

STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

VERIFICATION REPORT
GUIDANCE DOCUMENT



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PREAMBLE

The Connecticut Department of Energy and Environmental Protection (DEEP) has revised the Verification Report Guidance Document (VRGD), originally developed on August 1, 2008 with collaboration from the Environmental Professionals' Organization of Connecticut. The revised VRGD provides guidance regarding the type and degree of information that is expected to be included in a verification report to support a verification rendered by an environmental professional licensed in the State of Connecticut pursuant to Section 22a-133v of the Connecticut General Statutes (CGS).

Pursuant to Sections 22a-133x, 22a-134a, and 32-769(j)(2) of the CGS, verifications rendered by a licensed environmental professional (LEP) shall be submitted on a form prescribed by the Commissioner. DEEP has provided specific verification forms for specific types of verifications. These forms focus on the specific applications for each type of verification and on the available provisions and application of the Remediation Standard Regulations (RSRs), sections 22a-133k-1 through -3 of the Regulations of Connecticut State Agencies (RCSA). The Commissioner has also provided a verification form for use under CGS Section 22a-133y.

The Commissioner strongly recommends a verification report, as described in this VRGD, be submitted simultaneously with the verification form to support a verification. A verification report provides the relevant information that supports the applicability and use of the RSRs. Specifically, the verification report presents the relevant information regarding the environmental setting of the site, the LEP's final conceptual site model (CSM), and discusses all remedial actions completed to achieve compliance with the RSRs. The verification report also provides the written detail of the provisions used to achieve compliance and discusses the compliance data used to apply those provisions and the usability of such data.

It is not the purpose of the verification report to present all data and information that has been collected or generated from site investigation and remediation. It is only necessary to include the **relevant** information that supports the LEP's final and validated CSM and the LEP's application of the RSRs.

Pursuant to section 133v-5b of the RCSA, the LEP shall use his or her seal on the verification report, as the verification report is a document pertaining to a verification.

A complete verification form and verification report will facilitate effective and expeditious decision-making by DEEP. Furthermore, a properly completed verification report, as described in this guidance document, will provide a standard form of documentation that will serve the needs of all stakeholders. A verification that is submitted to the Commissioner without a verification report will likely be flagged for an audit.

If the documentation presented to support a verification does not provide sufficient relevant information, or if the documentation indicates that the verification may be invalid, a Notice of Audit or a rejection of the verification may be issued. If the verification report is a data dump and/or the relevant information that supports the application of the RSRs is buried in minutia, a Notice of Audit will likely be issued.

Some examples of insufficient documentation to support a verification include:

- an incomplete or missing verification report;
- the lack of a discussion of relevant information or insufficient detail;
- apparent significant data gaps in the Final CSM or an invalidated CSM;
- a review of other reports is necessary to obtain adequate information to understand the relevance of the LEP's Final CSM;
- appropriate receptor surveys/assessments have not been completed or reported;
- apparent misapplication of the RSRs or the means used to achieve/demonstrate compliance with applicable criteria is not explicit; and/or
- obvious or apparent violations of applicable statutes and/or regulations. In this case, not only would such violations likely result in issuance of a Notice of Audit or a rejection of the verification, but DEEP may pursue other actions, including potential legal actions, to resolve the most serious issues.

The revised VRGD presents key components of information that are relevant to document a valid verification. These key components include;

- (1) an introduction for the report;

- (2) the LEP's Final CSM with sufficient detail of relevant findings and rationale to support the LEP's verification that the investigation was completed in accordance with prevailing standards and guidelines¹;
- (3) a discussion of the results of receptor surveys/assessments;
- (4) a description and discussion of remedial actions;
- (5) a discussion of all means and methods used to demonstrate compliance in accordance with the RSRs;
- (6) a discussion and documentation of the results of laboratory data quality assessments and data usability evaluations; and
- (7) a list of references.

The content of the verification report should be of sufficient quality, and the key components should be presented in a manner that is most logical for the particular site and in a manner that can be understood by all stakeholders. The relevant findings should support the Final CSM and the LEP's determination that compliance with the RSRs has been achieved.

The verification report should not include a presentation of the entire characterization of the site or the multitude of iterations of the CSM. This degree of information is not considered "relevant" findings that support the Final CSM and demonstration of compliance with the RSRs.

¹ DEEP's Site Characterization Guidance Document provides detailed discussion of the multi-phased approach to site characterization using the conceptual site modeling process.

TABLE OF CONTENTS

1.0	Verification Report Introduction.....	1-1
2.0	Final Conceptual Site Model.....	2-1
2.1	Phase I Environmental Site Assessment Findings and Conclusions	2-1
2.2	Phase II Investigation Findings And Conclusions.....	2-2
2.3	Phase III Investigation Findings And Conclusions.....	2-3
3.0	Receptor Assessments.....	3-1
4.0	Description of Remedial Activities.....	4-1
5.0	Laboratory Quality Assurance / Quality Control.....	5-1
6.0	Demonstration of Compliance	6-1
7.0	Verification Specifics.....	7-1
7.1	“Property” or “Business Only” Verifications	7-1
7.2	Form III Verifications.....	7-1
7.3	Form IV (Supporting) Verifications	7-5
7.4	Final Form IV Verifications	7-8
7.5	Voluntary Remediation (§22a-133x) Verifications.....	7-11
7.6	Voluntary Remediation (§22a-133y) Verifications.....	7-15
7.7	Brownfields Remediation & Revitalization Program Verifications	7-16
8.0	References.....	8-1

