Multiple Lines of Evidence Guidance

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Connecticut Department of Energy and Environmental Protection in Cooperation with the Environmental Professionals Organization of Connecticut

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1 Introduction

"Multiple lines of evidence" is one mechanism by which an existing release may be discovered pursuant to the Release Based Cleanup Regulations (RBCRs). Under the RBCRs, knowledge of an existing release and when such knowledge is obtained and by whom forms the basis for "discovery" and subsequent investigation and cleanup of a release. Discovery occurs when a person who created or is maintaining the release (creator/maintainer) obtains knowledge that the release exists. Section 22a-134tt-2(a)(2) specifies the following types of knowledge that can lead to discovery:

(A) The results of laboratory analysis of soil, groundwater, sediment, or soil vapor that indicate concentrations of such substances above the laboratory reporting limit

(B) Observed presence of non-aqueous phase liquid (NAPL)

(C) Multiple lines of evidence, identified during the course of an investigation, that would indicate to a reasonable person, with similar knowledge, experience, or training and exercising a degree of care in similar circumstances, that a release has occurred. The RBCRs further define multiple lines of evidence as two or more types of observable facts which tend to demonstrate the truth of a matter asserted.

(A) and (B) above provide direct knowledge of a release. This document provides guidance regarding how multiple lines of evidence come together to create knowledge that a release has occurred pursuant to Section 22a-134tt-2(a)(2)(C) RBCRs. The following subsections provide the rationale for the "multiple lines of evidence" standard, and when such evidence does and does not lead to discovery.

When multiple lines of evidence do lead to discovery by the creator/maintainer, that discovery is to be reported within 120 days unless analytical results are obtained to demonstrate otherwise. Obtaining analytical results will result in one of the following actions by the creator/maintainer:

- No reporting required
- Reporting a significant existing release (SER) within 24 to 72 hours of discovery
- Reporting other reportable releases within 120 days if the release is not remediated and closed
- Reporting/tiering within 365 days if the release is not remediated and closed

1.1 Why "Multiple Lines of Evidence"

Most existing releases will be discovered through the analysis of soil or groundwater samples collected as part of environmental investigations associated with the purchase, refinancing, or redevelopment of real property. However, if an existing release could only be discovered through the analysis of samples or observation of NAPL, then it would be possible to avoid discovering releases simply by refusing to collect any samples. A mechanism is needed to ensure that people cannot refuse to discover a release that is apparent to individuals with appropriate training or experience.

The "multiple lines of evidence" standard focuses on the level of knowledge needed by a "reasonable person," to conclude that a release is present and is designed to prevent willful blindness to the apparent presence of a release by claiming no knowledge that it exists.

1.2 Who is the "Reasonable Person?"

The designation of "reasonable person" can apply to any individual obtaining knowledge of a release, including the environmental professional (EP) engaged in the collection and interpretation of data and the creator/maintainer who is provided conclusions regarding the presence of a release by a professional. The RBCRs factor the knowledge, experience, and training of an individual into the comparison to a reasonable person and whether they would be expected to have knowledge of a release:

> "…multiple lines of evidence that would indicate to a reasonable person, with similar knowledge, experience, or training and exercising a degree of care in similar circumstances, the presence of a release…" *[RCSA 22a-134tt-2(a)(2)(C)]*

The meaning of reasonable person is similar to the Massachusetts definition of "knowledge" which includes:

> "…knowledge a person acting in a reasonably prudent and intelligent manner would have, but for that person's willful, knowing or negligent avoidance of learning about the fact or facts in question. In determining whether a person has acted in a reasonably prudent and intelligent manner, any specialized knowledge or training possessed by that person and the circumstances surrounding the fact or facts in question shall be taken into account." *[Massachusetts Contingency Plan 310 CMR 40.0006(12), Knowledge definition (b).]*

1.3 What Constitutes "Knowledge?"

Section 22a-134tt-2(a)(2)(C)(i) of the RBCRs states that a creator/maintainer has knowledge of a release when, in the course of an investigation, they become aware of multiple lines of evidence that would indicate the presence of a release. A line of evidence is an observable fact that tends to demonstrate the truth of a matter asserted *[RCSA 22a-134tt-1a(88) – Release-Based Regulations Definition for "Multiple Lines of Evidence"]*, and the RBCRs provide the following as examples of lines of evidence:

- Information about the use of a particular geographic area, including anecdotal reports of historical disposal or releases, aerial photographs, and maps
- The results of field screening indicating the presence of volatile organic compounds, petroleum hydrocarbons, or metals
- Observed staining of soil, concrete floors, or pits
- Organoleptic evidence, including odors
- Indoor air samples indicating the intrusion of soil vapors
- The observed presence of asphalt, coal slag, solid waste, ash, or other non-native materials in or on the land and waters of the state

As additional examples of lines of evidence indicating the presence of a release are identified, the Department will update this document to include them.

