

REGISTERED **E**NVIRONMENTAL **C**ONSULTANT **P**ROGRAM

IMPLEMENTATION GUIDANCE

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Department of Environmental Quality
Division of Waste Management
Superfund Section
Inactive Hazardous Sites Branch

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REC Program Implementation Guidance 2015

The Registered Environmental Consultant Program Implementation Guidance (Guidance) document is updated annually, and the latest version is posted at <http://portal.ncdenr.org/web/wm/sf/ihs/recprogram>. Rule citations not discussed in the Guidance are considered self-explanatory. **In the document, text has been shaded where significant changes and/or additions have been made to the previous guidance document.** Some of the significant changes and/or additions to the Guidance include:

- *Inside cover – Summary of significant changes and/or additions.* A brief summary of the most significant changes and/or additions to the previous guidance document have been provided.
- *15A NCAC 13C .0306(j) – Public Notice of Remedial Action Plans (RAPs) and RAP Addendums.* The procedures have been clarified. RSMs can update the comments column of the tabulated mailing list with a brief summary of any public comments or mail delivery issues and return it along with copies of the certified mail receipts (US Postal green cards) to the Branch at the end of the public notice period.
- *App. A – Sampling and Analytical Procedures for the Remedial Investigation.* Additional details have been added regarding analytical parameters for cyanide, PCBs, and coal ash if the compounds are known or suspected for a site (A.7.1.1). Certain parameters are needed due to the applicable remedial goals.
- *App. E – Soil Health-Based Remedial Goals: Adjustments & Averaging.* Comments have been added to stress that protection of groundwater soil standards cannot be averaged across areas and that averaging should only be conducted in areas of consistent use and generally uniform release of contaminants (e.g., former waste lagoons and spray-fields, orchards, etc.). Also, the text has been clarified regarding sample grid node spacing.
- *App. F – Alternate Cleanup Levels and Land Use Restrictions.* Under Background and Overview (F.1), a note has been added regarding required REC Program fees and supplemental fees required for risk-based remedies under N.C.G.S. 130A-310.65-310.77. The required fees are separate. In the future, as the procedures for risk-based remedies develop, the supplemental fees may be reduced accordingly for work performed by RECs [see N.C.G.S. 130A-310.76(al)(4)].
- *App. F – Alternate Cleanup Levels and Land Use Restrictions.* Under Alternate Soil Remediation Goals and Procedures (F.2), text has been added. In order to properly establish institutional controls such as land use restrictions, all pre-existing, non-financial encumbrances/restrictions (e.g., utility easements, lease agreements, land use restrictions, etc.) for a property need to be identified.
- *App. F – Alternate Cleanup Levels and Land Use Restrictions.* Under Alternate Groundwater (and Other Media) Remediation Goals and Procedures (F.3), due to recent amendments to the risk-based remediation statutes (N.C.G.S. 130A-310.65-310.77), the procedures have been deleted. NCDEQ is in the process of reviewing

the changes and implementing several departmental directives that were included in the law revisions. New procedures for implementing a risk-based cleanup for a site in the REC Program will be provided as soon as they are available. Until further notice, for more information regarding qualification of sites using risk-based remediation under N.C.G.S. 130A-310.65-310.77, contact the Branch. **Note: If alternate goals are sought for soils only, Section F.2 should be used instead, as there are fewer requirements.**

- *App. F – Alternate Cleanup Levels and Land Use Restrictions.* For Property Owner Consent to Land Use Restrictions (Attachment F-1), text has been provided that RECs can use for the consent process when restrictions are for soil only. Note, for land use restrictions recorded pursuant to N.C.G.S. 130A-310.65 - 310.77, NCDEQ is in the process of developing a specific form for owner consent as required by the law revisions.
- *App. G – Certification Statements.* For sites using site-specific remediation standards in accordance with N.C.G.S. 130A-310.65 - 310.77, the forms used for Certification of Site-Specific Remediation Standards have been removed. Document content certification forms DC-1 and DC-II are satisfactory for sites in the REC Program.

As always, the REC Rules should be consulted when using the guidance document.

Submittal of Documents

Unless otherwise directed by the Inactive Hazardous Sites Branch, all documents, such as work plans and reports, should only be submitted in electronic format. The specifications and procedures for electronic document submittal can be found at the following website:

<http://portal.ncdenr.org/web/wm/sf/ihshome>.

Electronic File Storage System

All REC site files are stored electronically in an online document management system (CARA³) which can be accessed remotely. Instructions for accessing the Superfund Section CARA³ Portal can be found at the following website:

<http://portal.ncdenr.org/web/wm/sf-file-records>.

For access to a specific Superfund Section file that is not available in CARA³, a request should be sent to Mr. Scott Ross in the Superfund Section File Room, Division of Waste Management in one of the following ways:

- 1. Letter mailed to Mail Service Center #1646, Raleigh, NC 27699-1646**
- 2. Telephone/fax (919.707-8272)**
- 3. E-mail (Scott.Ross@ncdenr.gov)**

Important Message to Registered Site Managers

This document is the implementation guidance for the Registered Environmental Consultant (REC) Program Rules (15A North Carolina Administrative Code [NCAC] 13C .0300). Its purpose is to help explain the technical and administrative Rule requirements for conducting voluntary remedial actions under the REC Program so that the end result is a successful independent cleanup that protects public health. Please read the Rules and this implementation guidance carefully. **Note that this guidance addresses only *selected portions of the Rules that are not considered to be self-explanatory.* Text has been shaded where significant changes and/or additions have been made to the previous guidance document.** The guidance should only be used to supplement the complete text of the Rules which can be found at <http://portal.ncdenr.org/web/wm/sf/ihs/recrules>.

The work performed for projects in the REC Program is independent from Inactive Hazardous Sites Branch (Branch) oversight and approval. Therefore, the Registered Site Manager (RSM) is responsible for ensuring that site investigations and cleanups protect public health and comply with the REC Program Rules. Important resources to help with REC Program compliance can be found on our website at <http://portal.ncdenr.org/web/wm/sf/ihs/recprogram>. The website includes links to the REC Rules and other useful materials such as document content checklists, which provide a summary of the applicable rule requirements for each work phase of work and can be used as a tool to guide the RSM through the REC Program planning and documentation requirements. REC Program staff are available to assist Remediating Parties (RPs) and RECs with their understanding of, and compliance with, the rules and the Branch's procedures. We offer REC training sessions in small group settings for RSMs and their company staff, as well as RPs and other interested parties, at various times during the year or upon special request. In addition, REC staff can be contacted to arrange a conference call or meeting in order to discuss unusual technical situations that sometimes arise during the course of a remedial action. We encourage the use of these available resources. We would like to see remediating parties and their RECs succeed in a safe, compliant, and cost-efficient manner.

A portion of the REC Rules [.0307] addresses technical audits that may be conducted by the Branch. As required by law, the Branch performs the audits since the work for these projects is independent from state oversight. The purpose of an audit is to review the cleanup activities for compliance with the REC Rules and protection of public health. The audits also help us improve our procedures, guidance documents, and training for individuals working on projects in the REC

Program. Accordingly, RSMs should be aware that there may be occasions when the Branch needs questions answered or additional information regarding the activities performed by the REC so an audit can be completed. Audits that have been performed since the program was established have discovered several common oversights made by RECs following the execution of an REC-AA. Prior audits have discovered the following oversights that should be avoided:

- Not following the standards of conduct for RECs [.0305] by not recognizing the REC's primary obligation is to protect public health, safety and welfare and the environment (such as not reporting an imminent hazard or off-property contamination to the Department of Environmental Quality within 24 hours of discovery);
- Not meeting the work phase completion milestones [.0302(h)] that are established by the rules to ensure progress is made in these independent remedial activities;
- Not properly certifying documents [.0306(b)(1) & (2)] to assure that these independent actions are being conducted properly;
- Not certifying and submitting work plans prior to implementation [.0306(b)(4)] and providing required work phase completion statements at appropriate times [.0306(5)] to inform the public of site activities;
- Not addressing all required components in certified work plan and report documents;
- Not completely delineating contamination in all media [.0306(e) & (f)] which can result in an exposure to contaminants on and off property;
- Not evaluating structural vapor intrusion potential (specific guidance to conduct this evaluation is available on the Branch's web site at <http://portal.ncdenr.org/web/wm/sf/ihs/ihsguide>);
- Not demonstrating that the selected remedy will be effective [.0306(l)], such as implementing a monitored natural attenuation remedy when an active remedy may be warranted;
- Not ensuring remedial progress is made and performing proper remedial monitoring and reporting [.0306(o)] to ensure that the remedy is effective and funds are not misdirected; and
- Not ensuring that the applicable cleanup standards are properly determined and met [.0308] to avoid contaminant exposures to property occupants and nearby homes and businesses.

These REC Program Rule violations may result in temporary or permanent disqualification from the program. Parties may also be subject to penalties and other applicable sanctions. Therefore, please take advantage of the resources offered to ensure compliance with these issues and all of the REC Rules.

If assistance is needed with understanding any of the statutes, rules, guidance information, or Branch procedures, please contact any of the following REC Program staff:

Kim Caulk - REC Program Manager
(919) 707-8350
Kim.Caulk@ncdenr.gov

Janet Macdonald
(919) 707-8349
Janet.Macdonald@ncdenr.gov

Matt Aufman
(919) 707-8348
Matt.Aufman@ncdenr.gov

For issues related to the Branch's state-lead (priority) sites, please contact the appropriate staff shown on the Branch website:
<http://portal.ncdenr.org/web/wm/sf/ihs/ihsregmap>.

REC IMPLEMENTATION GUIDANCE

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*This guidance has been prepared to help explain the requirements specified in the REC Program Rules (15A NCAC 13C .0300). **Rule citations that are not discussed within this guidance are considered self-explanatory.** The REC Rules should always be consulted when using this guidance.*

The appendices of this document provide more technical details for conducting remedial investigations, establishing cleanup levels, and use of land use restrictions as part of site remedies.

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.0300 Remedial Action Oversight by Registered Environmental Consultants

Background

The Inactive Hazardous Sites Response Act was enacted to address hundreds of hazardous substance disposal sites in North Carolina which were not cleanup priorities for the federal Superfund Program. The Inactive Hazardous Sites Response Act is administered by the Division of Waste Management's Inactive Hazardous Sites Branch. This state statute provides site owners, operators and responsible parties (hereafter referred to as "remediating parties") the opportunity to voluntarily clean up their sites pursuant to administrative agreements with the Division. Due to limited staff resources, the Division had been unable to keep up with the demand for oversight of site cleanups. To address the problem, the General Assembly amended the Inactive Hazardous Sites Response Act to allow the Division to approve qualified, private environmental consulting firms to certify remedial action compliance in place of state oversight. This program is known as the Registered Environmental Consultant Program (REC Program).

The Registered Environmental Consultant Program

Remedial actions conducted under the REC Program are governed by the Inactive Hazardous Sites Response Act and the REC Program Rules found at 15A NCAC 13C .0300. Branch-approved environmental consulting or engineering firms are known as Registered Environmental Consultants. The REC is hired by the remediating party to implement and oversee the site cleanup in place of Branch review and approval. To qualify as an REC, an environmental consulting firm must employ one or more site managers who meet the criteria of Rule .0304. These site managers are known as Registered Site Managers (RSMs). All work performed by RECs must be conducted under the supervision and direction of one or more Branch-approved RSMs who must certify, in writing, that the site investigation and site remediation were conducted in accordance with the Inactive Hazardous Sites statute and the REC Program Rules. Only Branch-approved RSMs may make certifications on behalf of the REC. **This certification is in place of Branch review and approval.**

Once the RSM certifies that a site cleanup has been completed, the site will be transferred to the "no further action" category of the Inactive Hazardous Sites inventory. Ensuring that site cleanups are protective of public health and the environment will rely upon the professional qualifications, judgment and integrity of the REC and its RSM(s). The REC Rules mandate that "a Registered Environmental Consultant shall at all times recognize that its primary obligation is to protect public health, safety, welfare and the environment in the performance of professional services as a Registered Environmental Consultant."

Remediating parties who want an approved remedial action must first notify the Branch in writing. The Branch will screen site information and determine, based on the presence of any severe or sensitive site conditions, whether the cleanup will be managed directly by the Branch or under the REC Program. To expedite the screening process, remediating parties and their consultants will need to complete and submit a *Site Conditions Questionnaire* to determine REC Program eligibility. Answering "yes" to one or more of the questions does not automatically mean the site will be excluded from the REC Program. The questionnaire's purpose is to help

the Branch identify and evaluate any severe or sensitive site conditions. If the Branch determines that the voluntary cleanup will be managed by the REC Program, the remediating party must hire an approved REC and enter into a limited administrative agreement with the Division.

To ensure the quality of work performed by RECs and protection of public health, the Branch conducts detailed audits of selected sites. Audit results are used to track the performance of RECs and RSMs. Program Rule violations can result in the RSM and/or REC being temporarily or permanently disqualified from the REC Program. The RSM and the REC can also be subject to penalties and other applicable sanctions.

Submittal of Documents

Unless otherwise directed by the Branch, all certified documents, such as work plans and reports, should only be submitted in electronic format. The specifications for electronic document submittal can be found at: <http://portal.ncdenr.org/web/wm/sf/ihs/home>.

Purpose of the Implementation Guidance

The purpose of the implementation guidance is to assist remediating parties, RECs, and their RSMs in interpreting, applying and complying with the REC Program Rules and understanding the Branch's procedures. The guidance outlines the minimum technical and administrative requirements for site cleanups conducted under the REC Program. The implementation guidance addresses only selected portions of the REC Program Rules, and should be used in conjunction with the complete text of the Rules.

Due to the wide range of conditions encountered at hazardous substance disposal sites, this guidance does not address every conceivable situation. Therefore, use of the guidance does not guarantee Branch concurrence on the method or completeness of a remedial action, nor does it guarantee that a remedial action complies with the REC Program Rules. **Before beginning any site work, remediating parties and RSMs should read the REC Program Rules and the implementation guidance carefully.**

Information and guidance is only provided for each rule provision where clarification may be needed. The rules should always be consulted in conjunction with this guidance.

.0301 Definitions

.0302 General Provisions

- (a) Purpose of Rules
- (b) Compliance with Other Laws

(c) Enforcement Provisions

The Branch will conduct detailed audits of selected sites to track REC and RSM performance and protection of public health. REC Program Rule violations could result in the RSM and/or the REC being temporarily or permanently disqualified from the REC Program. The RSM and the REC may also be subject to penalties and other applicable sanctions. A listing of firms who have been cited for REC violations within the last five years are posted at <http://portal.ncdenr.org/web/wm/sf/ih/recviolations>. The numbers of Notices of Deficiency and Notices of Violation issued for the past fiscal year are also indicated.

(d) Administrative Agreements

Remediating parties who wish to participate in the REC Program must first enter into an administrative agreement with the Division. Copies of a model administrative agreement are available from the REC Program. The model administrative agreement contains standard provisions that apply to all sites. Only the site identification and site description will be project-specific.

(e) Authority for Site Access/Response Actions

(f) Requirement for REC/RSM Oversight

Please note that only Branch-approved RSMs may manage site cleanups and make certifications on behalf of the REC. **The RSM is personally responsible for the day-to-day oversight of the project. This responsibility may not be delegated to anyone else. Inquiries to the Branch from the REC should come from the RSM directly to ensure there are no communication issues in implementing the project.**

(g) Sites Requiring Branch Oversight

The Branch expects that the majority of site cleanups will be eligible for the REC Program. However, the Branch reserves the right to supervise and/or direct site cleanups at its discretion.

(h) Deadlines for Completing Remedial Investigations and Remedial Actions

Independent site investigations and site cleanups must be completed within a reasonable period of time. The following deadlines are specified in the REC Program Rules based on the effective date of the administrative agreement:

- Remedial investigation completion – 3 years
- Non-groundwater remedial action completion – 8 years
- Groundwater remedial action initiation – 2 years from completion of the remedial investigation

For sites which fail to meet these deadlines, the administrative agreement between the remediating party and the Division may be dissolved and the site may be transferred from the Responsible Party Remedial Action category to the Sites Priority List category of the Inactive Hazardous Sites inventory. Remediating parties at these sites may also be subject to enforcement action.

Effective Date: The "effective date of the agreement to conduct a remedial action" refers to the date that the administrative agreement between the remediating party and the Division is signed by the Division director. The Branch has no authority to grant extensions to the statutory deadlines. The REC should contact the Branch any time there are issues outside of its control that may delay progress and lead to missed deadlines, such as permitting and property access problems. The Branch can assist with property access.

