inquire about pasts uses of the subject property when interviewing current owner and occupants	Interview with past owners and occupants must be conducted as necessary to achieve the objectives and performance factors in §§ 312.20(e)-(f)
Interview with Neighbouring or Nearby Property Owners or Occupants	Discretionary	Mandatory at abandoned properties
Review of Historical Sources: period to be covered	All obvious uses from the present back to the property's first developed use or 1940, whichever is earlier	From the present back to when the property first contained structures or was used for residential, agricultural, commercial, industrial or governmental purposes
Records of Activity and Use Limitations (e.g., Engineering and Institutional Controls) and Environmental Cleanup Liens	-User's responsibility -The search results must be reported to the environmental professional -Scope of environmental cleanup lien search is limited to reasonable ascertainable land title records	-No requirement as to who is responsible for the search -Scope of environmental cleanup lien search includes those liens filed or recorded under federal, state, tribal or local law
Government Records Review	-Federal and state records -Local records/ sources at the discretion of the environmental professional	-Federal, state, tribal, and local records
Site Inspection	-Visual inspection of subject property required. No exception. -No specific requirement to inspect adjoining properties; only to report anything actually observed	-Visual inspection of subject property and adjoining properties required -Limited exemption with specific requirements if the subject property cannot be visually inspected
Contaminants of Concern	CERCLA hazardous substances and petroleum products	<u>Parties seeking CERCLA defense:</u> -CERCLA hazardous substances <u>EPA Brownfields Grant recipients:</u> -CERCLA hazardous substances, pollutants or contaminants -petroleun/petroleum products -controlled substances
Data Gaps	-Generally discretionary -Sources that revealed no findings must be documented	Requires identification of sources consulted to address data gaps and comments on significance of data gap with regard to the ability of the environmental professional to identify conditions indicative of releases and threatened releases
Shelf Life of the Written Report	Updates of specific activities recommended after 180 days	One tear, with some updates required after 180 days

Appendix II: ISO Definitions

Environmental Aspect:	An element of an organization's activities, products, or services that can interact with the environment (14015, 2.6).
Environmental Impact:	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization (14015, 2.8)
Organization:	Company, corporation, firm, enterprise, authority or institution, or part of combination thereof, whether incorporated or not, public or private, that has its own functions and administration (14015, 2.12).
Intrusive Investigation:	Sampling and testing using instruments and/or requiring physical interference (14015, 2.11).
Validation:	Process whereby the assessor determines that the information gathered is accurate, reliable, sufficient and appropriate to meet the objectives of the assessment (14015, 2.15).