"Reasonable persons" with different knowledge backgrounds and different levels of experience may acquire knowledge of a release in different ways and at different times:

- **Environmental professionals** trained to conduct Phase I investigations may conclude a release has occurred based on the lines of evidence described above. Anyone else observing these same conditions may not have the background and/or experience necessary to make that conclusion.

- **Property owners** will typically rely on EPs to conduct assessments and make release determinations. They will not necessarily be able to look at the same conditions as EPs and interpret them as lines of evidence indicating a release occurred. However, if the EP informs the property owner that they have a release, the property owner has acquired knowledge that they are the creator/maintainer of the release.

2 Discovery Based on Multiple Lines of Evidence

While environmental assessments are likely to be the most common avenue of discovery, the quality of the land and waters of the state may be assessed for a variety of reasons, and by a variety of experts. Any time a business decision is made to investigate the land and waters of the state for the purposes of redevelopment or to facilitate the purchase or sale of a property, a professional with the appropriate expertise may observe lines of evidence sufficient to indicate the presence of a release. When and how such knowledge translates into discovery is the subject of this section.

2.1 When Does Knowledge Become Discovery?

Who obtains knowledge and when are critical components of formally discovering an existing release, and people with different types of experience will obtain knowledge of releases in different ways and at different times. Knowledge is not always discovery. Some key elements in determining when knowledge based solely on multiple lines of evidence (no analytical data) becomes discovery are provided below:

- Discovery of a release per §22a-134tt-2(a) of the RBCRs occurs when the creator/maintainer obtains knowledge of it. An EP may be working directly for the creator/maintainer or another entity:
    - An EP will typically have knowledge of a release before their client does and is expected to inform their client of their observations and conclusions. An EP should notify their client that a release exists not more than 30 days after the earlier of the following:
        - The date of a laboratory report providing analytical evidence of a release.
        - The date of the parcel reconnaissance identifying multiple lines of evidence indicating the presence of a release.
    - If the EP's client is also the creator/maintainer of the observed release, the EP should inform them that knowledge of the release constitutes discovery under the RBCRs and carries all the obligations associated with discovery, including further investigation or reporting (see *Section 3* below).
    - If the EP's client is not the creator/maintainer, discovery has ***not*** occurred pursuant to §22a-134tt-2(a) of the RBCRs.
- Significant existing releases (RCSA §22a-134tt-2(c)), emergent reportable releases (RCSA §22a-134tt-2(e)), and significant environmental hazards (CGS §22aa-6u) have their own conditions for

discovery that are not covered here. However, with any observation, the EP should consider whether such observation could represent an emergent reportable release.

2.2 Exceptions to Discovery

The RBCRs include several conditions for which knowledge of the presence of a substance does not constitute discovery:

- The only evidence of a release is data available or generated before the date the RBCRs become effective (a.k.a. the "filing cabinet" exemption). Additional discussion of historical data as a line of evidence and when it supports discovery is provided in Section 2.3.
- The non-analytical lines of evidence indicating a release is present were not identified during an investigation (i.e., the information was not obtained as part of a business decision to investigate the land and waters of the state).
- Analysis has been conducted, but the substance is present because of one of the following:
    - It has been authorized under Title 22 of the Connecticut General Statutes
    - Naturally occurring
    - Result of automotive exhaust
    - Result of application of fertilizer or pesticides in accordance with their labeling

Additional Provisions

Following the public comment period on the draft RBCRs, adjustments to § 22a-134tt-2(a)(2)(C) of the RBCRs were proposed to clarify the Department's intent that releases be discovered when there is a business decision to investigate the land and waters of the state and to help limit the potential for inadvertent discoveries outside such decisions. Two of these clauses did not get incorporated into the final regulation as intended:

(ii) Notwithstanding clause (i) of this subparagraph, the owner of an owner-occupied single-family home shall not be determined to become aware of the presence of a release solely based on multiple lines of evidence observed by such owner.