Groundwater Remediation Initiation Date: The initiation of groundwater remediation is interpreted by the Branch as being that point when, after the administrative agreement has been executed, a remedial action plan has been certified as complete by the REC, the cleanup of groundwater has begun, and the REC submits a certified construction completion report to the Branch. For remedial actions involving monitored natural attenuation, a certified construction completion report is not required. Thus, initiation of groundwater remediation is interpreted as that point when the Remedial Action Plan (RAP) work phase completion statement is received. For monitored natural attenuation, groundwater monitoring will need to be conducted and the first certified progress report received within 90 days of RAP completion (see paragraph .0306(o) for additional information).

Public Notice/Permits Affect Timeframes: It is important to note that, prior to implementing a remedy, the REC must complete a required thirty-day public notice of the RAP, address any public comments received and allow time for all necessary permits. Submission of a groundwater remedial action plan alone does not constitute initiation of groundwater remediation. See .0306(j) for more information regarding public notices and .0306(l) for information regarding remedial action plans.

Remedial Action Completion: The completion of remedial activities is interpreted by the Branch as being that point when the Branch receives from the REC a certified Remedial Action Completion Report that documents the remedial activities are complete and the remedial goals have been met for the entire site.

- (i-j) Business Confidentiality
- (k) Disclosure of Information

(l) Maintenance and Submittal of Documents

The REC should ensure that all site-related documents are maintained in an orderly fashion in one location and are made available to the Branch in a timely manner to keep the public record up to date regarding site remedial activities and to demonstrate compliance with the REC Rules. **All work plans and reports must be submitted electronically to the Branch within 30 days of completion (i.e., within 30 days of certification by the RSM). The specifications for electronic document submittal can be found on the Branch's website.** All other miscellaneous records must be submitted to the Branch at the completion of the work phases shown in paragraphs .0302(l)(1) through (5). In addition, **certified status reports to demonstrate progress made toward achieving deadlines for these independent remedial actions, must be submitted for the public record if required by the administrative agreement.**

Note: Anytime during the site assessment and remedial action, the public may have interest in activities at a site. Therefore, any plans for events such as confirmation/baseline groundwater sampling or pilot tests should be briefly described, certified and submitted for the public record as soon as prepared if they will be performed prior to submittal of a remedial investigation work plan or preparation of a remedial action plan. This will ensure the Branch is able to respond to inquiries and, thus, help quell potential public concerns.

(m) Requirement to Maintain Documents

Unless otherwise directed by the Branch, RECs must preserve and maintain all documents related to site cleanups for six years after termination of the site-specific administrative agreement.

(n) Branch Requests for Information/Replacement RECs

Paragraph (n) has two parts: (i) RECs failing to comply with Branch requests for information can result in revocation of a consulting firm's REC status; (ii) in the event that an REC is terminated by the remediating party or disqualified from the program by the Branch, the remediating party must propose a replacement REC within sixty days to maintain approved remedial action status

(o) Authority of Branch to Compel Response Actions

(p) Requests for Site Access

The REC should maintain records (e.g., telephone logs, e-mail correspondence, letters, etc.) showing attempts to obtain permission for access to a site or other location to be investigated that is not owned by the remediating party. Copies of the records will be necessary if the REC or remediating party requests assistance

from the Branch to obtain access. RECs should not delay in pursuing access and promptly contact the Branch for assistance if these efforts fail.

.0303 Approval of Registered Environmental Consultants

(a) REC Application Package

The REC application package is available on the Branch's web site at http://portal.ncdenr.org/c/document_library/get_file?uuid=6a0e97d6-3d84-4b64-84bc-dc452db72480&groupId=38361

(b) Requirement to Supply References

For further information, see the Branch's REC application package.

(c-d) Requirement to Notify Branch of Change in Nature of Business or RSMs

When an REC learns that an RSM intends to change employment, the REC must notify the Branch within the time frames specified in .0303(d). If the sole RSM changes employment, the REC must also propose a replacement RSM within the time frames specified in .0303(d). RECs must also notify the Branch if the name of the REC firm changes, such as after being acquired by or merged with another firm. In this case, the Branch will request documentation demonstrating that the REC is still primarily an environmental consulting firm. **Failure to notify the Branch and/or to propose a replacement RSM is a violation of the REC Program Rules and may result in the REC being disqualified.** Therefore, the Branch recommends that RECs employ at least two RSMs.

The person responsible for communications with the Branch regarding the application, amendments, renewals, RSMs leaving employment, and proposed replacement RSMs is the "principal contact" shown on Part 1 of the REC application. To avoid problems caused by personnel changes, RSMs should not be listed as the principal contact. The RSMs, however, should be the sole individual contacting the Branch with questions/issues on their projects.

(e-f) Branch Approval of RECs

Any firm that represents itself as an REC without Branch approval is subject to prosecution under applicable laws. An RSM that leaves the employment of an REC needs to be approved by the Branch as an RSM for another REC before representing himself or herself as such.

(g) List of Branch-approved RECs

A list of Branch-approved RECs is available at <http://portal.ncdenr.org/web/wm/sf/ihs/approvedrecs>.

.0304 Minimum Qualifications for Registered Environmental Consultants

An REC applicant must demonstrate that it has an established environmental consulting practice. Additionally, one or more employees of the firm must meet the professional qualifications for RSMs shown in Rule .0304. For further information, see the Branch's REC application package.

.0305 Standards of Conduct for Registered Environmental Consultants

(a) Standards of Professional Competence

RECs and RSMs must follow standards of professional competence at all times. All documents and completion statements must be certified by the RSM. The RSM must certify documents only when he/she has directly reviewed the work in question. The RSM's certification indicates that the document meets the requirements of the statute and the REC Program Rules. Note that the REC Program Rules do not authorize an RSM to practice outside his/her area of professional expertise. If a document contains work outside the RSM's area of expertise, he/she must rely on the advice of other professionals with relevant expertise. Before certifying any document, the RSM must ensure that the document has been certified by a representative of the remediating party and has been signed and sealed by the appropriate professionals, if necessary (e.g., licensed geologist, registered professional engineer, etc.). A single document may require the signature and seal of more than one professional. Violation of these provisions may result in the RSM and/or the REC being temporarily or permanently disqualified from the REC Program. The RSM and the REC may also be subject to penalties and other applicable sanctions.

(b) Standards of Professional Responsibility

Paragraph .0305(b) states that RECs and RSMs are subject to the following standards of professional responsibility. Violations of the provisions can result in the RSM and/or the REC being temporarily or permanently disqualified from the REC Program. The RSM and the REC may also be subject to penalties and other applicable sanctions.

- (1) RECs must at all times recognize that their primary obligation in the performance of professional services is to protect public health, safety, welfare and the environment.
- (2) RECs must report the existence of imminent hazards to the Branch in writing within 24 hours of discovery, unless the remediating party has already provided such notice in writing.
- (3) RECs must report the presence of sensitive environments, mixed chemical and radioactive wastes, or off-site migration of hazardous substances to

the Branch in writing within 24 hours of discovery, unless the remediating party has already provided such notice in writing. As provided by .0302(g), the Branch may elect to supervise and/or direct the cleanup of sites with these site conditions.

- (4) RSMs must follow the requirements and procedures set forth in the Rules, must act with reasonable care and diligence, and must exercise independent professional judgment. "Independent professional judgment" refers to the RSM's judgment with respect to interpretation of the REC Program Rules and accepted standards of practice for hazardous substance site investigation and remediation.
- (5) If an REC becomes aware of new information that would modify its previous opinion on a site cleanup, the REC must promptly notify the remediating party and the Branch in writing.
- (6) If an REC becomes aware of relevant information that was not disclosed by a previous REC on the project, the REC must promptly notify the remediating party and the Branch in writing.
- (7) RECs must not allow the use of their names or the names of their RSMs by any firm engaging in fraudulent or dishonest business practices. They are also not allowed to associate in a business venture with such firms.
- (8) RECs must ensure that their professional reports, public statements and testimony are objective and truthful. They must include all relevant and pertinent information when the results of an omission could lead to an incorrect conclusion.
- (9) RECs must not misrepresent an RSM's academic or professional qualifications or degree of responsibility for prior site cleanups.
- (10) RECs must comply with all provisions of the REC Program regulations, all applicable federal and state laws, and local ordinances.
- (11) It is necessary for the RECs and RSMs to read and understand the REC Program Rules, this implementation guidance, and the site-specific administrative agreement.

.0306 Technical Standards for Registered Environmental Consultants

Rule .0306 outlines the minimum technical and administrative requirements for conducting site investigations and remedial actions.

- (a) Compliance with Administrative Agreement, Statute, and Rules.

This guidance is provided to assist with compliance.

(b) REC Certification of Documents and Completion of Work Phases

Paragraph .0306(b) requires two separate certifications: certification of documents and certification of work phase completion. Both certifications are notarized, sworn statements subject to penalty of law. A summary of the certification forms along with instructions are included in Appendix G. RSMs need to always download the most current version of the relevant work phase completion or document certification forms from the REC Program web site at <http://portal.ncdenr.org/web/wm/sf/ih/recprogram> at the time of preparation.

Certification of documents All work phase completion statements, schedules, work plans, and reports submitted to the Branch must first be certified by the remediating party (using Document Certification Form DC-I) and then by the RSM (using Document Certification Form DC-II). The “certification of documents” statements are shown in Appendix G, Section G.1. The language in the certification statements is specified in the Rules and may not be modified under any circumstances.

Certification of work phase completion The RSM must also certify the completion of the work phases shown in paragraph .0306(b)(5). The “certification of work phase completion” forms are shown in Appendix G, Section G.2. The language in the work phase completion forms is specified in the Rules and may not be modified under any circumstances.

Note: Once a work phase is completed, the appropriate work phase completion form must be signed by the RSM and then notarized. The work phase completion form must be accompanied by the certification of document statements. The date of certification of the reports for this work phase must be the same or follow the dates on the work phase completion statement.

(1) REC Certification of Documents

In this statement, the REC is certifying that the content of the submitted document complies with both REC Program Rules and the Inactive Hazardous Sites Response Act. The REC and its RSMs should read and understand this implementation guidance to help ensure compliance with the REC Program Rules and the site-specific administrative agreement. This certification statement is a notarized sworn statement subject to penalty of law. **The RSM may sign this certification statement only AFTER completion of the certification statement required by .0306(b)(2) and, if applicable, the professional signatures required by .0306 (b)(3).**

(2) Remediating Party Certification of Documents

All work phase completion statements, schedules, work plans, and reports containing any technical information about the site must also include the certification of documents statement from the remediating party. The remediating party is certifying that the information is true, accurate and complete. This certification is required to ensure that the REC has been supplied with all the site data it needs to make a competent professional decision. This certification statement is a notarized sworn statement subject to penalty of law.

(3) Other Professional Certification

The RSM may approve work products by relying, in part, on the advice of one or more professionals having relevant expertise (see paragraph .0305(a)). It is the RSM's responsibility to determine when documents must be sealed by a licensed professional (e.g., a registered engineer for engineering design work, a licensed geologist for geologic evaluations). If a portion of the site investigation or site cleanup requires the seal of a licensed professional, that portion must be sealed before the document is certified by the remediating party and the RSM. During a technical review or audit by the Branch, work that is identified as not properly prepared under the supervision of, and sealed by, a licensed professional will need to be reported to the appropriate professional licensing board.

(4) Documents to be Certified Prior to Implementation

The following documents must be certified and notarized **first** by the remediating party (using Document Certification Form No. DC-I), **second** by the RSM (using Document Certification Form No. DC-II) and received by the Branch **before implementation**:

- (A) remedial investigation work plans,
- (B) remedial action plans,
- (C) remedial action preconstruction reports, and
- (D) any major modifications of project schedules.

(5) Submittal of Work Phase Completion Statements

The RSM must submit work phase completion statements as follows:

- (A) at the completion of the Phase I remedial investigation (*Work Phase Completion Form No. WPC-I*),

- (B) at the completion of all phases of the remedial investigation (*Work Phase Completion Form No. WPC-II*),

Note: The remedial investigation includes preparing remedial investigation work plans(s), performing field activities and sampling various environmental media, and preparing remedial investigation report(s). The remedial investigation should not be certified as complete until all these activities have occurred.

- (C) at the conclusion of the remedial action plan public notice period [see .0306(j)], after receiving authorization from the Branch (*Work Phase Completion Form No. WPC-III*),
- (D) at the completion of remedial design (*Work Phase Completion Form No. WPC-IV*) and construction (*Work Phase Completion Form No. WPC-V*), and
- (E) at the completion of all remedial action activities (*Work Phase Completion Form No. WPC-VI*, *Work Phase Completion Form No. WPC-VII*, or *Work Phase Completion Form No. WPC-VIII*).

(6) Content of Completion Statements

The language in the work phase completion forms is specified in the Rules and may not be modified under any circumstances. Note that the RSM is certifying for a particular work phase that the work has been completed in accordance with the Inactive Hazardous Sites statute and the REC Program Rules; and that the REC itself is specifically in compliance with paragraphs .0305(b)(2) and (b)(3) of the REC Program Rules.

(c) Quality Assurance for Sampling and Analysis

(1) Data Quality Objectives

The selection of analytical methods and the detection limits they achieve, as well as field collection and analytical methods, must be commensurate with their intended use. Be aware that detection limits should not be higher than each contaminant's cleanup standard (or drinking water standard, if applicable) to ensure that all contamination is delineated and standards are met.

(2) Methods for Sample Collection and Analysis

RSMs should follow generally accepted standards of practice for hazardous substance site investigations. Standard or common field protocols, analytical methods and data reporting procedures are provided in Appendix A of this implementation guidance.

(3-4) Requirements for Analytical Laboratories

The REC must ensure it only uses laboratories meeting the criteria in this paragraph of the Rules for work to be considered valid.

(5) Minimum Qualifications for Field Staff

The RSM must ensure that field staff is qualified by education, training and experience.

(6) Reporting Analytical Results

(A-K) Sample collection documentation must include components A through K. Clarification is provided for the following component:

(B) Groundwater samples should not be filtered prior to laboratory digestion and analysis.

(d) Health and Safety Plans

The RSM must ensure that project health and safety plans explain measures to protect the **surrounding community** from exposure to site contaminants. The goal is to ensure that the health and safety of all persons on and off property will not be adversely affected by the remedial activity. The RSM is responsible for conforming to all local, state, and federal regulations for health and safety.

(e-f) Requirement to Investigate and Delineate All Areas of Concern

The Branch's procedures for investigating all known or suspected areas of concern are outlined in Appendix A. RSMs must delineate the extent of identified contaminants in all media (soil, groundwater, sediment, surface water, and vapor) to the unrestricted-use goals and should use their professional judgment to determine what sampling and analysis is required, based on site conditions. The unrestricted-use remedial goals are established using the procedures outlined in Appendix D. Defining the extent of contamination to the unrestricted-use goals is necessary to determine if contaminant exposure may exist off-property and in order to establish where to place restrictions for restricted use remedies. If the number of specific constituents of concern have been clearly established, unrestricted-use remedial goals for soil may be adjusted using the procedures outlined in Section E.2 of Appendix E. The extent of contamination can be delineated to the adjusted unrestricted-use remedial goal but not to restricted-use (e.g., industrial-use) remedial goals.

“Areas known, suspected, or having a reasonable probability of being contaminated” includes any media or areas with respect to which there is evidence (such as, but not limited to, allegations or indications of spills, visual

observations, field instrument readings, laboratory data, and chemical odors) of a release of hazardous substances or of materials that contain or may contain hazardous substances.

(g) Remedial Investigation Plans

The remedial investigation must be completed within 3 years of the effective date of the administrative agreement as indicated in paragraph .0302(h) of the Rules. A remedial investigation work plan must be submitted to the Branch within 30 days of completion (i.e., within 30 days of certification by the RSM) as required by paragraph .0302(l). All remedial investigation work plans must be properly certified as indicated in Rule .0306 and submitted to the Branch before implementation.

Refer to Appendix A for the sampling and analytical procedures for remedial investigations.