1.0 VERIFICATION REPORT INTRODUCTION

The introductory information in the verification report should include the following:

- the purpose of the verification report;
- an identification of the applicable certifying party, responsible party, or property owner;
- a discussion of the regulatory program under which the verification was rendered (e.g., Property Transfer Program, Voluntary Remediation Program, RCRA Corrective Action, Orders issued by the Commissioner, Emergency Response and Spill Prevention Division, or any other DEEP division in which an LEP is authorized by law to render a written opinion (“verification”));
- a discussion on the type of verification that is being rendered and the applicability of such;
- an identification of previously submitted verifications or Commissioner approvals of the investigation and remediation of the subject site and a discussion of the reliance on such, if applicable; and
- an inventory of existing/available documentation that supports the verification with a brief description of pertinent information, such as dates of reports and activities documented therein. Supporting documentation should also be listed in a reference section, as discussed in greater detail in Section 8.0 of this guidance.

2.0 FINAL CONCEPTUAL SITE MODEL

The LEP's Final CSM is the basis for his/her verification and, therefore, should be presented in the verification report. This is the LEP's description of what he/she knows and understands about the site (or portion of the site or release area, as applicable) after all necessary phases of investigation have been completed. The Final CSM should be supported by relevant facts (findings of the investigations) and described in sufficient detail in order to support the LEP's conclusion that the investigation was completed in accordance with prevailing standards and guidelines.

It is not necessary to include in the verification report the multitude of iterations of the CSM. The Final CSM is the key to support the LEP's remedial decisions and verification.

Information that has typically been identified by DEEP as relevant is described in the following subsections. As discussed earlier in this guidance document, this information may be presented in the verification report in an order that is logical for the site.

2.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT FINDINGS AND CONCLUSIONS

A discussion of relevant Phase I findings should include the following:

- the site's ownership history;
- the site's land use and operational history (types and duration [dates] of operations and activities, including substances and handling procedures of such substances used at the site through time);
- the regulatory compliance history;
- a discussion of the physical and cultural environmental setting, including site description, site and surrounding land use (current and historical), regional and site-specific geology, hydrogeology, groundwater classification, surface water identification and classification, and groundwater use;
- a description of areas of concern (AOCs), with historical context;
- the identification and nature of constituents of concern (COCs) for each AOC;
- a topographic map for the site and surrounding area;

- a site map depicting areas of current and historical operations, materials handling activities, and all AOCs;
- the LEP's conclusions regarding the Phase I findings and the applicability of the Phase I in achieving the goals of site characterization; and
- a discussion of the continued applicability of the most recently completed Phase I relative to the time of verification.

2.2 PHASE II INVESTIGATION FINDINGS AND CONCLUSIONS

A properly executed Phase II investigation is essential in the multi-phased approach of site characterization and is of particular importance to support a future verification that is applied to the date the Phase II is completed. The Phase II investigation will result in a finding for each AOC that:

- a release occurred; or
- a release did not occur.

If a release did occur, it is not necessary nor expected that the LEP present data or investigative information in this section of the verification report. In accordance with the multi-phased approach, a Phase III investigation will have been completed at all release areas. Therefore, a discussion of the relevant findings of any release in the subsequent Phase III investigation will be sufficient.

If a release did not occur, relevant information that supports the LEP's conclusion that a release to the environment did **not** occur should be presented in this section of the verification report. Relevant information would include, but not necessarily be limited to:

- the potential release mechanisms;
- the likely contaminant migration pathways;
- the potential fate and transport of contaminants;
- the sampling rationale, sampling data, lines of evidences, and means used to support the conclusion that a release did not occur; and

- a discussion of the LEP's data quality objectives and how they were met, and the relevance and representativeness of the Phase II findings that support the conclusions made by the LEP.

Specific maps, figures, and tables should be strongly considered to support the relevant findings.

2.3 PHASE III INVESTIGATION FINDINGS AND CONCLUSIONS

Relevant Phase III findings should include, but not necessarily be limited to, the following:

- the nature of the release area(s);
- the release mechanisms and timing;
- the contaminant migration pathways;
- the fate and transport of contaminants;
- the nature, degree, and three-dimensional spatial and temporal extent of pollution associated with each release identified at the site;
- the sampling rationale for the Phase III delineation of each release area;
- the groundwater investigation;
- a summary of sampling techniques (e.g., drilling methods, continuous sampling, discrete interval sampling, low-flow groundwater sampling, groundwater filtering) and the rationale describing how the techniques and methodologies were appropriate for the investigation;
- the physical environmental setting, including hydrogeology (e.g., depth to water table, aquifers, stratigraphic units), hydrology (e.g., permeability, conductivity, gradient, flow direction), and geology (e.g., overburden, bedrock, depth to bedrock);
- a discussion of how all relevant and compliance data points are representative for their intended use;
- the data quality objectives and how they were met;

- the LEP's conclusions regarding the Phase III findings, including a discussion on the significance of any data gaps;
- a validated Final CSM, with demonstration of adequate quantity and quality of data to support a remedial decision, and or support the application of the RSRs; and
- the inclusion of appropriate maps, figures, and tables to convey the findings and support the conclusions made by the LEP.