(iii) For the purposes of this subparagraph, "investigation" means any visual or organoleptic assessment of the condition or quality of the land and waters of the state performed or conducted by a licensed environmental professional, a permitted environmental professional, a technical environmental professional as defined by section 22a-6u of the Connecticut General Statutes, a professional engineer as defined by section 20-299 of the Connecticut General Statutes, a land surveyor as defined by section 20-299 of the Connecticut General Statutes, or a scientist educated in and engaged in the fields of soil science, geology, physical science, or hydrogeology for the purposes of identifying pollution, planning for construction or redevelopment, or disposing or discharging soil, sediment or groundwater, or complying with any federal, state, or locally issued permit or authorization.

It is the Department's intent to apply these provisions to the conditions under which a release can be discovered. This wording reflects the intended meaning of "in the course of an investigation" at the beginning of Section 22a-134tt-2(a)(2)(C)(i). Examples of scenarios that would and would not result in discovery based on multiple lines of evidence are included in Section 2.5.

2.3 Historical Data as a Line of Evidence

As indicated in Section 2.1, if the *only* evidence of a release is data available or generated before the date the RBCRs become effective, such information does not constitute discovery. This includes historical reports, notes, and laboratory data generated before the effective date of the RBCRS.

However, if a current line of evidence indicates the presence of a release, such historical documents would be considered secondary lines of evidence. Two examples are provided below (also included on Table 1):

- **No Discovery** – An environmental professional obtains a report prepared before the effective date of the RBCRs that includes a discussion of a dust collector under which a surficial soil sample was collected and found to contain chromium at 5,700 mg/kg.
    - By itself, this information does not warrant discovery.

- **Discovery Warranted** – Same scenario as above, but the environmental professional also conducts a site inspection after the effective date of the RBCRs. There is no dust collector currently present, but blue soil is observed in the location where the dust collector was formerly located.
    - The current observation of blue soil is a line of evidence that a release occurred. The historical report is no longer the sole evidence of a release and provides additional lines of evidence that a release has occurred. In this situation, discovery is warranted.

While data generated before the effective date of the RBCRs may not, by itself, serve as grounds for discovery of a release, such historical data may be used to demonstrate that a current observation does not warrant discovery. For example, an EP may observe staining during an inspection; however, if a historical report adequately documents the investigation and cleanup (closure) of that staining, discovery may not be warranted.

2.4 Application to Phase I Environmental Site Assessments (ESAs) and Transaction Screens

Phase I ESAs present unique considerations related to transmitting knowledge of a release to potential creator/maintainers. The LEP may or may not be the EP conducting the inspection, the client may or may not be the property owner, and people representing different interests may be present during inspections and interviews. Some key considerations to keep in mind include:

- **REC vs. Release** – The identification of recognized environmental conditions (RECs) per the ASTM standard does not necessarily equate to multiple lines of evidence indicating the presence of a release. The EP should take care to distinguish between RECs and conditions that, in their opinion, constitute a release. They should also document the lines of evidence used to reach their conclusion for each area evaluated.

- **Imparting Knowledge of Releases via the Phase I Process** – Providing a Phase I ESA identifying releases imparts knowledge of those releases. A Phase I may be provided not just to a client but to

other parties. Everyone who receives a copy of the Phase I acquires knowledge of releases identified therein. Whether that knowledge is ground for discovery depends on who has knowledge:

- **Property Owner** – If the property owner is the client for whom the Phase I is being prepared, they will acquire knowledge of any releases identified by the EP. The property owner is also considered a maintainer (and may also be a creator) and will "discover" the release(s) when the EP informs them of the presence of such releases (in writing or verbally). This could occur anytime between the site inspection and delivery of the Phase I ESA but should not be more than 30 days after the date of the parcel reconnaissance that identified multiple lines of evidence indicating the presence of a release.

  Some specific circumstances to keep in mind are provided below:

  - *Buyer* – A Phase I may be prepared for a potential buyer. If the buyer already occupies or operates the site, they could also be a creator/maintainer and informing them of a release would constitute discovery. If not, identification of a release to the buyer, while imparting knowledge, does not constitute discovery because discovery occurs only when the creator/maintainer has knowledge.
  - *Inspections and Interviews* – Whether a Phase I is conducted for the property owner or a potential buyer, owners or owner representatives often accompany EPs on inspections and/or are interviewed as part of the Phase I process. Showing interest in an area or asking questions does not necessarily constitute identification of a release; however, EPs should be conscious of when they have identified a release and what information (knowledge) they are imparting throughout the Phase I process.