The purpose of the remedial investigation plan is to assemble all available information on disposal history and site characteristics, and to use this information to formally plan the scope of the remedial investigation. The remedial investigation's purposes are: (i) to identify all releases of hazardous substances to the environment, (ii) to identify potential exposure pathways, (iii) to characterize the chemical nature of such releases and collect sufficient sampling data to support a cleanup-level determination, (iv) to delineate the areal and vertical extent of contamination, and (v) to characterize site conditions sufficiently to conduct a feasibility study of remedial alternatives and to support a proposed remedy. **Work plans and reports must address each component required by .0306(g).**

At some sites, part or all of the remedial investigation has already been completed when the administrative agreement is executed. In these cases, the RSM must address each component in .0306(g) and .0306(h) by identifying the location of, and providing a copy of, the documentation or report that fulfills the requirement. Work does not need to be repeated. The examples below outline procedures to follow:

Example #1: At site #1, *part* of the remedial investigation has already been completed by the time the administrative agreement is executed.

In this case, the RSM should prepare a work plan for completing the remedial investigation. All pre-existing remedial investigation work plans and reports should be provided as appendices to the work plan. If any pre-existing work plans and reports are already on file with the Superfund Section, the plan should state so and identify them. The work plan or report should also include a table identifying for the public the location in each pre-existing report (whether attached or on file) where each

component requirement from .0306(g) and .0306(h) is addressed. The RSM must attach both the remediating party and RSM certification of documents statements shown in Appendix G, Section G.1 to the package. The most current version of the certification forms need to be downloaded from the REC Program web site at <http://portal.ncdenr.org/web/wm/sf/ih/recprogram>.

Example #2: At site #2, *all field activities* of the remedial investigation have already been completed by the time the administrative agreement is executed.

In this case, the RSM should prepare a letter report that summarizes the results of the remedial investigation for the public record. All pre-existing remedial investigation work plans and reports not in the Superfund Section files should be provided as appendices to the letter report. If all pre-existing work plans and reports are already on file with the Superfund Section, the letter report should state so and identify them. The letter report should also include a table identifying for the public the location in each pre-existing report (whether attached or on file) where each component requirement from .0306(g) and .0306(h) is addressed. The RSM must attach both the remediating party and RSM certification of documents statements shown in Appendix G, Section G.1 to the package. The remedial investigation certification of work phase completion form shown in Appendix G, Section G.2 must also be attached. The most current version of the certification forms need to be downloaded from the REC Program web site at <http://portal.ncdenr.org/web/wm/sf/ih/recprogram>.

(1-19) Remedial Investigation Plan Content

Remedial Investigation Plan content must include components 1 through 19. Clarification is provided for the following components:

(6) Sources of Potable Water

Potable water sources must be identified within a **one-half (0.5) mile radius** of contamination. As the remedial investigation and remedial action proceeds, conditions change. An REC should update the potable water survey for a site approximately every three years or more frequently, depending on the site-specific situation, and evaluate whether any threats exist.

If hazardous substances have migrated from the contaminant sources and could threaten a water supply, an imminent hazard may exist. The REC must contact the Branch within 24 hours to

report the condition pursuant to .0305(b)(2) and to discuss any necessary actions to protect public health.

(7) Environmentally Sensitive Areas

The site and all adjacent property must be evaluated for the existence of the environmentally sensitive areas listed below. For very large sites, identification of environmentally sensitive areas should extend to a 1,500-foot radius of the contamination. Once the extent of the contamination is defined, any threats to the environmentally sensitive areas should be identified and re-evaluated. Any additional acquired information must be included in the Remedial Investigation Report.

- State Parks
- Areas Important to Maintenance of Unique Natural Communities
- Sensitive Areas Identified Under the National Estuary Program
- Designated State Natural Areas
- State Seashore, Lakeshore and River Recreational Areas
- Rare Species (state and federal Threatened and Endangered)
- Sensitive Aquatic Habitat
- State Wild and Scenic Rivers
- National Seashore, Lakeshore and River Recreational Areas
- National Parks or Monuments
- Federal Designated Scenic or Wild Rivers
- Designated and Proposed Federal Wilderness and Natural Areas
- National Preserves and Forests
- Federal Land designated for the Protection of Natural Ecosystems
- State-Designated Areas for Protection or Maintenance of Aquatic Life
- State Preserves and Forests
- Terrestrial Areas Utilized for Breeding by Large or Dense Aggregations of Animals
- National or State Wildlife Refuges
- Marine Sanctuaries
- National and State Historical Sites
- Areas Identified Under Coastal Protection Legislation
- Coastal Barriers or Units of a Coastal Barrier Resources System
- Spawning Areas Critical for the Maintenance of Fish/Shellfish Species within River, Lake or Coastal Tidal Waters

- Migratory Pathways and Feeding Areas Critical for Maintenance of Anadromous Fish Species within River Reaches or Areas in Lakes or Coastal Tidal Waters in Which Such Fish Spend Extended Periods of Time
- State Lands Designated for Wildlife or Game Management
- Wetlands

Appendix B provides the contacts that must be made in order to identify environmentally sensitive areas. The information received from these contacts must be detailed in this section of the work plan and copies of any correspondence included. In most cases, none of these areas will be present. Knowledge of the presence of these sensitive environments is necessary to determine if any special sampling (such as aquatic toxicity testing) is required and whether site remediation may do more harm than good (for example, excavation and destruction of a wetland vs. leaving in place residual contamination which will not significantly impact the wetland environment).

If, during performance of the remedial investigation it is determined that hazardous substances have migrated from the contaminant sources into any of these environmentally sensitive areas, the REC must contact the Branch within 24 hours pursuant to .0305(b)(3). If the RSM is uncertain about the existence of an environmentally sensitive area or more research is needed, the work plan should report on the information that was obtained during preparation of the work plan, and any additional research that is needed can be included as part of the work to be performed during the remedial investigation. If, based on the remedial investigation activities, it is determined that field work such as an ecological risk assessment is needed, a work plan amendment can be prepared, certified, and submitted to the Branch. The REC should contact the Branch for further instructions regarding conducting ecological screening evaluations and risk assessments.

(19) Health and Safety Plans

The RSM must ensure that project health and safety plans describe the measures to protect the **surrounding community** from exposure to site contaminants. The goal is to make sure the health and safety of all persons on and off property will not be adversely affected by the remedial activity. The RSM is responsible for conforming to all local, state, and federal regulations for health and safety.

(h) Remedial Investigation Report

The remedial investigation must be completed within 3 years of the effective date of the administrative agreement as indicated in paragraph .0302(h). A remedial investigation report must be submitted to the Branch within 30 days of completion (i.e., within 30 days of certification by the RSM) as required by paragraph .0302(i).

All remedial investigation reports must be properly certified as indicated in Rule .0306. The Phase I remedial investigation report must also include the Phase I work phase completion statement (*Work Phase Completion Form No. WPC-I*). The final report of the remedial investigation must also include the remedial investigation completion statement (*Work Phase Completion Form No. WPC-II*). These reports should document the findings of the site investigation in sufficient detail to delineate the contamination in all media to unrestricted use levels and all other preliminary remediation goals, identify potential sensitive receptors, support the final cleanup-level determination, and support conducting a feasibility study of remedial alternatives.

For the independent remedial actions that make up the REC Program, a clearly written and well-organized remedial investigation report is critical for the public to understand and for the Branch to confirm adequate performance during an audit.

Any special studies that may be conducted including an ecological evaluation, a vapor intrusion potential study, or a geophysical survey for buried material is part of a remedial investigation and must be completed and the findings included in the certified remedial investigation report.

If the remedial investigation is complete and no remedial goals have been exceeded for any of the media (i.e., soil, groundwater, sediment, surface water, vapor, etc.) and, therefore, remedial action is not necessary, a combined remedial investigation and remedial action completion report should be prepared. This document must include the combined remedial investigation & remedial action completion certification “For No Action Remedy” statement (*Work Phase Completion Form No. WPC-VIII*).

In some cases, only one phase of a remedial investigation may be needed to delineate the extent of contamination. If this is the case, the phase I remedial investigation work phase completion statement (*Work Phase Completion Form No. WPC-I*) and the remedial investigation completion statement (*Work Phase Completion Form No. WPC-II*) must be included with the Phase I remedial investigation report documenting all phases of the remedial investigation and the final remedial investigation are complete.

(1-11) Remedial Investigation Report Content

Remedial Investigation Plan content must include components 1 through 11. Clarification is provided for the following component:

(8) Tabulation of Analytical Results

A summary of the nature of any tentatively identified compounds (TICs) eliminated from further analyses and reporting should be provided in the report, including reasons for discounting the constituent. Refer to Appendix A, Section A.7.1.1 for further information.

(i) Remedies Requiring Branch Concurrence

If the planned remedy meets any of the three conditions outlined in (i), the Branch's concurrence of the proposed remedy is required prior to finalization of a RAP.

For any proposed remedies requiring concurrence from the Branch in accordance with .0306(i), a written proposal needs to be submitted to the Branch prior to submittal of a Remedial Action Plan. The proposal needs to describe the condition needing concurrence from the Branch and a project summary with specific details regarding how the remedy is supported by the feasibility study. The Branch will only be providing review and concurrence (if necessary) with the proposed remedy and not review and approval of the content of the RAP or the adequacy of the preceding remedial investigation. Once the Branch concurs with the remedy, the REC provides approval of the RAP by proper certification of the RAP document following a required 30-day public notice as specified in .0306(j).

The definition of "on-site containment or capping" as described in .0306(i)(2) includes any remedy which leaves in place contaminated media above Branch unrestricted use cleanup levels (e.g., containment remedies which rely on land use restrictions). The procedures for obtaining concurrence on a land use restriction proposal are provided in Appendix F.

(j) Public Notice of Remedial Action Plans (RAPs) and RAP Addendums

The public notice for RAPs and RAP Addendums is performed using the following procedures:

- The REC and RP submit a certified Proposed RAP or RAP Addendum to the Branch (with DC-I and DC-II certifications).
- Branch staff drafts the public notice and then e-mails it to the RSM with instructions and a tabulated mailing list of surrounding property owners and parties that have expressed interest in remedial activities at

the facility/site. The RSM is responsible for adding to the mailing list any additional parties that have expressed an interest in the site.

- The RSM completes the public notice form by writing the date that indicates the end of the public notice period in the blank near the bottom of the notice form (35 days from the mailing date to allow for postal delivery). No cover letter is necessary.
- The RSM distributes the public notice via certified mail to the facility mailing list. If delivery of a notice fails for any reason or comments are received, RSMs must notify the Branch.
- At the end of the public notice period, the RSM needs to contact the Branch to discuss any comments received. The RSM will need to update the comments column of the tabulated mailing list with a brief summary of any public comments or delivery issues and return it along with copies of the certified mail receipts (US Postal Service green cards) to the Branch (to confirm receipt of the notice). Also, the RSM must satisfactorily address any comments from the public regarding the RAP or RAP Addendum. If the Branch receives significant public comment, the Branch may elect to supervise the site cleanup directly as provided by .0302(g) or may direct more public involvement steps.
- After any public comments are satisfactorily addressed, the Branch will inform the RSM that the RAP work phase completion statement (WPC-III) can be certified and submitted and the RAP can be implemented. Note: the work phase completion form WPC-III must predate and be accompanied by Document Certification Forms DC-I and DC-II.
- Following the RAP public notice and work phase completion certification, progress toward site remediation is expected to begin immediately.

(k) Discharge of Remediation Waste Streams

(l) Remedial Action Plans and RAP Addendums

Remedies must be implemented as indicated in paragraph .0302(h). Groundwater remedial action must be implemented within two (2) years of completion of the remedial investigation. Non-groundwater (i.e., soil, sediment, and surface water) remedial action must be completed within eight (8) years of the effective date of the administrative agreement. All required documents must be submitted to the Branch within 30 days of completion (i.e., within 30 days of certification by the RSM) as required by paragraph .0302(l). When preparing a RAP or Addendum, the REC should confirm it will comply with paragraphs (c), (d), (i), (j) and (k) of Rule .0306, and should make sure it is properly certified. The work phase completion form for the proposed RAP or RAP Addendum can only be submitted to the Branch after

the 30-day public comment period has ended (following instruction from the Branch), and it must be certified with the appropriate document certification forms.

Remediation goals can change when new toxicological data become available. If groundwater remediation goals change during implementation of the remedy, these become the new goals for the site. If soil remediation goals change prior to the finalization of the remedial design, these become the new goals for the site. Once the soil remedial action design is complete, remediation goals are not subject to further change unless there is a delay in implementation of the remedy. Therefore, the specific applicable remediation goals should be well-documented in the RAP.

For sites with remedies that were initiated prior to execution of a REC-Administrative Agreement, the REC should review the existing remedial action plan and certify it meets all components of .0306(1) including a feasibility study. If minor supplementation is needed to fulfill the requirements, the REC can prepare a short RAP Addendum. Information in other documents already on file with the Superfund Section regarding previously implemented remedies can be referenced in the RAP.

The project schedule for complete implementation of the remedial action should include the time necessary to perform any needed pilot tests and to obtain any required permits and approvals. The REC Rules specify that remedial action for groundwater must commence within two years of completing the remedial investigation. Therefore, the remediating party and REC should proceed with developing a RAP as soon as the RI is complete. However, unusual circumstances can occur for a particular site. For example, the Branch understands that permits for certain technologies can involve multiple agencies and may take a substantial amount of time to obtain. The Branch also recognizes that depending on site-specific situations some pilot tests, such as injection for enhanced reductive dechlorination or oxidation technologies, may need to take place for several months in order to properly evaluate a remedy for full-scale implementation. If the remediating party and REC have been making steady progress and the groundwater remedy pilot test is initiated, the two-year deadline for implementing the groundwater remedy is considered to be met. If an extended pilot test is planned or there is an unusual situation (such as permit delays) that will potentially cause the deadline to be missed for implementation of a groundwater remedy, the REC should develop a time-line and contact the Branch to discuss the details.

If the remedial action was already in progress prior to an agreement executed under the REC Program and continuation of the same remedy is approved by the REC in the certified RAP, the preconstruction and construction completion reports described below are not necessary as long as the applicable components listed in .0306(m) for a preconstruction report and in .0306(n) for a construction

completion report are included in the RAP. Any previously prepared and submitted documents that include these components can be appropriately described and referenced in the RAP. In this situation, the work phase completion forms (Remedial Design Completion Certification for a preconstruction report [WPC-IV] and Construction Completion Certification for a construction completion report [WPC-V]) need to be included in the RSM-certified RAP.

(1-11) Remedial Action Plan Content

Remedial Action Plan content must include components 1 through 11.

Clarification is provided for the following components:

(9) Proposed Criteria for Remedial Action Completion

The remedial action plan must include a work plan for monitoring and evaluating the remedy's performance. Performance results should be submitted in remedial action progress reports pursuant to .0306(o). The work plan must also describe post-remediation confirmation sampling. Confirmation sampling results should be submitted in remedial action completion reports pursuant to .0306 (p). Branch guidance on confirmation sampling and analysis is provided in Appendix C.

(10) Health and Safety Plans

The RSM is also responsible for ensuring that project health and safety plans include measures to protect the **surrounding community** from exposure to site contaminants. The goal is to ensure that the health and safety of all persons on and off property will not be adversely affected by the remedial activity. The RSM is responsible for conforming to all local, state, and federal regulations for health and safety.

(m) Remedial Action Preconstruction Reports

After a RAP or RAP Addendum is certified, a preconstruction report must be prepared, properly certified, and submitted as indicated in Rule .0306. The work phase completion statement (*Work Phase Completion Form No. WPC-IV*) must also be included with the preconstruction report. A preconstruction report is required for three reasons. First, before remedial construction, the Branch wants to ensure that the RSM conducts the treatability studies and additional site characterization needed to support the final remedy, prepares a final design report and obtains the necessary permits and approvals. Second, if the site is audited, the Branch will need to review the information contained in the preconstruction report. Third, the preconstruction report documents the final design for the public record.

A preconstruction report is not necessary for a remedial action involving only monitored natural attenuation and/or soil excavation if the applicable components listed in .0306(m), such as final design parameters of the monitoring, excavation and project schedule are provided in the remedial action plan. However, if treatability studies, additional site characterization work, additional design or the acquisition of registrations, permits or approvals will be performed following certification of the remedial action plan, then a pre-construction report must be submitted. The report should document any post-RAP information and how it will be used to implement the remedial action.