3.0 RECEPTOR ASSESSMENTS

The verification report should include a discussion of the types of receptor surveys/assessments that were completed, such as water supply well, surface water, vapor migration, ecological, etc. The discussion on receptor surveys/assessments should include, but not necessarily be limited to, a description of each survey/assessment that was completed and the findings thereof. This description should include the rationale for the identification of “at risk” receptors, receptor sampling results, conclusions, and measures taken to mitigate/abate exposure pathways. If an ecological receptor was identified, the verification report should include discussion of the level of ecological risk assessment conducted. The verification report should reference all documents that pertain to each survey/assessment.

If a notification was submitted to DEEP for a Significant Environmental Hazard (SEH) pursuant to CGS Section 22a-6u, the verification report should provide a summary of the hazard condition and the actions taken to mitigate or abate the hazard. Significant Environmental Hazards must be resolved prior to verification, or the verification will be considered invalid. SEH resolution generally means that the hazard condition has been abated to a degree less than SEH notification triggers. File documentation of such abatement is the Commissioner’s review and approval of a report documenting abatement and issuance of a Certification of Compliance for the SEH. In some cases, the Department may instead review the case file and generate a memorandum documenting resolution. In the specific case of an impacted drinking water well receptor only, a source of pollution and the groundwater plume may have been remediated to applicable RSR criteria, yet pollutants remain in the drinking water receptor at concentrations below the Drinking Water Standard established by the Connecticut Department of Public Health. In this scenario, the verification report should provide evidence that pollutant levels in the water supply well are, and are expected to remain, significantly below applicable criteria. The Department may issue a Certification of Compliance based on a review of this evidence.

The LEP should include or reference appropriate documentation (Certification or equivalent documentation issued by DEEP) that the hazard has been resolved.

4.0 DESCRIPTION OF REMEDIAL ACTIVITIES

The verification report should include a description of the remedial activities implemented at the site, the duration of remedial activities, and the analytical results of confirmation sampling and groundwater monitoring that demonstrate that the remedial activities were successful in achieving compliance with the RSRs. The following information should be included in the verification report:

- an evaluation of historical remedial activities conducted at the site, explained in the context of the Final CSM;
- a description of the approach to remediation and the LEP's rationale for using such approach, including, but not necessarily limited to, the type of remediation implemented (e.g., active or passive) and the applicability of such approach;
- the date remediation was initiated and completed for each release area;
- the publication date and copy of the Public Notice of Remediation, including comments received from the public and the LEP's responses;
- a summary of sampling techniques and an explanation of the appropriateness of the techniques and methodologies used to confirm the effectiveness of the remedial activities in achieving compliance with the applicable criteria;
- a discussion and documentation of mass-removal calculations, total mass removal, and justification for shut-down of remedial system, if applicable;
- the rationale for confirmation sampling of each remedial action (density, frequency, locations, and depths of samples used to apply RSR provisions and demonstrate compliance);
- a discussion of conclusions that demonstrate why remediation was considered complete; and
- the inclusion of appropriate maps, figures, and tables to convey the findings and support the conclusions of the LEP.

5.0 LABORATORY QUALITY ASSURANCE / QUALITY CONTROL

The results of environmental analysis may contain an element of uncertainty and in some cases may be significantly biased, due to the nature of environmental media, limitations of analytical methods, characteristics of analytes, and human error. Therefore, analytical results may not be representative of the actual concentrations of the analytes in the environmental media. Consequently, an evaluation of the quality of the analytical data in relation to the intended use is important in order for the LEP to make decisions which are supported by data of known and sufficient quality.

There are many ways to evaluate the quality of analytical data in terms of precision, accuracy, representativeness, comparability, completeness and sensitivity in relation to the intended use of the data. DEEP has provided guidance² for this purpose, and the LEP should refer to this guidance for specific details. The verification report should include the findings of the data quality assessments and data usability evaluations for all data the LEP relied upon to demonstrate compliance with the RSRS, including, but not necessarily limited to, data quality assessment and data usability worksheets. If already provided to DEEP, reference to this documentation should be included.

² *Laboratory Quality Assurance and Quality Control Guidance - Reasonable Confidence Protocols;*
Laboratory Quality Assurance and Quality Control Guidance - Data Quality Assessments and Data Usability Evaluations;
Guidance for Collecting and Preserving Soil Samples for Laboratory Determination of VOCs; and
other Recommended Reasonable Confidence Protocols - Quality Assurance and Quality Control Requirements for various analytical methods.

6.0 DEMONSTRATION OF COMPLIANCE

It is expected that all provisions of the RSRs marked on the Verification Form will be discussed in the verification report. It is also expected that the compliance data that was used for the application of such provisions will be presented, discussed, and documented in the verification report. The demonstration of compliance is expected to include, but not necessarily be limited to, the following:

- how all statutory and regulatory requirements that may affect the LEP's capacity to render a verification were addressed (e.g., RCRA Closure Plans, Orders issued by the Commissioner, Stewardship Permits, other permits, SEH abatement, etc.);
- the applicable criteria, the regulatory provisions used to achieve compliance (e.g., alternatives, exemptions, exceptions, variances, ELURs, groundwater re-classification, self-implementing RSR options, etc.), and how compliance with applicable criteria was achieved (discussion of the compliance data used to apply those provisions);
- the LEP's use of regulatory provisions to achieve compliance (e.g., alternatives, exemptions, exceptions, variances, environmental land use restrictions [ELURs], self-implementing RSR options, etc.);
- the compliance data that the LEP used to apply specific provisions of the RSRs and to demonstrate compliance with the Standards for Soil Remediation;
- the relevance and representativeness of the groundwater data used to understand the seasonal and dimensional groundwater and plume conditions and to demonstrate compliance with the Groundwater Remediation Standards, including a presentation that:
 - the concentrations of all COCs, and all existing and potential breakdown products, at each representative sampling location that define the groundwater plume are less than applicable criteria and geochemically and spatially stabilized to the point that the concentrations of all polluting substances in the plume will continue to be less than the applicable criteria;
- how the completed groundwater monitoring achieved the seasonal compliance requirements;
- a copy of any Commissioner Approvals or notices for additional polluting substances, alternative criteria, site-specific criteria, exceptions, variances, alternative methods for demonstrating compliance

or alternative groundwater monitoring plans, and temporary/emergency authorizations, as applicable; and how the Commissioner's Approval(s) and the LEP's use of the approved alternatives, exceptions, and variances were utilized;

- any engineered controls that may have been used to achieve compliance, including but not limited to a site map illustrating the location of the engineered control, copies of the Commissioner's Approval for the completed engineered control, and affirmation and documentation that the financial surety mechanism to monitor and maintain the engineered control is in place; and
- any approved and recorded ELUR, if applicable. Such discussion should include a summary of the purpose of the ELUR, the applicability of the ELUR in achieving compliance with the RSRs, and a site map illustrating the location of the Subject Area(s). A copy of the Certificate of Title is requested to document the ELUR was recorded on the land records.

7.0 VERIFICATION SPECIFICS

In addition to the expectations of a verification report to contain the key elements that support any verification, as discussed in this guidance document, there are unique circumstances / requirements for certain verifications that will require slight modification to the information that is reported in the verification report. For instance:

7.1 “PROPERTY” OR “BUSINESS ONLY” VERIFICATIONS

Verifications may be rendered for all types of Property Transfer and Voluntary Remediation verifications. The Introduction of the verification report should identify the specific focus of the verification and the relationship of the investigation and remediation of releases attributed to land use (property) or business operations to the verification.

7.2 FORM III VERIFICATIONS

A. APPLICABILITY

Form III Verifications may be applicable to releases that occurred up to the date the Form III was filed with DEEP or the date the Phase II Investigation was completed, whichever is later. The Form III verification may also be applicable to releases that occurred up to the date of the verification. The applicability of the verification is to be indicated on the Verification Form.

The verification report should provide additional discussion and justification on the applicability of the verification. **All releases subsequent to such declared date will not be closed with the verification.**

Portion of Establishment Verifications and Interim Verifications are acceptable under a Form III scenario, and either type of verification may be suitable to the applicable date of the verification as indicated on the Verification Form.

B. PORTION OF ESTABLISHMENT VERIFICATIONS

Portion of Establishment Verifications may be rendered when a portion of an establishment has been remediated (to the applicable date indicated on the Verification Form). The requirements for investigation and remediation of a portion of an establishment are no different than for a verification of an entire parcel. Full compliance with the RSRs at the portion of the establishment is required.

DEEP requires that the portion of the establishment be clearly defined with an accurate survey. The verification report is to include the survey and a detailed discussion of the physical and environmental parameters of the 'Portion'.

The Form III Certifying Party will remain obligated by law to comply with all applicable requirements of the Form III, pursuant to CGS Section 22a-134a, until a final verification is rendered by an LEP for the entire establishment. The LEP's final CSM that will support a final Form III Verification must discuss the physical and environmental relationship of the Portion in relation to the final verification for the entire establishment.

C. INTERIM VERIFICATIONS

An Interim Verification may be rendered for an entire establishment or a portion of the establishment, and to the applicable date of the verification as indicated on the Verification Form. An Interim Verification is suitable when compliance with the Standards for Soil Remediation can be documented, but the Groundwater Remediation Standards have not yet been achieved and groundwater remediation is ongoing. The LEP must demonstrate that compliance with RSR criteria for all media have been achieved, with the exception that a selected remedy for groundwater pollution is in operation.

Compliance groundwater monitoring is not considered groundwater remediation and therefore, would not be applicable to an Interim Verification scenario.

The verification report should include a dedicated section that discusses and documents the following specifics:

- plans and specifications of the selected groundwater remedy and why the selected groundwater remedy is appropriate for the environmental setting.
- the estimated duration of the remedy;
- the ongoing operation and maintenance requirements of the remedy;
- confirmation that there are no current exposure pathways from contaminated groundwater to receptors that have not yet met the remediation standards, including vapor migration into indoor air, drinking water, and surface water.

No current exposure pathways for these receptors means that documentation is provided to demonstrate that the groundwater plume has been fully delineated, and:

- For indoor air, either
 1. There are no occupiable structures overlying or within fifteen feet of a groundwater plume containing volatile organic substances that exceeds applicable Volatilization Criteria for Groundwater or Soil Vapor; or
 2. If there are occupiable structures, vapors must be demonstrated to be currently mitigated now and in the future.
 3. If a significant environmental hazard is present, it must be in a mitigated (controlled) status with regular hazard reporting.

- For drinking water, either
 1. There are no drinking water receptors within five hundred feet hydraulically downgradient of a groundwater plume that exceeds Groundwater Protection Criteria (GWPC);
 2. If there are drinking water receptors present within 500 feet yet outside of the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring; or
 3. If there are drinking water receptors present within 500 feet and within the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring and treatment, if necessary.
 4. If a significant environmental hazard is present, it must be in a mitigated status with regular hazard reporting.