- **Assessments Conducted by Junior Staff** – Junior (entry-level) staff often conduct Phase I assessment inspections and interviews. The training and experience of the inspector should be considered when identifying releases vs. RECs, and discussion with the LEP may be necessary to determine which observations constitute knowledge of a release.

2.5 Other Activities that May Lead to Discovery Via Multiple Lines of Evidence

Activities other than Phase I ESAs and Transaction Screens may also lead to the discovery of releases when those activities are conducted for certain purposes by qualified individuals. Specifically:

- **What** – investigations of the condition or quality of the land and waters of the state
- **Why** – for the purposes of identifying pollution, planning for construction or redevelopment, or disposing or discharging soil, sediment or groundwater, or complying with any federal, state, or locally issued permit or authorization
- **Who** – conducted by a reasonable person with appropriate knowledge, experience, or training, including:
  - licensed environmental professional
  - permitted environmental professional
  - technical environmental professional
  - professional engineer
  - land surveyor
  - scientist educated and engaged in soil science, geology, physical science, or hydrogeology

Examples of activities/observations that do and do not meet the above conditions regarding discovery of a release are provided on Table 1.

3 Reporting a Release Based on Multiple Lines of Evidence

Section 22a-134tt-3(a)(2)(A) specifies that an existing release (that is not a significant existing release) discovered by a creator or maintainer must be reported within 120 days of discovery if it has not been cleaned up and meets one of the following conditions:

- Subsurface non-aqueous phase liquid (NAPL) greater than or equal to 1/8 inch is present.
- A substance in the release exceeds 2x the applicable cleanup standard specified in the RBCRs (with additional conditions for petroleum)
- A substance in the release has no numeric cleanup standard specified in the RBCRs, and:
    - the concentration is greater than 2x an additional polluting substances (APS) criteria calculated pursuant to the RBCRs

      or

    - no APS criteria can be calculated

Releases identified based solely on multiple lines of evidence (i.e., no analytical data) will be presumed to meet one of the above conditions unless analytical results are obtained to demonstrate otherwise. As a result, releases discovered by the creator/maintainer through multiple lines of evidence and not further investigated through the collection of analytical data are to be reported within 120 days of discovery.

Tables

Table 1
Lines of Evidence and Discovery Decision Examples
Multiple Lines of Evidence Guidance

Example Scenario	Discovery Warranted?	Rationale
Historical Data Applicability		
A Phase I is being conducted for Property A. Historical reports generated before the effective date of the RBCRs indicate that Property A was occupied by a dry cleaner in the 1950s and that downgradient Property B is impacted by a groundwater PCE plume.	No	The only information indicating the presence of a release is data generated before the effective date of the RBCRs.
An environmental professional obtains a report prepared before the effective date of the RBCRs that includes a discussion of a dust collector under which a surficial soil sample was collected and found to contain chromium at 5,700 mg/kg.	No	The historical data is the sole line of evidence indicating a release.
Same scenario as above, but the environmental professional also conducts a site inspection after the effective date of the RBCRs. There is no dust collector currently present, but blue soil is observed in the location where the dust collector was formerly located.	Yes	The current observation of blue soil is a line of evidence that a release occurred. The historical report is no longer the sole evidence of a release and provides additional lines of evidence that a release has occurred.
A Phase I is being conducted for Property A. Historical reports generated before the effective date of the RBCRs contain boring logs and lab reports for adjacent Property B indicating the presence of fill containing coal and ash with elevated metals and PAHs. The reports also indicate that Properties A and B were developed at the same time.	No	The only information indicating the presence of a release is data generated before the effective date of the RBCRs, and there is no direct evidence of fill on Property A.
Same scenario as above, but the environmental professional observes coal and ash on Property A during the site reconnaissance.	Yes	The observation of coal and ash is one line of evidence. The historical reports serve as a second line of evidence and are no longer the sole evidence of a release.