For remedial actions involving multiple phases of injection such as for enhanced reductive dechlorination or oxidation technologies, a preconstruction report is not required as long as the applicable components listed in .0306(m) are provided in the RAP. However, in this case, the Remedial Design Completion Certification must be included with the RAP or it can be included with the construction completion report (see .0306(n) below) following the first phase of injection. For any subsequent phases of injection that have changes/deviations from the original RAP, such as the rates of injection, injection locations, etc., a RAP Addendum is not needed, but brief preconstruction reports and construction completion reports must be submitted for each phase of injection so the information will be available for the public record. The reports can simply describe the specific changes from the original RAP and initial phase of injection and provide copies of any additional permits. Each subsequent preconstruction report must have the required Remedial Design Completion Certification and each construction completion report must have the Construction Completion Certification.

Remedial Action Preconstruction Report content must include components 1 through 3.

(1) Treatability Studies and Site Characterization

All treatability study reports and additional site characterization reports should be provided in an appendix and summarized in the text. The Branch strongly recommends the use of pilot-scale treatability studies to evaluate the suitability of proposed technologies based on site-specific conditions and to optimize the remedial design.

(2) Final Engineering Design Report

The engineering design report should include the final plans and equipment specifications for construction of the remedy. The report should include a narrative description of the final design. It should be written in a style that the general public can understand. The report should also include an updated schedule for construction, operation and

maintenance, performance monitoring and evaluation, and progress reporting.

(3) Permits and Approvals

Copies of all registrations, permits and approvals should be incorporated into the preconstruction report as an appendix. Examples of registrations and permits that might be required for groundwater remediation sites include: non-discharge permits for discharge of treated groundwater to re-injection wells or infiltration galleries; pretreatment permits for discharge of treated groundwater to publicly owned treatment works; NPDES permits for discharge of treated groundwater to surface waters; well installation permits for monitoring, extraction and injection wells; air quality registrations/permits for discharge of air streams; etc.

(n) Remedial Action Construction Completion Reports

All construction completion reports must include components 1 through 3 and be properly certified as indicated in Rule .0306. The work phase completion statement (*Work Phase Completion Form No. WPC-V*) must also be included with the construction completion report.

If soil excavation is used as the only remedial alternative, once the excavation and transport of the soil to an off-property permitted treatment or disposal facility has been completed, confirmation data has been received that indicates the soil remedial goals have been achieved, and the excavation has been backfilled, a combined construction completion report/soil remedial action completion report (see .0306(p) below) can be submitted and include: 1) the Remedial Design Completion Certification (if a pre-construction report was not previously submitted), 2) the Construction Completion Certification, and the Remedial Action Completion Certification (*Work Phase Completion Form No. WPC-VI* or *Work Phase Completion Form No. WPC-VII*). In any case, if the soil excavation remedial activities take longer than 3 months to complete, certified quarterly progress reports (see .0306(o) below) must be prepared to keep the public informed (as required by the REC Program Rules) until construction is completed and the remedial goals have been met.

For remedial actions involving only monitored natural attenuation of groundwater or only institutional controls for a land use restriction scenario (essentially no site construction activities), a Construction Completion Report is not required. Therefore, the work phase completion forms for Remedial Design Completion Certification (*Work Phase Completion Form No. WPC-IV*) and Construction Completion Certification (*Work Phase Completion Form No. WPC-V*) are not required. Any activities such as installation of groundwater monitoring wells or recordation of documents for a declaration of a land use restriction scenario can be documented in the first progress report.

The Construction Completion Report is the last document submitted prior to beginning the routine remedial action progress reporting requirements of the REC Program Rules (see .0306(o) below). It also signifies initiation of groundwater remedial action. The Construction Completion Report can be combined with the first Remedial Action Progress Report.

(o) Remedial Action Progress Reports

Remedial action progress reports must include components 1 through 5 and be submitted in accordance with paragraph .0306(o). It is important to keep the public record up to date regarding the status of the site remedial activities. **Following the RAP public notice and RAP work phase completion certification, progress toward site remediation is expected to begin immediately. The first Progress Report is due within 90 days of certification of Remedial Action Construction Completion. Each subsequent Progress Report is due within 90 days of the previous report until remedial goals are achieved.** After the first full year of remedial action and the completion of four quarterly monitoring events, groundwater sampling and reporting may be performed on a reduced schedule but no less than an annual basis. Monitoring data collected for use in progress reports must meet the quality assurance requirements of paragraph .0306(c). **Copies of laboratory data must be included as part of the certified reports. The submitted data should include the laboratory summary sheet, laboratory results, QA/QC results, and chain of custody documentation. See Appendix A.8 for laboratory data reporting requirements.**

For remedial actions involving only monitored natural attenuation, groundwater monitoring must be implemented and the first Progress Report received by the Branch within 90 days following receipt of the RAP work phase completion statement (*Work Phase Completion Form No. WPC-III*) from the RSM. Progress monitoring must demonstrate that natural attenuation is occurring and an effective remedy for protection of public health.

The REC's obligation to protect public health is critical for the independent remedial actions within the REC Program [.0305(b)(1)]. If, during performance of the remedial action it is determined that hazardous substances have migrated from the contaminant sources and could threaten a water supply, an imminent hazard exists. The REC must contact the Branch within 24 hours to report the condition pursuant to .0305(b)(2) and to discuss any necessary actions for protecting public health. As remedial action proceeds, conditions change. An REC should update the potable water survey for a site approximately every three years or more frequently, depending on the site-specific situation.

(p) Remedial Action Completion Reports

All remedial action completion reports must include components 1 through 4 and be properly certified as indicated in Rule .0306. The work phase completion statement should be included with the report, but can be submitted separately. *Work Phase Completion Form No. WPC-VI* must be submitted when a cleanup action has been completed and remedial goals met. For remedies with land use restrictions only, *Work Phase Completion Form No. WPC-VII* should be submitted. Non-groundwater (i.e., soil, sediment, and surface water) remedial action must be completed within eight (8) years of the effective date of the administrative agreement as indicated in paragraph .0302(h). Groundwater remedial action must continue until remedial goals are achieved.

To demonstrate the remedial goals that protect public health have been achieved, a clearly written and well-organized remedial action completion report is critical. The final remedial action completion report must indicate that all remediation specified in the executed REC-Administrative Agreement has been completed. The certified Remedial Action Completion Report should include the specific applicable remedial goals obtained from the Branch that were applicable at the time the remedial action was completed.

In accordance with N.C.G.S. 130A-310.7(c), a written request can be sent to the Branch for a determination that a site has been remediated to unrestricted use standards. After the Branch confirms that the RSM has certified the site has been remediated to unrestricted use standards, the Branch will issue a written notification that no further remediation will be required at the site. The no further action letter from the Branch will be based on the certification by the RSM that the site has been remediated. Additional information regarding no further action can be found on the Branch's website at <http://portal.ncdenr.org/web/wm/sf/ih/s/ra/nfa>.

(q) Investigation-Derived Wastes

In the remedial investigation and remedial action reports, the REC should describe the generation, treatment, handling and ultimate disposition of wastes produced during the investigation and remedial action phases. For more details, see Appendix A, Section A.6(2)(g).

.0307 Branch Audits and Inspections

(a) Audits-General

Work on REC projects is independent from state oversight. Branch audits are performed to ensure that site cleanups under the REC Program are conducted in a manner to protect public health in accordance with the REC Program Rules, the

site-specific administrative agreement and applicable federal and state statutes and regulations. This guidance is to assist the REC in compliance with these requirements.

- (b) Method of Audits
- (c) Annual Participation Fee

To participate in the REC Program, remediating parties must pay an annual administration cost to offset the cost of the Branch's administration and auditing of the program. Currently, volunteering parties under this program initially pay \$2,500 and then an annual fee each year they participate. The annual fee is adjusted annually to reflect the actual costs of the audit program and availability of remaining funds.

- (d) Disciplinary Actions

The Branch will use the results of the audit program to track the performance of RECs and RSMs. Violations of the program Rules may result in temporary or permanent disqualification from the program. The parties may also be subject to penalties and other sanctions.

.0308 Cleanup Levels

The REC must ensure compliance with the remediation goals established in accordance with the procedures described in Appendices D and E.

Appendix A Sampling and Analytical Procedures for the Remedial Investigation

A.1. Introduction

This appendix provides general guidance on sampling and analytical procedures. The REC may need to prescribe additional sampling and analysis based on site-specific conditions. Regardless of whether a soil remedy will involve unrestricted-use or restricted-use cleanup levels, the contamination must be delineated to unrestricted use levels (along with the other soil cleanup criteria). This information is needed in order to know what areas require land use restrictions. Once the first phase of sampling is complete, Appendices D and E should be consulted to determine these levels.

A.2. Soil Sample Collection

A.2.1. Phase I Sampling

The purpose of the Phase I soil investigation is to identify all releases of hazardous substances to site soils, to characterize the chemical nature of such releases, and to collect sufficient sampling data to establish remediation goals.

Known or suspected spills and disposal areas must be investigated using historical research, such as waste management records, employee interviews and vintage maps and aerial photographs. Samples must be collected from *each* known or suspected area of concern. All areas known, suspected, or having a reasonable probability of being contaminated by hazardous substances must be investigated. “Areas known, suspected, or having a reasonable probability of being contaminated” includes any media or areas where there is evidence (such as, but not limited to, allegations or indications of spills, visual observations, field instrument readings, laboratory data, stressed vegetation, and chemical odors) of a release of hazardous substances or of materials that contain or may contain hazardous substances. The necessary sampling strategy depends on whether or not there is visible evidence of contamination.

A.2.1.1. Visible Evidence of Contamination

At least one grab soil sample should be collected centrally from the most visibly contaminated location and horizon in each area of hazardous substance release or possible release.

A.2.1.2. No Visible Evidence of Contamination

A.2.1.2.1. Surface Release:

- a. If no visible evidence exists in an area of a suspected *surface* release of contaminants, sampling should be

conducted by first establishing a grid with grid line intersections (nodes) spaced no farther than 50 feet apart. Samples should be collected at ground surface at each grid node. Compositing to reduce the total number of samples for non-VOC analyses may be conducted as follows:

- | | |
|--|---|
| ≤ 62,500 square feet:
(250 ft. x 250 ft.) | No more than four grid node samples may be composited. |
| > 62,500 square feet: | A greater number of grid node samples may be composited, but a minimum of five resulting composite samples should be submitted for laboratory analysis. |

The samples for volatile organic analyses should be collected at each node as unmixed grab samples with no compositing. If the area exceeds 15,000 square feet, a minimum of five samples for VOC analysis should be collected from locations that are evenly distributed across the area of suspected contamination. Field screening methods may be used to select these unmixed samples. For areas greater than 62,500 square feet, at least five additional samples should be collected by compositing grab samples from at least 25% of the nodes to generally reflect an even distribution across the area. These composite samples will be used for qualitative purposes only.

Note: For extremely large sites (sites several acres in size), contact the Branch to discuss site specific conditions.

- b. In addition to A.2.1.2.1.a, if the actual contaminants released are unknown, mobile contaminants or contaminants that have been detected in groundwater at the site, a soil boring should be advanced to the water table. The boring should be centrally located in the area of concern and adequately sampled at intervals from ground surface to the water table. Examples of sampling intervals include 0 to 6 inches below ground surface, every five feet from 6 inches to the water table, and at the water table. Additional sampling depths should also be chosen based on visual and field-

screening evidence. Samples collected for volatile organic analysis should be unmixed grab samples.

A.2.1.2.2. Subsurface Release:

- a. The results of the historical research should be used to conduct geophysical surveys and test trenching. Geophysical surveys should be conducted by scanning areas of concern on parallel and perpendicular traverses spaced no further than 30 feet apart. Closer spacing may be necessary when using a metal detector. Grids should be established in all areas which yield anomalous readings during the scanning phase. Grid nodes should be spaced no greater than 10 feet apart. Readings should be recorded at each grid node and mapped. If areas are excluded from the survey due to instrument interferences, the REC should provide a written justification for exclusion along with a map delineating the features causing the interferences with the remedial investigation report.
- b. Once the subsurface disposal area has been identified, it should be sampled in accordance with Sections A.2.1.1, A.2.1.2.1(b) and A.5.1(1). If the suspected subsurface disposal area cannot be located using the methods above, a soil boring should be advanced through the suspected disposal area in accordance with Section A.2.1.2.1(b).

A.2.2. Subsequent Phase Sampling

The purpose of additional soil investigation phases is to delineate the lateral and vertical extent of contamination in each area of concern, until concentrations less than or equal to unrestricted use (or naturally occurring background levels for metals) soil remediation goals and protection of groundwater criteria established pursuant to Appendix D have been determined. Delineating the extent of soil contamination needs to include sampling all ditches, culverts or other drainage features which may have received runoff from known contaminated areas. Field screening methods, such as soil gas testing and immunoassay test kits, may be used to help define the extent of contamination. If these methods are used, soil samples should also be collected at the expected vertical and lateral boundaries of each contaminated area and sent to the laboratory for confirmation.

A.3. Groundwater Sample Collection

A.3.1. Phase I Sampling

The purpose of the Phase I groundwater investigation is to identify all releases of hazardous substances to groundwater, characterize the chemical nature of the contaminant plume(s), and collect sufficient sampling data to establish remediation goals.

The need for groundwater assessment at a site with known soil contamination will be determined on a case-by-case basis. If the water table is within five feet of the land surface, the contaminants are known to extend to within a five-foot depth of the water table, or the contaminants are somewhat mobile (such as VOCs and leachable metals), the uppermost groundwater aquifer should be sampled. At least one well should be installed centrally *within each area of release* that meets one or more of the above criteria. Where contaminants are believed to be "floaters" due to density and solubility in water, well screens should be positioned across the water table. Where contaminants are believed to be "sinkers," the well screen should be positioned just above the bedrock surface or a continuous impermeable layer (sufficient data may be necessary to determine the continuity of the impermeable layer). In many cases, insufficient information on the nature of hazardous substance releases at the site will make it necessary to perform the Phase I groundwater field work after the Phase I soil work is completed.

If the remediating party decides not to install a well within an area due to grossly contaminated conditions or concern for rupturing buried vessels, a minimum of three wells should then be installed immediately surrounding the suspect area. Once groundwater flow patterns are clearly defined, a well will be necessary on the hydraulically down-gradient perimeter of the area of concern. A previously installed well may be appropriately located. Depending on the size of the area and nature of the release, additional monitoring wells may be necessary once the source is removed or remediated.

Groundwater elevation data should be collected during each sampling event and at least every six months during the remedial investigation. If subsequent water table elevation data indicate a significant change in the direction of groundwater flow, additional wells will be necessary to adequately evaluate groundwater contamination. Groundwater elevations should be measured from a datum established by a registered land surveyor.

A minimum of one sample should be collected from each monitoring well.

A.3.2. Subsequent Phase Sampling

If Phase I sampling indicates hazardous substances are present in groundwater, additional groundwater assessment will be necessary. The purpose of the next phase(s) of groundwater investigation is to delineate the lateral and vertical extent of all contaminant plumes, on- and off-property. For protection of public health, the lateral and vertical extent of the groundwater contaminant plumes need to be defined by wells free from hazardous substance concentrations that exceed Branch remediation goals.

Note: Site-specific conditions may necessitate more than two phases to complete the groundwater investigation. Examples include complex hydrogeology, such as fractured bedrock aquifers, and complex contaminant behavior, such as the migration of dense non-aqueous phase liquids.

A.4. **Surface Water and Sediment Sample Collection**

A.4.1. Phase I Sampling

The purpose of the Phase I surface water/sediment investigation is to identify all releases of hazardous substances to surface water or sediments, characterize the chemical nature of such releases, and collect sufficient sampling data to establish remediation goals. A surface water and sediment assessment will be necessary if there is a potential for contaminants to migrate to surface water via surface runoff or through a discharge of contaminated groundwater to a surface water body. Water and sediment samples should be collected at the probable point of entry. In addition, at least one water and one sediment sample should be collected immediately upstream of the site and one water and one sediment sample should be collected immediately downstream of the site. Analyze these samples only for those contaminants previously detected in other media at the site unless a non-permitted direct discharge of a hazardous substance from the site to surface water has occurred. If such a discharge has occurred, samples should be analyzed for the analytical scan shown in Section A.7.1

A.4.2. Subsequent Phase Sampling

If contamination is detected in any downstream sample, additional surface water/sediment assessment will be necessary. The purpose of the next phase(s) of surface water/sediment investigation is to define the downstream extent of contamination to concentrations less than or equal to the remediation goals established pursuant to Appendices D and E.