- For surface water, a demonstration that there is no groundwater plume with concentrations that exceed the Surface Water Protection Criteria (SWPC) or an Alternative SWPC as described in RCSA section 22a-133k-3(b)(3) that is discharging or will discharge to surface water; and

- the groundwater monitoring plan, including, but not necessarily limited to:
 - analytical parameters to monitor the effectiveness of the remedial measure,
 - appropriate representation of monitoring points,
 - frequency of monitoring, and
 - a schedule for the submittal of annual progress reports.

If MNA is the selected ongoing groundwater remedy, the Verification Report should include discussion and documentation of the following:

- all remedial actions for polluting substances have been concluded, specifically the documentation of the remediation of all source area(s), other than the natural attenuation of a groundwater plume;
- the groundwater monitoring points are representative of the release area(s) and the plume and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the extent and geochemistry of the plume;
- any sensitive receptors located within 500 feet of the plume, including vapor intrusion, drinking water and surface water, are not or will not be at risk; and
- the LEP has an appropriate understanding of the fate and transport of all applicable substances in the plume.

The LEP is to demonstrate that the MNA approach is an appropriate remedy to ultimately achieve compliance by presenting a discussion and documentation of the following:

- all substances in the plume and the plume geometry are in a diminishing state;
- the attenuation process (e.g., destructive/non-destructive, geochemical footprints, etc.);
- the conditions for attenuation are sustainable; and

- calculated estimates of the attenuation rates of all substances in the plume.

The LEP is to also present the MNA monitoring plan, including, but not necessarily limited to:

- analytical parameters to monitor the attenuation and degradation of COCs;
- appropriate representative monitoring points;
- frequency of monitoring; and
- a schedule for the submittal of MNA progress reports (not to exceed every five (5) years from the date of initiation of MNA). Unless it is stated that the attenuation process is a non-destructive one, such as sorption, volatilization, or dilution, which is accomplished by the transfer of the contaminant by groundwater flow, etc., then geochemical reporting may be unwarranted.

The Form III filing will remain open, and the Certifying Party will remain obligated by law to comply with all applicable requirements pursuant to CGS Section 22a-134a until a final Form III verification is rendered by an LEP for the entire establishment.

7.3 FORM IV (SUPPORTING) VERIFICATIONS

A. APPLICABILITY

Supporting Form IV Verifications may be applicable to releases that occurred up to the date the Form IV was filed with DEEP or the date the Phase II Investigation was completed, whichever is later. The Supporting Form IV Verification may also be applicable to releases that occurred up to the date of the verification. The applicability of the verification is to be indicated on the Verification Form.

The verification report should provide additional discussion and justification on the applicability of the verification. **All releases subsequent to such declared date will not be closed with the verification.**

A verification rendered to support the filing of a Form IV must demonstrate that the investigation of all applicable releases and plumes have been completed and compliance with RSR criteria for all media have been achieved, except that the following actions may be pending:

- the recording of an environmental land use restriction (ELUR) to achieve compliance with applicable criteria; and/or
- monitored natural attenuation (MNA) of a groundwater plume; and/or
- quarterly groundwater monitoring to demonstrate compliance.

Either of the above pending actions may be suitable to the applicable date of the verification as indicated on the Verification Form.

B. ENVIRONMENTAL LAND USE RESTRICTION

If the recording of an ELUR is necessary to achieve compliance with a particular criterion and the recordation of such is pending, the Supporting Form IV Verification Report should include documentation and discussion of the following:

- the intent to record an ELUR;
- the type of ELUR, its applicability, and how the recording of the ELUR will achieve compliance for the release area;
- a site map illustrating the location of the Subject Area(s); and
- the status of the draft ELUR.

It is very important that the Supporting Form IV Verification Report includes written acknowledgement and acceptance of the deed restriction from the property owner.

C. MONITORED NATURAL ATTENUATION

If MNA is the selected ongoing groundwater remedy, the Supporting Form IV Verification Report should include a dedicated section that discussion and documentation of the following:

- all remedial actions for polluting substances have been concluded, specifically the documentation of the remediation of all source area(s), other than the natural attenuation of a groundwater plume;

- the groundwater monitoring points are representative of the release area(s) and the plume and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the extent and geochemistry of the plume;
- any sensitive receptors located within 500 feet of the plume, including vapor intrusion, drinking water and surface water, are not or will not be at risk; and
- the LEP has an appropriate understanding of the fate and transport of all applicable substances in the plume.

The LEP is to demonstrate that the MNA approach is an appropriate remedy to ultimately achieve compliance by presenting a discussion and documentation of the following:

- all substances in the plume and the plume geometry are in a diminishing state;
- the attenuation process (e.g., destructive/non-destructive, geochemical footprints, etc.);
- the conditions for attenuation are sustainable; and
- calculated estimates of the attenuation rates of all substances in the plume.

The LEP is to also present the MNA monitoring plan, including, but not necessarily limited to:

- analytical parameters to monitor the attenuation and degradation of COCs;
- appropriate representative monitoring points;
- frequency of monitoring; and
- a schedule for the submittal of MNA progress reports (not to exceed every five (5) years from the date of initiation of MNA). Unless it is stated that the attenuation process is a non-destructive one, such as sorption, volatilization, or dilution, which is accomplished by the transfer of the contaminant by groundwater flow, etc., then geochemical reporting may be unwarranted.