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Lines of Evidence and Discovery Decision Examples
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Example Scenario	Discovery Warranted?	Rationale
Phase I-Type Inspections by Environmental Professionals		
Light surficial staining is observed on a concrete floor in a manufacturing area. There is no other damage to the floor and no cracks. The staining is not directly adjacent to machinery or a material storage area.	Maybe	Light surficial staining on an in-tact poured, concrete floor may not, by itself, be reason to suspect a release occurred to the underlying soil. Knowledge of current or historical activities in the area will help establish fact patterns used to determine if sampling is necessary.
Heavy staining is observed on a concrete floor near machinery that uses oil as a lubricant. There is no other damage to the floor and no cracks.	Y	The heavy staining is evidence of a significant release or repeated releases, and oil use is known at that location.
Surficial staining is observed on a concrete floor near machinery that uses oil as a lubricant. The floor is cracked in the area of the stain.	Y	There is evidence of a release (staining and known oil use) and a pathway to soil (cracks).
Oil from machinery is observed dripping onto an in-tact, poured concrete floor. The oil drippage is an on-going process and is contained with an absorbent that is regularly cleaned up and replaced.	Y	Even though the oil is managed with an absorbent, the drip is on-going, and the oil-soaked material is in constant contact with the floor and is never really "cleaned up." Over time, there is a reasonable chance that this kind of leak will penetrate the floor.
Phase II-Type Sampling Results		
During sampling, a photoionization detector (PID) detects low concentrations of unspecified volatile substances.	Maybe	Any PID reading must be evaluated with consideration for background conditions and moisture effects. Anything that potentially represents non-background conditions is a line of evidence of a possible release. If the investigation is being conducted based on other non-analytical lines of evidence, then conditions warranting discovery have already been observed and analytical data is needed to refute the observed evidence of a release. Every sample with a PID response above background may not need to be analyzed, but sufficient data needs to be collected to characterize the magnitude and extent of a release.

Table 1
Lines of Evidence and Discovery Decision Examples
Multiple Lines of Evidence Guidance

Example Scenario	Discovery Warranted?	Rationale
Activities by various professionals who could encounter releases		
During a geotechnical investigation for building construction, a professional engineer observes discolored soil that has an odor.	Yes	This is an investigation for the purpose of planning for construction, and evidence of contamination was observed by a qualified person.
A survey crew conducting a metes and bounds survey walks over a portion of the site that has coal fragments on it.	No	The surveyor is not on-site in an investigatory capacity, and the crew members may not be trained to recognize environmental conditions.
A survey crew is on a site surveying monitoring wells installed as part of an environmental assessment. Stained soil is located in one of the areas they traverse.	Maybe	An environmental investigation was already done, so the stained soil may or may not be new information. They are present for a very specific purpose that is tangentially related to an environmental investigation, so the activity could result in discovery. Whether the observation becomes discovery depends on the qualifications of the survey crew and if they make note of the staining.
A surveyor supporting site redevelopment observes an unusual change in topography related to non-native fill with evidence of staining, ash, and debris.	Maybe	This is an investigation associated with redevelopment, so it is an activity that could result in discovery. Whether the observation becomes discovery depends on the qualifications of the surveyor and whether they make note of the non-native fill as being potentially contaminated. A qualified individual's reason for being on-site will affect what they notice.
A soil scientist delineating a wetland prior to construction observes evidence of contamination in wetland soils.	Yes	This is an investigation supporting construction, and evidence of contamination was observed by a qualified person with the experience to identify this condition as a discoverable release.
During a regulatory inspection, the inspector identifies stained, deteriorated concrete at the location of a former plating line.	Yes	The inspector is there specifically to look at environmental conditions and has the experience to identify this condition as a discoverable release.

Table 1
Lines of Evidence and Discovery Decision Examples
Multiple Lines of Evidence Guidance

Example Scenario	Discovery Warranted?	Rationale
A building inspector visits a site to inspect building mechanicals. The compressor room where some of the equipment is located has heavy oil staining on the floor.	No	The building inspector doesn't have the training and experience to discover releases. They are also not on site conducting an investigation to identify pollution or support development.
A sewage and drain crew is on-site to repair a septic system that has leaked.	No	The repair crew may be able to recognize a leak, but they don't necessarily have the training and experience to recognize the environmental significance of the observation. They are also not on site conducting an investigation to identify pollution or support development.
A roof inspector walks through a facility to reach the roof access to inspect an area that needs repairs.	No	The inspector does not have the necessary training to discover releases and is not there in an investigatory capacity.
The roof inspector above has a degree in environmental science and observes staining and cracked floors near several machines.	No	Even if the roofer has the necessary knowledge, they are not present in a capacity related to that training and are not conducting an investigation to identify pollution or support development.