A.5. Other Sample Collection

A.5.1. Phase I Sampling

1. If any abandoned or buried vessels containing unknown materials or hazardous substances are discovered, contact the Branch before proceeding with assessment activities. Depending on the scope, full characterization may be part of the remedy. When an investigation does occur, the contents need to be sampled and analyzed for parameters sufficient to meet disposal or treatment facility requirements. A full-scan composite soil sample(s) in the vessel area should be collected as described in Section A.2.1. Soil samples also should be collected at the time of vessel excavation in the immediate vicinity of all joints and junctures of subsurface pipe associated with any underground vessels known or suspected to contain or have contained hazardous substances.
2. Waste materials (e.g., flyash, sludge, etc.) that are known or suspected to contain hazardous substances which may cause an exposure hazard and contaminate other media should be evaluated using the same procedures as if it were contaminated soil. Laboratory analyses are necessary to determine if the contaminants in the waste materials exceed the Branch's remedial goals. See A.2 Soil Sample Collection procedures for additional information.
3. Site-specific background soil samples should be collected to establish natural metals concentrations if metals are a contaminant of concern at the site. Samples should be located away from roadways, railways, parking areas and other potential sources of contamination. Because natural metals concentrations are highly variable, the Branch recommends collecting a minimum of five background soil samples. Background soil samples should be collected from depths and soil types that are representative of contaminated soils, but should not be collected from topsoil (0-6 inches). Statistical methods for establishing representative background concentrations may be used at the RSM's discretion. Sample concentrations that are obvious outliers should not be used to establish background concentrations.
4. If groundwater assessment is necessary, background groundwater samples should be collected to established natural background conditions if metals exceed remediation goals for the site. Samples should be collected upgradient of any on-site sources of contamination.
5. If surface water assessment is necessary, background (upstream) surface water and sediment samples should be collected to establish natural or anthropogenic background conditions. Samples should be collected upstream of any on-site sources of contamination. If contamination is

found upstream of the site in concentrations that are greater than the downstream concentrations, downstream delineation may not be needed.

A.5.2. Subsequent Phase Sampling

1. Areas determined to have hazardous substance contamination resulting from a release from a vessel should be characterized according to Section A.2.2.
2. At sites having any volatile organic compound contamination located within 100 feet of an occupied or potentially occupied building, evaluation of subsurface vapor intrusion may be required and samples collected as necessary. See Section D.4 for additional information and contact the Branch for instructions.

A.6. **Standard Field Protocols**

1. Unless noted below, the field procedures, specifically those relating to sample collection techniques, sample containers, sample preservation, equipment decontamination, and field measurement procedures, should comply with the most current version of the US Environmental Protection Agency Region IV Science And Ecosystem Support Division (SESD) *Field Branches Quality System and Technical Procedures*. This information is available from US EPA Region IV, SESD at <http://www.epa.gov/region4/sesd/fbqstp/>.
2. In addition to the standard EPA protocols, please observe the following procedures:
 - a. Field QC samples: Duplicate samples, equipment rinsate blanks and VOA trip blanks are strongly recommended. Refer to 15A NCAC 13C .0306(c) in the rules for more environmental sample collection criteria. The RSM should use their professional judgment and have appropriate support for the QA/QC utilized. In some cases, additional support data may be needed for certain work phases such as confirmation samples collected for site closure.
 - b. Other than composited samples collected under Section A.2.1.2.1.a, soil, sediment and waste samples for volatiles analysis should be collected directly into sample containers without mixing.
 - c. All soil sampling and boring locations must be staked and flagged (or surveyed) until the remedial investigation is complete.
 - d. All monitoring well locations must be surveyed by a land surveyor registered in North Carolina.

- e. Except for hexavalent chromium, filtration of groundwater samples for metals analysis before digestion is not permitted (see note below). If turbidity is a problem, groundwater samples should be collected using a low-flow purging and sampling technique. Additional well development may also be necessary. Rapid analysis of samples is also recommended to reduce contact time with the acid preservative.

Note: Samples collected for hexavalent chromium analyses must be field filtered within fifteen minutes of collection into a sample container using the preservation procedures in the USEPA Region IV modification to method 218.6.

- f. For surface waters that are very shallow (less than six inches deep) or turbulent, samples may be collected in a separate collection container and then decanted into the sample container to reduce turbidity. Samples for organic analysis should be decanted into the sample container immediately. Samples for metals analysis may be allowed to settle for a few minutes prior to decanting. All collection containers should be made of the same materials as the sample container. They should be pre-cleaned and handled in the same manner.
- g. Investigation derived waste or IDW (may include drill cuttings and mud, sampling materials, purge water, soil, and residuals from testing) generated as part of assessment activities may be discharged or stored in the area of contamination and are not subject to RCRA permitting as long as the material: 1) stays on site and remains in the contaminated area, 2) is secured, 3) does not increase the spread of contamination or concentrations in a particular medium, 4) does not cause mobilization of contaminants, and 5) does not introduce contamination to uncontaminated soil (causing an increase in contaminant concentrations). In residential and public use areas, IDW will necessitate off-property management unless it meets unrestricted-use levels and disposal permission has been granted by the property owner. IDW cannot be transferred and discharged to another area of concern.

A.7. Sample Analyses

The RSM should provide a copy of the following analytical procedures to the laboratory and discuss the procedures with them to ensure proper analyte lists are used in the analysis of samples.

A.7.1. Phase I Analyses

A.7.1.1. Analytical Parameters

In most cases, the parameters listed below need to be included in the first phases of testing each contaminated medium. Typically, the contaminants for an area of concern at an inactive hazardous site are not clearly understood or are unknown due to the uncertainty of past practices at the site (e.g., poor recordkeeping of disposal practices, uncertainty of business practices from a previous property owner or operator, etc.). If the REC believes that some of the analyses below should be excluded because of site history, the RSM should contact the Branch to discuss the site specific conditions before excluding analyses.

Each Phase I sample should be analyzed for:

1. Hazardous substance list metals (totals analysis) including antimony, arsenic, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium and zinc. In subsequent analyses, hexavalent chromium analyses are only required if: total chromium concentrations in the Phase I soil samples exceed 2 times the site-specific natural background concentrations and exceed the hexavalent chromium soil remedial goals standard and chromium is a known or suspected contaminant of concern at the site.
2. All of the volatile and semi-volatile compounds listed on the most current USEPA Contract Laboratory Program (CLP) Target Compound List using analytical methods specified in Section A.7.1.2 with a library search (using the National Institute of Standards and Technology mass spectral library) to produce a list of tentatively identified compounds (TICs). The library search should identify TICs for the largest 10 peaks in each analytical fraction that have reasonable agreement with reference spectra (i.e., relative intensities of major ions agree within $\pm 20\%$). The list of identified TICs should not include laboratory control sample compounds, surrogates, matrix spike compounds, internal standards, system monitoring compounds or target compounds. Any TICs that have reasonable agreement with reference spectra, and are detected in more than one sample in an area of concern, should be included in all subsequent analytical work unless the compound is detected in only one sample, a laboratory contaminant, naturally occurring, or otherwise a non-toxic anthropogenic source constituent. If only one sample is collected from an area of concern, include the library search of TICs in

subsequent analyses. Check with the laboratory for possible procedures to quantify the TICs so that cleanup levels can be determined. A summary of the nature of any TICs eliminated from future analysis and reporting should be provided in the remedial investigation report, including reasons for discontinuing the constituent from future analysis.

3. Pesticides, PCBs, dioxins, cyanide, formaldehyde, nitrates, nitrites, ammonia, phosphorus, and any other CERCLA hazardous substances or pollutants not mentioned here, if the RSM suspects they were discharged or used at the site based on its chemical usage history.

- a. If cyanide is a known or suspected contaminant of concern, Phase I soil samples should initially be analyzed for *Total Cyanide*. The remedial goal in the PSRG table for *Total Cyanide* is based on the most toxic of a number of cyanide compounds, so if the analytical results are less than the *Total Cyanide* PSRG, then no further analyses for cyanide in soil are warranted. If the *Total Cyanide* PSRG is exceeded, then a Phase II soil sample can be collected for both *Total Cyanide* and *Free Cyanide* analyses to see if a higher remedial goal can be used. If the *Free Cyanide* concentration is less than the *Total Cyanide* PSRG, subtract the *Free Cyanide* sample concentration from the *Total Cyanide* sample concentration and compare that result to the *Total Cyanide (With No Free Cyanide Present)* PSRG.

Groundwater samples should be analyzed for *Total Cyanide* and the results compared to the 15A NCAC 2L standard. Note, the 15A NCAC 2L standard is based on the toxicity for *Free Cyanide*; no 15A NCAC 2L standard exists for other cyanide species and the 2L Standard would otherwise become the practical quantitation limit (PQL).

- b. If PCBs are a known or suspected contaminant of concern in soils, Phase I soil samples should be analyzed using congener specific analysis and the results compared to applicable remedial goals. If concentrations detected are less than soil remedial goals, no additional PCB sampling is required. If concentrations exceed applicable remedial goals, delineation can be performed using immunoassay test kits. In areas where PCBs are detected, soil samples should also be collected and analyzed for volatile organic compounds as indicated in Section 2, above. Confirmation samples must be analyzed using congener specific analyses. Arochlor analyses should not

be performed for delineation purposes.

Groundwater samples should be analyzed for *Total PCBs* and the results compared to the 15A NCAC 2L standard.

Note: At sites having large areas of PCB contamination, alternate analytical methods may be appropriate. Please contact the Branch for additional information.

4. If coal ash is known or suspected to have been disposed or buried at the site, please contact the Branch for additional information on soil and groundwater analytical parameters.

A.7.1.2. Analytical Methods

The analytical methods used to test for the parameters discussed in A.7.1 should be the *most recent* versions of the analytical methods tabulated below. For SW-846 Methods, the latest edition of SW-846, including any subsequent updates which have been incorporated into the edition, must be used. Sampling must be planned so that required holding times for the analytical methods are met.

Soil and sediment samples

Volatile Organic Compounds ¹	SW-846 Method 8260
1,4-Dioxane ²	SW-846 Method 8260 SIM
Semi-volatile Organic Compounds ¹	SW-846 Method 8270
Metals ³ (excluding hexavalent chromium), pesticides, PCB congeners, dioxins, cyanide, formaldehyde and any other analytes not covered by above methods	USEPA method or method published in <i>Standard Methods for the Examination of Water and Wastewater</i> having the lowest detection limits, or having detection limits below unrestricted use remediation goals. For PCB congeners use USEPA Method 1668.
Hexavalent chromium (if total chromium exceeds 2X background concentrations and the remedial goal for hexavalent chromium)	SW-846 Method 3060A ⁴ alkaline digestion coupled with USEPA method or method published in <i>Standard Methods for the Examination of Water and Wastewater</i> having the lowest detection limits, or having detection limits below unrestricted use remediation goals.

Water samples (including groundwater, surface water and TCLP/SPLP leachate)

Volatile Organic Compounds ¹	SW 846 Method 8260
1,4-Dioxane ²	SW-846 Method 8260 SIM
Semi-volatile Organic Compounds ¹	SW-846 Method 8270
Metals ^{3,5} (excluding hexavalent chromium), pesticides, PCBs, dioxins, cyanide, formaldehyde and any other analytes not covered by above	USEPA method or method published in <i>Standard Methods for the Examination of Water and Wastewater</i> having the lowest detection limits, or having detection limits below the 15A NCAC 2L standards.
Hexavalent chromium (if total chromium exceeds 2X background concentrations and the remedial goal) ^{6,7}	USEPA Method 218.7 or Method 218.6 as modified by USEPA Region IV.

- ¹ *Analyses must include a library search of TICs as described in Section A.7.1.1.*
- ² *1,4-dioxane must be analyzed for if chlorinated solvents are present or if it is a suspected contaminant on its own.*
- ³ *SW-846 Method 6010 does not have detection limits below the unrestricted use standards/15A NCAC 2L for all of the hazardous substance list metals. Therefore, it should not be used for first-phase metals scans.*
- ⁴ *Method 3060A extraction for soil and sediment samples allows for a 30-day holding time prior to extraction.*
- ⁵ *Rapid analysis of samples is recommended to lessen the contact time with the acid preservative. Filtration of groundwater and surface water samples before digestion is not permitted. Highly turbid water samples for metals analysis should be collected in accordance with Appendix A, Section A.6 (2)(e) and (f).*
- ⁶ *Samples for hexavalent chromium analysis must be field filtered within 15 minutes of sample collection. Each sample must be collected in a separate pre-preserved container from those for other metals analyses. See USEPA Region IV modified Method 218.6 for specific details.*
- ⁷ *Method 218.7 or Method 218.6 as modified by USEPA Region IV should be used. Method 218.7 requires low turbidity and allows for a 14-day holding time. USEPA Region IV has developed a*

modification of Method 218.6 that allows for a 28-day holding time. Bottles must be pre-preserved as specified in the modification to the method. Laboratories should contact the USEPA in Region IV for methodology.

A.7.2. Subsequent Phase Analyses

A.7.2.1. Analytical Parameters

After the first phase of sampling is conducted as specified in Sections A.2 through A.5 above, any samples subsequently collected need only be analyzed for the following compounds.

1. TICs that meet the criteria in Section A.7.1.1(2), and that are also CERCLA hazardous substances, should be quantified in subsequent phase analyses using a USEPA method or method published in *Standard Methods for the Examination of Water and Wastewater* having the lowest method detection limit, or one that achieves the 15A NCAC 2L standards for water or Branch unrestricted use goals for soil.
2. All CERCLA hazardous substances detected (including those with qualified estimated concentrations), unless the contaminant concentration is proven through sampling to be the result of a naturally-occurring condition, or the contaminant is a common laboratory contaminant detected in concentrations below that detected in the method blank. If a compound that is not a common laboratory contaminant is detected in both the blank and a sample, another phase of sampling is necessary to demonstrate the absence or presence of the contaminant.
3. Potential degradation compounds (which are also CERCLA hazardous substances) of those CERCLA hazardous substances detected at the site.
4. If total chromium concentrations in the Phase I soil samples exceed 2 times the site-specific natural background concentrations and exceed the hexavalent chromium soil remedial goals standard and chromium is a known or suspected contaminant of concern at the site, hexavalent chromium analyses are required.
5. If laboratory sample dilutions were performed on Phase I samples, subsequent phase samples should be analyzed for the entire analytical fraction previously diluted in addition to the above items. Sample dilutions raise analytical detection limits and can mask the presence of other constituents at lower concentrations.

A.7.2.2 Analytical Methods

Phase II and subsequent samples should be analyzed using the methods specified above for Phase I samples. Other USEPA methods, or methods published in *Standard Methods for the Examination of Water and Wastewater*, may be substituted if the substitute methods achieve equal or lower method detection limits or if they achieve the unrestricted use remediation goals for soil samples and the 15A NCAC 2L standards for water samples.

A.8. Data Reporting Procedures

Laboratory reports submitted with remedial investigation reports should include the items listed below. Full CLP documentation packages are not necessary.

1. The laboratory report should state that the laboratory is either certified for applicable parameters under 15A NCAC Subchapter 2H .0800 and provide its certification number, or that it is a contract laboratory under EPA's Contract Laboratory Program.
2. A signed statement from the laboratory that the samples were received in good condition, at the required temperature and that analysis of the samples complied with all procedures outlined in the analytical method, unless otherwise specified. Any deviation from the methods, additional sample preparation, sample dilution and unrectified analytical problems, should be justified in a narrative with the laboratory report.
3. Laboratory sheets for all analytical results, including sample identification, sampling dates, date samples were received by laboratory, extraction dates, analysis dates, analytical methods used, dilution factors and sample quantitation limits.

Note: The laboratory should provide written explanation for any sample having sample quantitation limits that exceed 10 times the U.S. EPA method detection limits.

4. Laboratory sheets for all laboratory quality control samples, including results for bias and precision and control limits used. The following minimum laboratory quality control sample reporting is typical industry practice: (a) at least one matrix spike and one matrix spike duplicate per sample delivery group or 14-day period, whichever is more frequent (control limits should be specified); (b) at least one method blank per sample delivery group or 12-hour period, whichever is less; and (c) system monitoring compounds, surrogate recovery required by the method and laboratory control sample analysis (acceptance criteria should be specified). All

samples which exceed control limits/acceptance criteria must be flagged in the laboratory report.