D. QUARTERLY GROUNDWATER COMPLIANCE MONITORING

If the completion of quarterly groundwater compliance monitoring, as required by Section 22a-133k-3(g) of the RSRs, is outstanding, the Supporting Form IV Verification Report should provide details on the following:

- all remedial actions for polluting substances have been concluded, other than groundwater compliance monitoring;
- the groundwater monitoring points are representative of the release area(s) and the plume, and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the groundwater and the plume;
- all substances in the plume are in a steady or diminishing state; and
- a demonstration that sensitive receptors are not at risk.

7.4 FINAL FORM IV VERIFICATIONS

A Final Form IV Verification is a verification focused on closure of a Form IV filing, and is an opinion rendered by an LEP that the intended ELUR (if applicable) has been recorded, and/or natural attenuation of a groundwater plume has achieved compliance with applicable groundwater standards, and/or groundwater compliance monitoring has been completed.

The verification report for a Final Form IV Verification does not have to recreate the level of documentation provided in the Supporting Form IV Verification Report previously submitted to DEEP; however, the verification report to support a Final Form IV Verification should include, at a minimum, the following:

- a presentation of the introductory information (discussed in Section 2.0 of this guidance document);
- a summary of the environmental setting; and
- a detailed discussion of any changes to the findings or conclusions presented in the original verification report (specific references to the original verification report must be included).

A. ENVIRONMENTAL LAND USE RESTRICTION

If the recordation of an ELUR was a commitment of the Form IV filing, the Final Form IV Verification Report should include discussion of the following:

- the purpose of the ELUR;
- what RSR criterion were achieved with the recordation of the ELUR;
- the financial surety mechanism that has been established, if applicable;
- a site map illustrating the location of the Subject Areas; and
- a copy of the Certificate of Title recorded on the land records.

B. MONITORED NATURAL ATTENUATION

If monitoring the natural attenuation of a plume was a commitment of the Form IV filing, the Final Form IV Verification Report should include a discussion and demonstration of how MNA has been completed to the point of achieving compliance with the groundwater criteria, including, but not necessarily limited to:

- all remedial actions for polluting substances have been concluded, specifically the documentation of the remediation of all source area(s), other than the natural attenuation of a groundwater plume;
- the groundwater monitoring points are representative of the release area(s) and the plume and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the extent and geochemistry of the plume;
- any sensitive receptors located within 500 feet of the plume, including vapor intrusion, drinking water and surface water, are not or will not be at risk; and
- the LEP has an appropriate understanding of the fate and transport of all applicable substances in the plume.

The LEP is to demonstrate that the MNA approach is an appropriate remedy to ultimately achieve compliance by presenting a discussion and documentation of the following:

- all substances in the plume and the plume geometry are in a diminishing state;
- the attenuation process (e.g., destructive/non-destructive, geochemical footprints, etc.);
- the conditions for attenuation are sustainable; and
- calculated estimates of the attenuation rates of all substances in the plume.

The LEP is to also present the MNA monitoring plan, including, but not necessarily limited to:

- analytical parameters to monitor the attenuation and degradation of COCs;
- appropriate representative monitoring points;
- frequency of monitoring; and
- a schedule for the submittal of MNA progress reports (not to exceed every five (5) years from the date of initiation of MNA). Unless it is stated that the attenuation process is a non-destructive one, such as sorption, volatilization, or dilution, which is accomplished by the transfer of the contaminant by groundwater flow, etc., then geochemical reporting may be unwarranted.

C. QUARTERLY GROUNDWATER COMPLIANCE MONITORING

If the completion of quarterly groundwater compliance monitoring was a commitment of the Form IV filing, the Final Form IV Verification Report should include discussion and documentation of the following:

- The quarterly monitoring events that were used to demonstrate compliance, and monitoring had been completed;
- the analytical parameters;
- the appropriate representation of the plume(s) with the location of monitoring wells;

- any substance that may have been detected in any quarter at a concentration greater than criteria, or if a particular monitoring well was dry or inaccessible during a specific quarterly sampling event, and how that was addressed; and
- any new (following the submittal of the supporting Form IV verification report) Commissioner Approvals or notices for additional polluting substances, alternative or site-specific criteria, if applicable.

7.5 VOLUNTARY REMEDIATION (CGS SECTION 22a-133x) VERIFICATIONS

In addition to the standard verification for an entire parcel, an LEP may render Portion of the Property Verifications, Release Area Verifications, and Interim Verifications under the CGS Section 22a-133x Voluntary Remediation Program. The intent of the voluntary remediation is declared when the Applicant submits the statement of proposed actions for investigating and remediating the parcel or a release area and a schedule for implementing such actions.

A. PORTION OF PROPERTY VERIFICATIONS

A Portion of Property Verification may be rendered when a portion of the property has been remediated. The requirements for investigation and remediation of a portion of the property are no different than for a verification for an entire parcel. Full compliance with the RSRs at the portion of the property is required.

DEEP requires that the portion of the property be clearly defined with an accurate survey. The verification report is to include the survey and a detailed discussion of the physical and environmental parameters of the 'Portion'.

There are no subsequent obligations of the property owner under CGS Section 22a-133x.

B. RELEASE AREA VERIFICATIONS

A Release Area Verification may be rendered when a particular release area on the property has been remediated. The requirements for investigation and remediation of a release area are no different than for a portion of the property. Full compliance with the RSRs of the Release Area is required.