5. The results of any library searches performed for TICs (see Section A.7.1.1(2)). The library search should identify TICs for the largest 10 peaks in each analytical fraction that have reasonable agreement with reference spectra (i.e., relative intensities of major ions agree within $\pm 20\%$) and provide percent probabilities of match. TICs should not include compounds which are laboratory control sample compounds, internal standards, surrogates, matrix spike compounds, system monitoring compounds and target compounds. Any identified TICs should be evaluated by the REC to determine the correlation to any contaminant source materials.
6. All constituents detected must be reported even if they were not definitively quantified. All estimated concentrations with data qualifiers must be reported.
7. Completed chain-of-custody with associated air bill (if applicable) attached.
8. The laboratory report should include the names of the individuals performing each analysis, the quality assurance officer reviewing the data and the laboratory manager.
9. The submitted data should include the laboratory summary sheet, laboratory results, QA/QC results, and chain of custody documentation. Copies of QA/QC such as chromatograms are not needed nor desired for the Superfund files.

Appendix B Sensitive Environment Contacts

The contacts below need to be used in order to identify environmentally sensitive areas:

CONTACT AGENCY	CONTACT INFORMATION	SENSITIVE ENVIRONMENT
<p>NC Division of Conservation, Planning, and Community Affairs - Natural Heritage Program</p>	<p>Visit the Natural Heritage Program's data services website (http://portal.ncdenr.org/web/nhp/data-services). Use the NHP Map Viewer to search for records within 2 miles of your project area or the database search tool for record summaries by county and USGS 7.5-minute topo map. You can also download GIS shapefiles of our data; see the "GIS Download" page for details.</p> <p>Email inquiries to: natural.heritage@ncdenr.gov</p>	<p>State Parks</p> <p>Areas Important to Maintenance of Unique Natural Communities</p> <p>Sensitive Areas Identified Under the National Estuary Program</p> <p>Designated State Natural Areas</p> <p>State Seashore, Lakeshore and River Recreational Areas</p> <p>Rare species(state and federal Threatened and Endangered)</p> <p>Sensitive Aquatic Habitat</p> <p>State Wild & Scenic Rivers</p>
<p>National Park Service Public Affairs Office</p>	<p>Anita Barnett (404)507-5706 Anita_Barnett@nps.gov for specifics on National Seashore, Lakeshore and River Recreational Areas as necessary.</p> <p>http://www.nps.gov/rivers</p>	<p>National Seashore, Lakeshore and River Recreational Areas</p> <p>National Parks or Monuments</p> <p>Federal Designated Wild & Scenic Rivers</p>
<p>US Forest Service</p>	<p>Heather Luczak (828) 257-4817</p>	<p>Designated and Proposed Federal Wilderness and Natural Areas</p> <p>National Preserves and Forests</p> <p>Federal Land Designated for the Protection of Natural Ecosystems</p>

NC Division of Water Resources	Ian McMillan (919) 807-6364 or Melanie Williams (919) 707-9000 <i>Ask for Clean Water Act 305b report</i>	State-Designated Areas for Protection or Maintenance of Aquatic Life
NC Division of Forest Resources	Chris Carlson (919) 857-4819	State Preserves and Forests
US Fish & Wildlife Service	Pete Benjamin (919) 856-4520 x 11	Endangered Species
NC Department of Natural and Cultural Resources	Renee Gledhill-Earley (919) 807-6579 Email Inquiries to: Environmental.Review@ncdcr.gov	National and State Historical Sites
NC Division of Coastal Management	Ted Tyndall (252) 808-2808, x. 207 http://portal.ncdenr.org/web/cm/	Areas Identified Under Coastal Protection Legislation Coastal Barriers or Units of a Coastal Barrier Resources System
NC Wildlife Resources Commission	David Cox (919) 707-0366 David.Cox@ncwildlife.org	National or State Wildlife Refuges State Lands Designated for Wildlife or Game Management Wetlands Migratory Pathways and Feeding Areas Critical for Maintenance of Anadromous Fish Species within River Reaches or Areas in Lakes or Coastal Tidal Waters in which such Fish Spend Extended Periods of Time Spawning Areas Critical for the Maintenance of Fish/Shellfish Species within River, Lake or Coastal Tidal Waters.
US Army Corps of Engineers	Dorothy Harrington (919) 554-4884, x. 28	Wetlands

Appendix C

Procedures for Confirmation Sampling and Analysis

C.1. Introduction

This appendix provides general guidance on the "post-remediation" sampling and analyses necessary to demonstrate compliance with Branch remediation goals. At most sites, the REC will need to prescribe additional sampling and analysis based on site-specific conditions.

C.2. Soil Sampling

C.2.1. Post In-Situ Remediation

For in-situ soil remedies, confirmation sampling needs to be designed to verify that the entire soil column has been remediated to below Branch remediation goals. To demonstrate that remedial goals have been attained, the design should be a three-dimensional sampling grid that meets the four procedures below.

1. Design a surface sampling grid over the area(s) of concern. Grid nodes should be no more than 50 feet apart.
2. At each grid node, specify "candidate" sampling locations at the surface, at 0 - 6 inches below ground surface, and at a minimum of 5-foot intervals down to the vertical limit of contamination. The result is a three-dimensional grid of "candidate" sampling locations that encompasses the area of concern.
3. Select at least two candidate locations at each grid node for sample collection, using a combination of random and biased selection. Biased samples should be collected from known "hot spots" and from soil zones that are known to be resistant to in-situ methods (e.g., clay lenses).
4. Same-depth samples from up to four adjacent grid nodes may be composited. Samples at different depths may not be composited. For samples submitted for volatiles analysis, at least five samples or 25% of the node samples, whichever is greater, should be unmixed grab samples. Field screening methods may be used to select these unmixed samples, or the unmixed samples should be collected from locations that are evenly distributed across the area of suspected contamination. The remaining samples should be collected as either unmixed grab samples or composited samples. Composited samples will be used for qualitative data only. For very large areas (multiple acres), an alternate approach may be proposed.

C.2.2. Post Ex-Situ Remediation

C.2.2.1 Post-Excavation Sampling

Post-excavation sampling needs to be designed to verify that all soils/wastes above Branch remediation goals have been removed. Excavations should be sampled using the four procedures below.

1. Design a sampling grid over the base and sidewalls of the excavation. Grid nodes should be no more than 50 feet apart. At each grid node, collect a sample from 0-3 inches into the base or sidewall.
2. For very small excavations, collect at least one composite sample from the base and one composite sample from each sidewall. Composite samples should consist of at least four aliquots each.
3. Biased samples should also be collected from areas of residual contamination, based on visible or field-screening evidence.
4. For excavations <62,500 square feet, samples from up to four adjacent grid nodes may be composited. For excavations >62,500 square feet, a greater number of grid nodes may be composited but a minimum of five resulting composite samples should be submitted for laboratory analysis. For all excavations, samples from different sidewalls may not be composited. For samples submitted for volatiles analysis, at least five samples or 25% of the node samples, whichever is greater, should be unmixed grab samples. Field screening methods may be used to select these unmixed samples, or the unmixed samples should be collected from locations that are evenly distributed across the area of suspected contamination. The remaining samples should be collected as either unmixed grab samples or composited samples. Composited samples will be used for qualitative data only. For very large areas (multiple acres), an alternate approach may be proposed.

C.2.2.2 Treated Soil Stockpiles

Treated soils/wastes must meet Branch remediation goals before they can be replaced on site. Treated soil stockpiles should be sampled using the following four procedures.

1. Stockpiles should be gridded into equal segments of approximately 100 cubic yards each.

2. Within each segment, use either random or biased selection to locate at least three hand-auger borings. Samples should be collected from two depths within each boring (minimum six samples per segment).
3. Use visible or field-screening evidence to collect additional biased samples from areas of residual contamination.
4. Samples may be composited only within each segment. For samples submitted for volatiles analysis, at least 25% should be collected as unmixed grab samples.

C.3. Groundwater Sampling

Groundwater confirmation sampling must demonstrate that site groundwater has been remediated to below Branch remediation goals. Demonstrate this using the procedures below.

C.3.1 Active Groundwater Remediation

1. Groundwater remediation systems may be shut down when two consecutive semiannual (twice a year) sampling events demonstrate that *all* monitoring wells (on-property and off-property) are free of contamination above remediation goals. To account for the effects of seasonal fluctuations in the water table, semiannual sampling events should be conducted in winter and summer.
2. Following system shutdown, data from two additional sampling events (spaced at least three months apart) should demonstrate that *all* monitoring wells are free of contamination above remediation goals and contaminant concentrations are not increasing.

Note: For remedial alternatives using injection, the first confirmation sampling event needs to occur after reagent is spent.

C.3.2 Passive Groundwater Remediation

1. For sites using passive groundwater remedial alternatives (e.g. monitored natural attenuation, phytoremediation, etc.), data from four consecutive sampling events (spaced at least three months apart) should demonstrate that *all* monitoring wells are free of contaminant concentrations above remediation goals and contaminant concentrations are not increasing.

C.4. Surface Water/Sediment Sampling

Confirmation sampling must demonstrate that site surface water and sediment have been remediated to below Branch remediation goals. Four consecutive quarterly sampling events should demonstrate that concentrations in downstream samples are less than or equal to concentrations in upstream samples or Branch remediation goals.

C.5. Confirmation Sample Analyses

Confirmation sampling should demonstrate that all contaminants identified during the remedial investigation meet applicable remedial goals. Therefore, all confirmation samples need to be analyzed for *all* contaminants identified during the remedial investigation. Confirmation samples need to be analyzed using USEPA methods or *Standard Methods for the Examination of Water and Wastewater* (latest edition), with detection limits less than or equal to Branch remediation goals, or lowest available detection limits for each contaminant of concern.

Appendix D Procedures for Establishing Remediation Goals

D.1. Introduction

RECs should use the procedures outlined below to establish site-specific remediation goals. The Branch's policy for establishing remediation goals is consistent with the intent of CERCLA/SARA and the National Contingency Plan, as required by N.C.G.S. 130A-310.3. The remediation goal tables referenced in this section may be periodically updated based on new or revised toxicological data. Remediation goals for soil and vapor intrusion screening levels are typically updated twice per year (during the first and third quarters). Therefore, the REC/RSM should periodically check the remediation goal tables to ensure that the most current information is used.

Note 1: The remediation goals for all media at each area of concern need to be determined prior to completion of the remedial investigation so that a remedial action plan can be prepared properly.

Note 2: Remediation goals can change when new toxicological data become available. If groundwater remediation goals change during implementation of the remedy, these become the new goals for the site. If soil remediation goals change prior to the finalization of the remedial design, these become the new goals for the site. Once the soil remedial action design is complete, remediation goals are not subject to further change unless there is a delay in implementation of the remedy. Therefore, remediation goals should be well-documented in the RAP.

D.2. Remediation Goals for Unrestricted Land Use

This section describes the procedures used to establish remediation goals for unrestricted land use for each environmental medium. Remediation goals for restricted land use are discussed in Section D.3.

D.2.1 Remediation Goals for Soils

The Branch has two soil remediation goals. One is a "health-based" remediation goal for total concentrations of contaminants (Sections D.2.1.1, D.2.1.1.2, and E.2). The other is a "protection of groundwater" remediation goal for leachable concentrations of contaminants (Section D.2.1.2). ***The REC is responsible for demonstrating compliance with both soil remediation goals. If sensitive environments are present at a site, if there is a potential for vapors from subsurface contamination to enter structures, if the site is currently or likely to become agricultural (plant uptake, livestock), or if there is potential for contaminated soil to enter surface water bodies, the REC must adjust health-based remediation goals, if possible, and/or the proposed remedial alternative accordingly.***

D.2.1.1 Health-Based Soil Remediation Goals

D.2.1.1.1 Preliminary Health-Based Soil Remediation Goals for unrestricted use

These goals must be used to delineate the extent of contamination during the remedial investigation and can be used as final health-based remediation goals.

The Branch's preliminary health-based soil remediation goals are shown in the Branch Preliminary Soil Remediation Goals Table (PSRG Table) located under Guidance at <http://portal.ncdenr.org/web/wm/sf/ih/ihsguide>. These remediation goals have been adopted from the USEPA's Regional Screening Tables. Carcinogenic PAHs not listed in the PSRG Table can be screened using the remediation goal for benzo(a)pyrene. Similarly, non-carcinogenic PAHs not listed in the PSRG Table can be screened using the remediation goal for pyrene. For other preliminary health-based remediation goals not found on the PSRG Table, contact the Branch for instructions.

Note 1: In some cases, site-specific natural background metals concentrations may exceed the acceptable risk range. Cleanup to below site-specific natural background metals concentrations is not required.

Note 2: At sites with surface water contamination, RECs may need to plan the remedial action to address source areas first. For example, surface water contamination may result from continuing releases from soils. In this case, soil must be remediated to levels that will ensure attainment of the surface water remediation goals.

Note 3: The soil remediation goal for PCBs was established in accordance with USEPA policy for cleanup of PCBs at Superfund sites. The unrestricted use remediation goal for PCBs is 1 ppm. This number may not be adjusted. However, higher levels can remain in subsurface soils if (1) restrictive covenants are applied which prevent exposure and (2) the remaining concentrations of PCBs in soil are shown not to pose a threat to groundwater (i.e. soils meet protection of groundwater remediation

criteria). Application of restrictive covenants requires Branch concurrence (see Section D.3.).

Note 4: If soil contamination is causing or will cause a structural vapor intrusion risk, cleanup levels may need to be adjusted accordingly.

Note 5: In certain situations, health-based soil remediation goals may be attained through averaging contaminant concentrations. See Appendix E for additional information.

D.2.1.1.2 Final Health-Based Soil Remediation Goals

The preliminary soil remediation goals established pursuant to Section D.2.1.1.1 can be used as final, health-based remediation goals. Under certain site conditions, the preliminary remediation goals may be adjusted. Refer to Appendix E, Section E.2 for allowable adjustments of these numbers.

Note: See notes that follow Section D.2.1.1.1.

D.2.1.2 Protection of Groundwater Soil Remediation Goals

Procedure

In addition to meeting health-based remediation goals for unrestricted use, soils must meet a protection of groundwater remediation goal. Soils which leach organic contaminants in excess of the groundwater remediation goals will require further remediation. Soils which leach metals in excess of the groundwater remediation goals (or natural leachable background concentrations, whichever are less stringent) will also require further remediation. The protection of groundwater soil remedial goals must be determined using one of the following methods unless one of the exceptions at the end of this section applies:

1. Use the Protection of Groundwater values provided on the Inactive Hazardous Sites Branch Preliminary PSRG Table. If a compound is not listed on the PSRG Table, a value can be calculated using the equation at the end of the table.
2. Soil contaminant concentrations (in mg/kg) for both metals and organics (totals analysis) do not exceed values of twenty times the corresponding groundwater remediation goals (in mg/l). See Section D.2.4 for groundwater remediation goals.

3. Determine the site soil's leachability by conducting the Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characterization Leaching Procedure (TCLP) on several site soil samples in the area of concern. If contaminant concentrations in the soil leachate exceed the respective groundwater remediation goals, those soils require remediation.

Note: If another laboratory model is used to determine leachability, the REC must demonstrate its scientific validity and that its precision and accuracy are commensurate with its stated use.

4. A soil protection of groundwater remediation goal can be determined using total and TCLP / SPLP sample results from the site. Several soil samples need to be collected from various locations within the area of concern representing the higher and lower concentrations. Each of the soil samples should be analyzed for 1) the total soil concentrations (in mg/kg) and 2) the leachate concentrations (in µg/L) using the SPLP or TCLP analysis. The data will need to be plotted against each other to determine the linear correlation. An acceptable total soil concentration for the protection of groundwater would correspond to a leachate concentration at the 15A NCAC 2L standard. The target soil cleanup concentration (in mg/kg) then becomes the value that corresponds to a leachate concentration at the groundwater remediation goal for that contaminant.
5. Use site-specific data for porosity, bulk density, and organic carbon content to refine a value in the PSRG Table using the equation at the end of the table. Only the parameters noted should be modified and only site-specific data should be used. All calculations and data must be provided.

Note: The Branch does not consider physical barriers (e.g., concrete slabs, parking lots, roofs, buildings, man-made liners, etc.) as a method/procedure that demonstrates protection of groundwater remedial goals have been met since drainage due to gravity, leaking underground utilities, etc. can cause contaminants to continue leaching to groundwater.

Exceptions

At sites that meet either of the following two conditions, the protection of groundwater soil remediation goals do not apply. However, the site must meet the health-based remediation goals.

1. Total metals concentrations (not leachable) in soil (mg/kg) do not exceed the natural background concentrations in the site area.
2. If the site will be remediated to unrestricted use health-based remediation goals, the REC may demonstrate meeting the protection of groundwater remediation goals if **either (a) or (b) applies**.
 - (a) The REC has determined that all on-site disposal and releases of hazardous substances occurred over 15 years ago and groundwater monitoring immediately at the source area demonstrates that the constituents of concern and any daughter products in groundwater are below the groundwater remediation goals (see Section D.2.4 for groundwater remediation goals).
 - (b) The REC-certified remedial action plan for the site includes active groundwater remediation (including remediation of any non-aqueous phase source material in the saturated zone) which will capture contamination such that soil contamination will be reduced to meet protection of groundwater criteria within 5 years of initiation of groundwater remediation, and will not cause an increase in groundwater contaminant concentrations during that period. If active groundwater remediation is discontinued, it will be necessary to demonstrate the contaminants will no longer leach from the soil to the groundwater. The demonstration must be made before the remedial action is certified as complete. Note that use of this provision does not provide a waiver for meeting the deadline for completing non-groundwater remediation. The REC must demonstrate that the protection of groundwater remediation goals have been met before the deadline. Note that monitored natural attenuation is not considered active remediation.

D.2.2 Remediation Goals for Sediments

D.2.2.1 Preliminary Remediation Goals for Sediments

The purpose of this section is to establish preliminary remediation goals for sediments to be used as "target" cleanup levels. These goals should be used to delineate the extent of sediment contamination during the remedial investigation for perennial streams. For intermittent streams, the procedures that are used to establish remedial

goals for soil should be used as described in Section D.2.1. Final remediation goals for sediments are described in Section D.2.2.2.

Remediation goals for sediment must meet all of the following:

1. The health-based soil remediation goals listed in the PSRG Table (*or the upstream "background" concentrations if lower*);
2. Levels that ensure contaminated sediment will not cause exceedance of the remediation goals for groundwater and surface water; and;
3. Levels that ensure protection of aquatic receptors. The REC must compare maximum sediment contaminant concentrations to USEPA Region 4 ecological risk screening levels for sediment located at <http://www2.epa.gov/risk/region-4-ecological-risk-assessment-supplemental-guidance>.

To demonstrate compliance with the Branch's preliminary sediment remediation goals for the protection of aquatic receptors, the laboratory must achieve sample quantitation limits less than or equal to the USEPA Ecological Screening Level. If this is not possible, it needs to be stated in the case narrative that the quantitation limits are the lowest that can be achieved using EPA-approved methods.

If site ecological screening levels for sediments are exceeded, the REC needs to contact the Branch with a request for the Branch to determine the need for further ecological evaluation. The request should provide the following information:

1. A topographic map with roads, surface water features, etc. clearly identified.
2. A map drawn to scale with locations of all sampling points.
3. A summary table containing maximum contaminant concentrations, upstream contaminant concentrations, USEPA aquatic screening levels and sample quantitation limits. All contaminant concentrations that exceed screening levels should be clearly identified and highlighted. Also, concentrations that have no screening level should be clearly identified and highlighted.
4. A statement that indicates whether the contaminated surface water body is perennial or intermittent.
5. A discussion of potential mobility of contaminated sediment and potential for contaminants to leach into surface water.

6. The names and classifications of all downstream surface water bodies *if* they are potential recipients of contaminated surface water or sediment.
7. The identity of adjacent or downstream wetlands that could be affected.
8. An estimate of the width and depth of the contaminated surface water body.

If the information will eventually be included in a certified document (remedial investigation report or remedial action plan), then the request does not need to be certified. Otherwise, all technical information must be submitted to the REC Program in a certified document.

D.2.2.2 Final Remediation Goals for Sediments

The preliminary sediment remediation goals established pursuant to Section D.2.2.1 can be used as final remediation goals. If concentrations in the contaminated sediments exceed the USEPA Region 4 aquatic screening levels, an ecological risk assessment may be required to determine final sediment remediation goals. The RSM should contact the Branch about potential adjustments to the sediment remediation goals. The Branch will assist in determining final remediation goals. If remediation of sediments is determined to cause unreasonable harm to a wetland (or other protected environment), remediation goals or remedies may need to be altered. Note that in any case, cleanup to less than upstream background concentrations is not required.

Note: At sites with surface water contamination, RECs may need to plan the remedial action to address source areas first. For example, surface water contamination may result from continuing releases from sediments. In this case, sediments must be remediated to whatever levels will ensure attainment of the surface water remediation goals.

D.2.3 Remediation Goals for Surface Water

To determine surface water remediation goals, RECs need to first submit the items listed in Section D.2.2.1 to the Branch. The Branch will provide a surface water remediation goal following review of this information.

D.2.4 Remediation Goals for Groundwater

For contaminants with 15A NCAC 2L standards, groundwater remediation goals are the permanent and interim groundwater standards established under 15A

NCAC 2L unless groundwater is or may be used for potable purposes in any area where the groundwater contaminant plume is currently located or may be located in the future. In those situations, the remediation goal would be the lower of the 15 NCAC 2L standards or federal maximum contaminant level (MCL). For contaminants without 15A NCAC 2L standards, the remediating party should contact the Branch.

Note 1: Remediation below the practical quantitation limits (using the analytical methods specified in Section A.7.1.2) or site specific natural background levels (for metals only) are not required.

Note 2: The permanent and interim groundwater standards are listed in the North Carolina Administrative Code (NCAC) at 15A NCAC 2L .0202 Groundwater Quality Standards. The NCAC can be found at <http://portal.ncdenr.org/web/wm/sf/ihs/ihsguide>.

D.3. Remediation Goals for Restricted Land Use

D.3.1 Soil

Under certain site conditions, it may not be appropriate or feasible to meet the unrestricted remediation goals described in Section D.2. The REC may propose (for Branch review and concurrence) a remedy with alternate remediation goals based on a restricted land-use exposure scenario. The procedures for proposing a containment remedy are described in detail in Appendix F of these guidelines.

To qualify for alternate health-based remediation goals for soils, protection of groundwater remediation goals along with any remediation goals related to abating ecological risks at the site, must be met. Sites that qualify for a groundwater risk-based cleanup have alternate protection of groundwater soil targets (see Section D.3.2 below). The methods used to determine protection of groundwater remedial goals are provided in Section D.2.1.2.

D.3.2 Groundwater

N.C.G.S. 130A-310.65-.77 allows for alternate groundwater remediation goals at qualifying industrial sites if the contamination has not and will not leave the property. See Appendix F, Section F.3 for additional qualification requirements and information on risk-based cleanup for groundwater.

D.4. Structural Vapor Intrusion Potential

At sites having any volatile organic compound contamination located within 100 feet of an occupied or potentially occupied building, evaluation of subsurface vapor intrusion is

required. For additional information, see the Branch's vapor intrusion guidance document at <http://portal.ncdenr.org/web/wm/sf/ihs/ihsguide> and contact the Branch for instructions.

D.5. Additional Provisions

The Branch considers “monitored natural attenuation” to be a potential remedial alternative for attaining the remediation goals established pursuant to Appendices D and E. Monitored natural attenuation is *not* a waiver of the remediation goals. If natural attenuation of any contaminated medium is proposed, the REC must demonstrate that it is supported by the results of the feasibility study and that it is the preferred remedy.

If an REC determines that cleanup to established final remediation goals are not technically practicable from an engineering perspective, the REC may submit such demonstration to the REC Program for consideration. Contact the Branch for further instructions.

Appendix E

Soil Health-Based Remediation Goals: Adjustments & Averaging

E.1. Introduction

The preliminary health-based soil remediation goals can be used as final health-based soil remediation goals. However, the preliminary goals can also be adjusted for the number of contaminants present at the site. In this case, a contaminant is defined as any compound detected at a concentration within one order of magnitude of the health-based preliminary remedial goal. In addition, there are certain situations when the goals can be met by averaging contaminant concentrations at a particular site. This appendix provides general guidance for calculating adjusted final health-based soil Remediation Goals and procedures for demonstrating attainment of health-based soil remedial goals through averaging. Note that these calculations can be done for both the restricted and unrestricted scenario, but remediating soil to restricted- use (industrial) remedial goals will require land-use restrictions.

Note: Protection of groundwater remedial goals cannot be adjusted or averaged by the methods described below. See Section D.2.1.2 for methods to establish protection of groundwater remedial goals.

E.2. Adjustment Procedures for Final Health-Based Soil Remediation Goals

The Branch's preliminary health-based soil remediation goals are shown in the Branch Preliminary Soil Remediation Goals Table (PSRG Table). The remediation goals have been adapted from the USEPA Regional Screening Tables. The levels may be adjusted based on the individual contaminant's health effects and the number of contaminants present at the site. Before you proceed with the adjustments you should gather information regarding the contaminants at the site as follows:

1. List the site contaminants present in soils. For adjustments, all contaminants that either exceed or are within one order of magnitude of a health-based remedial goal (i.e., $1/10^{\text{th}}$ of the standard) must be considered.
2. Access the USEPA Regional Screening Tables to determine if a contaminant has carcinogenic health effects, non-carcinogenic health effects, or both. To do so, go to <http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>. Under Generic Tables, choose the table for Residential Soil and Target Cancer Risk (TR) of $1\text{E-}06$ and Target Hazard Quotients (THQ) of 1.0. Find the chemical to be adjusted from the table. If there are data on the right under "Carcinogenic SL", then it is a carcinogen. If there are also data under "Noncarcinogenic SL", the contaminant also has non-carcinogenic health effects. See the example from the EPA Composite Worker (Industrial) Soil Table below:

er; E = Environmental Criteria and Assessment Office; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; F = See FAQ; R = RBA applied (See User Guide for Arsenic notice); c = cancer; * = noncancer; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); SSL values are based on DAF=1

Contaminant	CAS No.	Carcinogenic Target Risk (TR) = 1E-6				Noncancer Hazard Index (HI)			
		Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)	Ingestion SL HQ=1 (mg/kg)	Dermal SL HQ=1 (mg/kg)	Inhalation SL HQ=1 (mg/kg)	Noncarcinogenic SL HI=1 (mg/kg)
ALAR	1596-84-5	1.6E+02	2.4E+02	3.3E+06	9.6E+01	1.5E+05	2.3E+05		9.2E+04
Acetate	30560-19-1	3.3E+02	5.0E+02		2.0E+02	4.1E+03	6.2E+03		2.5E+03
Acetaldehyde	75-07-0			5.2E+01	5.2E+01			3.7E+02	3.7E+02
Acetochlor	34256-82-1					2.0E+04	3.1E+04		1.2E+04
Acetone	67-64-1					9.2E+05		2.0E+06	6.3E+05
Acetone Cyanohydrin	75-86-5							2.2E+02	2.2E+02
Acetonitrile	75-05-8							3.7E+03	3.7E+03
Acetophenone	98-86-2					1.0E+05			1.0E+05
Acetylamino fluorene, 2-	53-96-3	7.5E-01	1.1E+00	1.3E+04	4.5E-01				
Acrolein	107-02-8					5.1E+02		6.5E-01	6.5E-01
Acrylamide	79-06-1	5.7E+00	8.7E+00	1.7E+05	3.4E+00	2.0E+03	3.1E+03	3.6E+07	1.2E+03
Acrylic Acid	79-10-7					5.1E+05	7.7E+05	6.0E+06	2.9E+05

If there is a numerical value under each of the circled column headings (“Carcinogenic SL” and “Noncarcinogenic SL”) for the contaminant, then the contaminant has both effects. For example, ALAR has both carcinogenic and non-carcinogenic effects, but acrolein has only non-carcinogenic effects.

3. Add up the number of contaminants with carcinogenic effects and ones with non-carcinogenic effects. If a contaminant has both effects, include it in both counts. Note that each compound in the PSRG Table is identified as a C or an N according to the most conservative screening level, even if the contaminant has both effects. Therefore, do not use the PSRG Table to determine the number of the contaminants with each health effect.
4. Calculate the adjusted remedial goal for each contaminant’s health effect(s) using one of the three equations below.

E.2.1 Contaminants With Only Carcinogenic Effects

The health-based remediation goals for carcinogens in the PSRG Table are based on a lifetime excess cancer risk of 1×10^{-6} . The REC may calculate final soil remediation goals within the acceptable cancer risk range (i.e., a cumulative excess cancer risk for all contaminants of 10^{-4} to 10^{-6}). The remedy selection and final cleanup goal determination must consider all exposure routes (e.g., soil contact, drinking water, vapor intrusion) when ensuring the 10^{-4} levels are not exceeded. Any adjustment of the health-based remediation goals for a cancer risk of 10^{-4} must be conducted in accordance with the procedures outlined below.

Sites Without PCB Contamination

Multiply the preliminary health-based remediation goal in the Branch PSRG Table by $100/n$, where n is the number of carcinogens detected, or

$$\text{Adjusted PSRG} = \frac{\text{PSRG} \times 100}{\text{No. of "C" contaminants}}$$

If the adjusted PSRG exceeds the soil saturation concentration (C_{sat}) provided in the PSRG Table, then the C_{sat} value becomes the adjusted remedial goal.

Sites with PCB Contamination

At sites where PCBs are the only carcinogen in soils, the PCB remediation goal in the PSRG Table should be used with no adjustment. For sites where PCBs are not the only carcinogen in soils, please consult a toxicologist or contact the Branch prior to making any adjustments of the remediation goal specified in the PSRG Table to ensure 10⁻⁴ risk is not exceeded collectively for all contaminants present.

E.2.2 Contaminants With Only Non-Carcinogenic Effects

The health-based remediation goals for non-carcinogens shown in the PSRG Table are based on a hazard quotient of 0.2. The hazard quotient of 0.2 is used to account for multiple (average of five) non-carcinogens in the same critical effect group. For sites with less than five non-carcinogens, RECs may adjust the remediation goals using the following calculation:

Multiply the preliminary health-based remediation goal in the Branch PSRG Table by 5/n; where n= the number of non-carcinogens detected, or

$$\text{Adjusted PSRG} = \frac{\text{PSRG} \times 5}{\text{No. of "N" contaminants}}$$

If the adjusted PSRG exceeds the soil saturation concentration (C_{sat}) provided in the PSRG Table, then the C_{sat} value becomes the adjusted remedial goal.

If there are different critical effect groups/target organs, RECs may also adjust the remediation goals based on the number of non-carcinogens per critical effect group/target organ. Please consult a toxicologist or contact the Branch for this procedure.

Note: Lead toxicity is calculated using a different model from other contaminants. Therefore, it cannot be adjusted using these procedures, and the value in the PSRG Table must be used, or contact Branch staff for further instructions. However, averaging lead contaminant concentrations can be performed using the procedures described in Section E.3 or a possible containment remedy can be evaluated for a restricted-use scenario as described in Appendix F.

E.2.3 Contaminants With Both Carcinogenic and Non-Carcinogenic Effects

If a contaminant that has both carcinogenic and non-carcinogenic effects, adjusted health-based remediation goals must be determined for each health effect and compared. **The final adjusted remediation goal will become the lower (more stringent) of the two concentrations.** Note that only the EPA Generic Screening Level Tables are needed for these calculations.

1. **To determine the carcinogenic value**, the REC must use the value listed under the “Carcinogenic SL” column under the heading “Carcinogenic Target Risk” of the appropriate Soil Table. (Use the residential soil table unless land use restrictions compatible with industrial use will be part of the remedy). Multiply the health-based (carcinogen) value (under the “Carcinogenic SL” column) by $100/n$, where n is the number of carcinogens present, or

$$\text{Adjusted PSRG} = \frac{\text{EPA Carcinogenic SL} \times 100}{\text{No. of "C" contaminants}}$$

2. **To determine the non-carcinogenic value**, use the value listed under the “Non-carcinogenic SL” column under the heading “Non-cancer Hazard Index” of the appropriate Soil Table. (Use the residential soil table unless land use restrictions compatible with industrial use will be part of the remedy). The REC must divide the non-carcinogen value (under the “Non-carcinogenic SL” column) by n , where n is the number of non-carcinogens present, or

$$\text{Adjusted PSRG} = \frac{\text{EPA Non-carcinogenic SL}}{\text{No. of "N" contaminants}}$$

3. The lower result of the two calculations then becomes the adjusted PSRG for that contaminant.
4. If the adjusted PSRG exceeds the soil saturation concentration (C_{sat}) provided in the PSRG Table, then the C_{sat} value becomes the adjusted remedial goal.

E.3. Procedures for Demonstrating Attainment of Health-Based Soil Remedial Goals Through Averaging Contaminant Concentrations

Cleanup levels for soils under the Inactive Hazardous Sites Program have multiple components. These are the health-based remedial goal for direct contact, the protection of groundwater remedial goal and, if applicable, the ecological risk component, concerns for transfer to surface water bodies, structural vapor intrusion potential, and agricultural use of property (plant uptake and livestock exposure). All must be met at the site.