DEEP requires that the Release Area be clearly defined with an accurate survey. The verification report is to include the survey and a detailed discussion of the physical and environmental parameters of the Release Area.

There are no subsequent obligations of the property owner under CGS Section 22a-133x.

C. INTERIM VERIFICATIONS

An Interim Verification may be rendered for an entire parcel, for a portion of the property, or for a Release Area, and to the applicable date of the verification as indicated on the Verification Form. An Interim Verification is suitable when compliance with the Standards for Soil Remediation can be documented, but the Groundwater Remediation Standards have not yet been achieved and groundwater remediation is ongoing. The LEP must demonstrate that compliance with RSR criteria for all media have been achieved, with the exception that a selected remedy for groundwater pollution is in operation.

Compliance groundwater monitoring is not considered groundwater remediation and therefore, would not be applicable to an Interim Verification scenario.

The verification report should include a dedicated section that discusses and documents the following specifics:

- plans and specifications of the selected groundwater remedy and why the selected groundwater remedy is appropriate for the environmental setting.
- the estimated duration of the remedy;
- the ongoing operation and maintenance requirements of the remedy;
- confirmation that there are no current exposure pathways from contaminated groundwater to receptors that have not yet met the remediation standards, including vapor migration into indoor air, drinking water, and surface water.

No current exposure pathways for these receptors means that documentation is provided to demonstrate that the groundwater plume has been fully delineated, and:

- For indoor air, either

1. There are no occupiable structures overlying or within fifteen feet of a groundwater plume containing volatile organic substances that exceeds applicable Volatilization Criteria for Groundwater or Soil Vapor; or
 2. If there are occupiable structures, vapors must be demonstrated to be currently mitigated now and in the future.
 3. If a significant environmental hazard is present, it must be in a mitigated (controlled) status with regular hazard reporting.
- For drinking water, either
 1. There are no drinking water receptors within five hundred feet hydraulically downgradient of a groundwater plume that exceeds Groundwater Protection Criteria (GWPC);
 2. If there are drinking water receptors present within 500 feet yet outside of the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring; or
 3. If there are drinking water receptors present within 500 feet and within the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring and treatment, if necessary.
 4. If a significant environmental hazard is present, it must be in a mitigated status with regular hazard reporting.
 - For surface water, a demonstration that there is no groundwater plume with concentrations that exceed the Surface Water Protection Criteria (SWPC) or an Alternative SWPC as described in RCSA section 22a-133k-3(b)(3) that is discharging or will discharge to surface water; and
- the groundwater monitoring plan, including, but not necessarily limited to:
 - analytical parameters to monitor the effectiveness of the remedial measure,

- appropriate representation of monitoring points,
- frequency of monitoring, and
- a schedule for the submittal of annual progress reports.

If MNA is the selected ongoing groundwater remedy, the Verification Report should include discussion and documentation of the following:

- all remedial actions for polluting substances have been concluded, specifically the documentation of the remediation of all source area(s), other than the natural attenuation of a groundwater plume;
- the groundwater monitoring points are representative of the release area(s) and the plume and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the extent and geochemistry of the plume;
- any sensitive receptors located within 500 feet of the plume, including vapor intrusion, drinking water and surface water, are not or will not be at risk; and
- the LEP has an appropriate understanding of the fate and transport of all applicable substances in the plume.

The LEP is to demonstrate that the MNA approach is an appropriate remedy to ultimately achieve compliance by presenting a discussion and documentation of the following:

- all substances in the plume and the plume geometry are in a diminishing state;
- the attenuation process (e.g., destructive/non-destructive, geochemical footprints, etc.);
- the conditions for attenuation are sustainable; and
- calculated estimates of the attenuation rates of all substances in the plume.

The LEP is to also present the MNA monitoring plan, including, but not necessarily limited to:

- analytical parameters to monitor the attenuation and degradation of COCs;
- appropriate representative monitoring points;
- frequency of monitoring; and
- a schedule for the submittal of MNA progress reports (not to exceed every five (5) years from the date of initiation of MNA). Unless it is stated that the attenuation process is a non-destructive one, such as sorption, volatilization, or dilution, which is accomplished by the transfer of the contaminant by groundwater flow, etc., then geochemical reporting may be unwarranted.

Pursuant to CGS Section 22a-133x(e), the applicant for the voluntary remediation of the parcel shall remain obligated to operate and maintain the groundwater remedy, prevent exposure to the plume, and submit annual status reports on the groundwater remediation.

7.6 VOLUNTARY REMEDIATION (CGS SECTION 22a-133y) VERIFICATIONS

A Final Remedial Action Report, approved in writing by an LEP, may be submitted to the Commissioner. The Department considers a FRAR similar in intent to a standard verification report, and therefore expects the content to be identical to a verification report as presented in this guidance document. In addition, a dedicated Verification Form has been provided by the Commissioner (“FINAL VERIFICATION, Voluntary Remediation Program, Connecticut General Statute 22a-133y”).

In addition, per CGS Section 22a-133y(d), it is expected that an ELUR will be necessary to achieve full compliance with the RSRs. In addition to the relevant information as presented in this guidance document, the FRAR should include:

- A statement of intent to approve and record a ELUR on the land records; or
- A copy of an ELUR approved by an LEP and recorded; or
- Discussion and documentation that remediation has achieved full compliance with the RSRs without the need for an ELUR.

7.7 BROWNFIELDS REMEDIATION & REVITALIZATION PROGRAM VERIFICATIONS

A Final Verification or an Interim Verification may be rendered under the Brownfields Remediation & Revitalization Program (BRRP).

A. APPLICABILITY

In accordance with §32-769, the Applicant is not required to investigate or remediate pollution that has migrated off the property boundaries. The Final BRRP Verification Report should be completed as presented in this guidance document, with the understanding of the confines of the investigation and remediation of releases. The verification report should present any information on pollution that may have migrated off the site, and the significance of said pollution.

B. INTERIM VERIFICATIONS

An Interim Verification may be rendered under the BRRP for an entire parcel when compliance with the Standards for Soil Remediation can be documented, but the Groundwater Remediation Standards have not yet been achieved and groundwater remediation is ongoing. The LEP must demonstrate that compliance with RSR criteria for all media have been achieved, with the exception that a selected remedy for groundwater pollution is in operation.

Compliance groundwater monitoring is <u>not</u> considered groundwater remediation and therefore, would not be applicable to an Interim Verification scenario.
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The verification report should include a dedicated section that discusses and documents the following specifics:

- plans and specifications of the selected groundwater remedy and why the selected groundwater remedy is appropriate for the environmental setting.
- the estimated duration of the remedy;
- the ongoing operation and maintenance requirements of the remedy;
- confirmation that there are no current exposure pathways from contaminated groundwater to receptors that have not yet met the remediation standards, including vapor migration into indoor air, drinking water, and surface water.

No current exposure pathways for these receptors means that documentation is provided to demonstrate that the groundwater plume has been fully delineated, and:

- For indoor air, either
 1. There are no occupiable structures overlying or within fifteen feet of a groundwater plume containing volatile organic substances that exceeds applicable Volatilization Criteria for Groundwater or Soil Vapor; or
 2. If there are occupiable structures, vapors must be demonstrated to be currently mitigated now and in the future.
 3. If a significant environmental hazard is present, it must be in a mitigated (controlled) status with regular hazard reporting.
- For drinking water, either
 1. There are no drinking water receptors within five hundred feet hydraulically downgradient of a groundwater plume that exceeds Groundwater Protection Criteria (GWPC);
 2. If there are drinking water receptors present within 500 feet yet outside of the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring; or
 3. If there are drinking water receptors present within 500 feet and within the delineated plume area, the absence of an exposure pathway must be demonstrated now and in the future through continued monitoring and treatment, if necessary.
 4. If a significant environmental hazard is present, it must be in a mitigated status with regular hazard reporting.
- For surface water, a demonstration that there is no groundwater plume with concentrations that exceed the Surface Water Protection Criteria (SWPC) or an Alternative SWPC as described in RCSA section 22a-133k-3(b)(3) that is discharging or will discharge to surface water; and

- the groundwater monitoring plan, including, but not necessarily limited to:
 - analytical parameters to monitor the effectiveness of the remedial measure,
 - appropriate representation of monitoring points,
 - frequency of monitoring, and
 - a schedule for the submittal of annual progress reports.

If MNA is the selected ongoing groundwater remedy, the Verification Report should include discussion and documentation of the following:

- all remedial actions for polluting substances have been concluded, specifically the documentation of the remediation of all source area(s), other than the natural attenuation of a groundwater plume;
- the groundwater monitoring points are representative of the release area(s) and the plume and define the extent and degree of the plume;
- the LEP has an appropriate seasonal and dimensional understanding of the extent and geochemistry of the plume;
- any sensitive receptors located within 500 feet of the plume, including vapor intrusion, drinking water and surface water, are not or will not be at risk; and
- the LEP has an appropriate understanding of the fate and transport of all applicable substances in the plume.

The LEP is to demonstrate that the MNA approach is an appropriate remedy to ultimately achieve compliance by presenting a discussion and documentation of the following:

- all substances in the plume and the plume geometry are in a diminishing state;
- the attenuation process (e.g., destructive/non-destructive, geochemical footprints, etc.);
- the conditions for attenuation are sustainable; and

- calculated estimates of the attenuation rates of all substances in the plume.

The LEP is to also present the MNA monitoring plan, including, but not necessarily limited to:

- analytical parameters to monitor the attenuation and degradation of COCs;
- appropriate representative monitoring points;
- frequency of monitoring; and
- a schedule for the submittal of MNA progress reports (not to exceed every five (5) years from the date of initiation of MNA). Unless it is stated that the attenuation process is a non-destructive one, such as sorption, volatilization, or dilution, which is accomplished by the transfer of the contaminant by groundwater flow, etc., then geochemical reporting may be unwarranted.

The requirements and commitments of the BRRP Applicant will remain open, and the Applicant will remain obligated by law to comply with all applicable requirements pursuant to Section 32-769 until a Final BRRP Verification is rendered by an LEP.

8.0 REFERENCES

Previously submitted reports should not be attached to the verification report. However, reports which have been previously submitted to DEEP and which provide support for the verification should be referenced. References to previous reports to support a particular statement in the verification report should be specific (i.e., report name, date, author, and page number). Copies of any referenced documentation not previously submitted to DEEP should either be submitted under separate cover coincident with or before the verification report is submitted or appended to the verification report.

The verification report itself should allow DEEP to evaluate the adequacy of the verification. If review of the actual referenced or attached reports is necessary to evaluate the adequacy of the verification, a Notice of Audit will likely be issued.