Averaging of contaminant concentrations in soil may be used in demonstrating attainment of final health-based SRGs for both unrestricted and restricted land use. Note that protection of groundwater soil standards are not averaged across areas. Averaging should only be conducted in areas of consistent use and generally uniform release of contaminants (e.g., former waste lagoons and spray-fields, orchards, etc.). All of the following conditions apply to the use of such averaging:

1. Only sample points within ¼-acre sectors may be averaged for comparison to unrestricted-use levels. For restricted industrial use (land use restrictions approved as part of the remedial action plan), averaging over larger areas can be performed if the access and use across the area is consistent. Remote areas and areas of less frequent access may not be included in the industrial restricted-use averaging.
2. **No single contaminant concentration of any sample point may exceed ten times the Branch Preliminary Remedial Goal or the site-specific adjusted cleanup level for each of the contaminants, except in the case of lead.** For lead, no single sample point used in an average may exceed 1000 ppm for unrestricted-use and no more than three times the site-specific cleanup level for restricted-use.
3. The 1/4-acre zone may be a circle or a square or triangle of generally equal sides. One dimension of the zone's perimeter may not be disproportionately longer than another.
4. Samples must generally be evenly spaced over the zone of averaging.
5. Only samples of the same vertical horizon may be averaged (0-6 inches for surface samples and no more than 5-foot vertical spread for subsurface samples).
6. Only actual sample data may be used for all points included in the average and not published averages for background concentrations.
7. The laboratory practical quantitation limit (PQL) must be used for points where concentrations are at or below lab reporting limits. Sample data should not be diluted or elevated unnecessarily above normal reporting limits.
8. Composite sample results may be included in an average, but must be weighted proportionally to the area they represent. For example, if one composite sample in an area represents ½ of the area and 5 others represent 1/10 of the area each, then the concentration of the first composite should be multiplied by 5, added to the sum of the other concentrations and then divided by 10 to compute the average concentration.
9. For characterizing soil concentrations over a ¼-acre area, a sampling grid with 50-foot grid node spacing should be established. The average concentration for each compound within a ¼-acre area is presumed to represent the entire ¼-acre sector. If the concentration for the sector still exceeds unrestricted-use remedial goals, the

area would require cleanup or land use restrictions. For very large areas (e.g., a 500-acre orchard), an alternative is to collect samples in multiple ¼-acre zones within the overall contaminated area that represent the range of environmental conditions present (i.e., various geologic and geographic conditions such as slope vs. valley, wetter vs. drier, etc.). Grids with a 50-foot node spacing should be established across these representative areas. The highest ¼-acre average from all the areas tested would be presumed to reflect the overall area. This approach requires the area to be consistent in use and accessibility and requires land use restrictions as part of the remedy.

10. For unique circumstances, contact the Branch for further guidance.

Appendix F

Alternate Cleanup Levels and Land Use Restrictions

F.1. Background and Overview

Alternate health-based remediation goals are allowed for various media. All remedies where contaminants will remain above unrestricted-use levels are considered “containment” remedies and require Branch concurrence [see 15A NCAC 13C .0306(i)(2)]. Contaminated materials are being “contained” through institutional controls, typically utilizing land use restrictions (LURs), and sometimes engineering controls such as barriers.

Note: Land use restrictions and alternate soil cleanup standards are not appropriate for sites with limited volumes of soils exceeding the unrestricted use standards unless obstructed by buildings.

Restricted-use containment remedies are allowed in the following situations (refer to the relevant subsequent section for conditions and more details and procedures):

- (1) Soils and non-leachable solid materials alone (see Section F.2)
- (2) Groundwater - can include other media (see Section F.3)
- (3) All media – when remediation is technically impracticable (see Section F.4)

***Note:* The REC Program is an approved cleanup program under 130A-310.9(c), and the Branch’s annual oversight fees for the REC Program include costs associated with administrative duties, training, technical audits conducted by Branch staff, etc. The REC Program fees cover concurrence with the containment remedy portion of a remedial action (all risk-based remedies are considered containment remedies since contamination will remain on properties through institutional controls). The REC Program fees are separate from the supplemental fees required for risk-based remediation under N.C.G.S. 130A-310.65-310.77. The fees for groundwater risk-based remedies are intended to specifically cover the cost of NCDEQ’s activities associated with any human health or ecological risk assessments, groundwater modeling, financial assurance matters, community outreach, and tracking of land-use restrictions. For sites in the REC Program, these supplemental fees for risk-based remedies do not cover staff oversight of the remedial investigation and remedial action implementation. In the future, as the procedures for risk-based remedies develop, the supplemental fees may be reduced accordingly for work performed by RECs [see N.C.G.S. 130A-310.76(a1)(4)].**

F.2. Alternate Soil Remediation Goals and Procedures

Once a remedial investigation is complete and all potential exposure routes are known, development of a proposed remedy should begin. If the feasibility analysis for the remedy [see 15A NCAC 13C .0306(1)] determines that a containment remedy is the best remedial alternative, it must be proposed to the Branch for concurrence. After concurrence is granted by the Branch, the REC will incorporate the proposed containment remedy into a remedial action plan (RAP).

To qualify for alternate health-based remediation goals for soils, protection of groundwater remediation goals along with any remediation goals related to abating ecological risks at the site, must be met. In general, alternate soil remediation goals are not allowed at property that will remain in use for single-family homes and property routinely accessed by children such as a day care center or playground. Cleanup to unrestricted-use/residential-use will also be necessary at many multi-unit facilities unless an existing building obstructs contaminated material or is a multi-story mixed use building with no residential access to contaminated areas. LURs and proper engineering controls will then be applied.

If a property is restricted to a particular use such as industrial/commercial, cleanup levels must not only be calculated for industrial/commercial uses, but may also be necessary for construction workers (for future site development or redevelopment) and any other applicable risk groups (such as trespassers at vacant property). Note that “industrial use only” will be an insufficient restrictive covenant because many industrial zoning codes allow for parks, recreational areas and day care facilities on industrial property. The particular site uses will need to be evaluated from a risk perspective and the restrictive covenants will need to be specific.

Remedies not meeting unrestricted-use levels throughout the soil column must include a restrictive covenant that bars taking soils off the property. For example, a site might meet industrial levels/construction worker levels throughout the soil column and there are no prohibitions on excavating, but that soil is not safe for all uses and must not be removed from the site without Branch approval.

If engineering controls are used to prevent exposure, restrictive covenants calling for the inspection and maintenance of these are required. If the remedy utilizes barriers to prevent exposure to higher concentrations in soil than is allowed for the intended use, the barriers must be definable, visible barriers such as concrete or asphalt and the perimeter of these must be recognized and delineated on a Notice plat (further explained below). Signage may be necessary. A restrictive covenant should be included that does not allow disturbance of the barrier or disturbance of underlying soils without Branch approval. Certain types of disturbance can be specified in the restrictive covenants where allowed. Soil only as a barrier is not adequate without erosion/exposure markers such as a geotextile liner unless soil contamination above unrestricted-use levels is only present at depths of greater than about 10 feet below ground surface. If a geotextile marker covered with a specified number of feet of cover is used, the elevation of the marker and finished surface should also be surveyed. Soil and a marker as barriers should only be used in

areas of low to no traffic. Parking areas, areas accessed by trucks and cars, horse riding rings, kennel yards and ball fields are considered high traffic areas.

Those remediating parties proposing LURs as part of the remedy must ensure that the owner has the financial ability to conduct the annual maintenance and reporting associated with a remedy involving LURs. The maintenance duties must run with the land and bind all future owners.

Procedures

The REC must seek Branch concurrence on all containment remedies. The procedures for proposing a containment remedy using alternate soil remediation goals are described below:

1. The REC and RP should ensure that a certified Remedial Investigation (RI) Report has been completed in accordance with 15A NCAC 13C .0306(h) and is on file with the Branch.
2. If, during evaluation of the site remedy, the REC determines that a containment remedy using alternate remedial goals for soil is the best remedial alternative, the REC must submit a summary of the proposed containment remedy to the Branch for review and concurrence prior to completion of a proposed RAP. If the remedy is extremely simple, the entire RAP can be submitted instead. The RAP should have a separate section summarizing the remedy (contact Branch Staff for further discussion and instructions). The proposed containment remedy summary should contain the following information:
 - a. A statement as to whether standard industrial/commercial cleanup levels or calculated site-specific cleanup levels will be used. The soil cleanup levels for a standard industrial/commercial exposure scenario are provided on the PSRG Table. The REC may apply the adjustments described in Appendix E (Section E.2) to these numbers. Cleanup levels for other site specific exposure scenarios (e.g., park settings, restricted site access, etc.) can be calculated by a risk assessor familiar with the USEPA risk assessment procedures under REC oversight. If the REC calculates cleanup levels, all supporting risk and exposure assessment calculations must be provided for the Branch's review.
 - b. Descriptions of the current site and surrounding property use, the proposed site's use, and current and proposed zoning of the site and surrounding properties.
 - c. A brief summary of the nature and extent of past release(s), and soil and groundwater conditions. Include copies of or references to the appropriate maps, figures and summary tables of soil and groundwater data provided in a certified remedial investigation report to fully document the extent of contamination on the property.

- i. Site map(s) and figures must show sampling locations, the lateral and vertical extent of soil and groundwater contamination for each separate area of release.
 - ii. Table(s) of analytical data must identify all contaminant concentrations that exceed remedial goals. For example, the soil table should indicate the soil sample ID, sample depth, concentrations of compounds detected, the laboratory reporting limit if the concentrations were below detection, and their respective remedial goals: the calculated or health-based industrial remedial goal and the protection of groundwater remedial goal, and the proposed remedial goal for each compound for the restricted-use scenario. Each release area must be summarized in the table separately or summarized in separate tables.
 - iii. A summary of any ecological receptors and sensitive environments found, and any risk analysis conducted.
- d. A description of the entire remedy with proposed remedial goals for restricted land use. Include an explanation of how the health-based and protection of groundwater soil remedial goals will be met and how any ecological receptors or sensitive environments will be addressed (see Section D.2.1.2 in Appendix D).

Note: Residual contaminated soils cannot leach contaminants to groundwater above the 15A NCAC 2L standards, i.e., the protection of groundwater criterion must be met.

- e. A statement of the proposed use of the restricted area (i.e., parking lot, permanent structure, open space, park, etc.) and any proposed use restrictions.
- f. The deed book and page numbers for the property or properties where the restrictions will apply, if approved.
- g. The plat book and page numbers for any “Notice of an Inactive Hazardous Substance or Waste Disposal Site” (Notice) already recorded in relation to the site.
- h. Identification of all pre-existing, non-financial encumbrances/restrictions (e.g., utility easements, lease agreements, land use restrictions, etc.) for the property.
- i. Written consent by the property owner(s) of the site to the imposition of LURs using the applicable form provided as Attachment F-1 to this appendix. The property owner must provide a copy of any lease agreements and/or encumbrances that exist for the property.
- j. A proposed inspection plan for the site to verify that the recorded LURs remain in place and activities at the site are in compliance with the restrictions. The proposed inspection plan should be included in the section of the RAP, discussed below, that describes planned inspection, maintenance and progress reporting.

Note: The site owner will be required to conduct an inspection of the site no less than annually. They must also submit to the Branch a signed and notarized statement using the form in Attachment F-2 to this appendix indicating that the LURs are still in effect and that conditions at the site are not in violation of the LURs. Current and future owners, operators and other responsible parties are required under N.C.G.S. 130A-310.3(f) to enforce the LURs and are expected to take action immediately upon discovery of a violation of the LURs. Failure to do so will cause revocation of Branch concurrence on the remedial action.

3. The Branch will review the certified proposal and will concur, reject, or provide comments to the REC and RP on the proposed containment remedy. After preliminary concurrence is issued by the Branch, staff will direct the REC and RP to prepare and/or submit a certified proposed RAP. **The proposed RAP must be prepared in accordance with 15A NCAC 13C .0306(l) and the REC Program Implementation Guidance.** The proposed containment remedy must be incorporated into the certified RAP. When concurrence is granted, the Branch will transmit a draft Declaration of Perpetual Land Use Restrictions (DPLUR) document to the REC and RP for review. The REC and RP can discuss/propose any changes or additional restrictions based on the current and future intended use of the site. The REC will also begin creating a draft Notice of an Inactive Hazardous Substance or Waste Disposal Site to go along with the DPLUR. Sections F.5 and F.6 below describe the procedures for preparing the DPLUR and Notice documents. Unrecorded, proposed final draft versions of the documents must be incorporated as part of the proposed RAP for public notice. Once the documents are complete and the Branch has issued final concurrence of the proposed containment remedy, it will be made available for public comment. After public comment, the Branch will send the REC the documents for later recordation at the appropriate register of deeds office. See Section F.7 regarding instructions for completing and implementing the RAP for a containment remedy, including specific instructions for document recordation.

F.3 Alternate Groundwater (and Other Media) Remediation Goals and Procedures

N.C.G.S. 130A-310.65-310.77 provides a mechanism for alternate health-based remediation goals for groundwater and other media at certain eligible sites. Being that contaminated groundwater will be “contained” from an exposure standpoint, containment remedies and procedural compliance with N.C.G.S. 130A-310.65-310.77 require REC Program concurrence. For more information regarding qualification of sites using risk-based remediation under N.C.G.S. 130A-310.65-310.77, contact the Branch.

Note: If alternate goals are sought for soils only, Section F.2 should be used instead, as there are fewer requirements.

F. 4. Procedures for Alternate Cleanup Levels (aka a Containment Remedy) Due to Technical Impracticability

Containment remedies with LURs can be imposed on sites where it can be demonstrated that remediation to the remedial goals is technically impracticable. As with any LUR proposal, site characterization data must be presented to demonstrate that the source of contamination is controlled and the contaminant distribution is fully delineated.

Technical discussions and conclusions should be supported by figures, data tables, statistical analyses, fate and transport modeling, or other types of data reduction. A feasibility study must show that the site restoration potential is limited by the effectiveness of available technologies, engineering feasibility, and/or excessive cost. Refer to “Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration” (EPA, September 1993), and contact the Branch for further information.

F.5 Procedures for Preparing a Declaration of Perpetual Land Use Restrictions (DPLUR) Document

The DPLUR document outlines the restrictive covenants or perpetual land use restrictions that must run with the land and bind all future owners.

1. Once concurrence for the proposed containment remedy is issued, the Branch will create and transmit a draft DPLUR document to the REC. The REC, RP and the Branch will work together to come up with the LURs for the site. The following mandatory restrictive covenants will be included in all DPLURs:
 - No surface or subsurface native or fill materials may be removed from the Site without the written permission of NCDEQ or its successor in function.
 - Activities necessary to maintain the security of the Site, prevent human exposure to contaminated materials, and to prevent erosion of the contaminated soil at the Site are permitted with prior written approval by the Superfund Section or its successor in function.
 - Each person who owns any portion of the Site must submit a letter report, containing the notarized signature of the owner, in January of each year on or before January 31st, to the Superfund Section, or its successor in function, confirming that this Declaration is still recorded in the appropriate register of deeds office and that activities and conditions at the Site remain in compliance with the land use restrictions herein.
 - No person conducting environmental assessment or remediation at the Site, or involved in determining compliance with applicable LURs, at the direction of, or pursuant to a permit or order issued by, NCDEQ or its successor in function may be denied access to the Site for the purpose of conducting such activities.
 - Each person who owns any portion of the Site must cause the instrument of any sale, lease, grant, or other transfer of any interest in the Site to include a provision expressly requiring the lessee, grantee, or transferee to comply with

this Declaration. The failure to include such provision must not affect the validity or applicability of any land use restriction in this Declaration.

2. When the language is finalized, the final DPLUR as it is to be recorded at the appropriate register of deeds office will be forwarded to the REC.

F.6 Procedures for Preparing a “Notice of an Inactive Hazardous Substance or Waste Disposal Site” (Notice)

1. The Notice is a survey plat of the subject property prepared for recordation at the appropriate county Register of Deeds office. It is prepared and certified by a professional land surveyor registered in North Carolina and in accordance with N.C.G.S. 130A-310.8. Every plat should be a new or existing survey of the entire property conducted by the surveyor preparing the plat unless the property is extremely large or otherwise problematic to re-survey and the Branch has approved the allowance of the modification of an existing survey prepared by another surveyor.
2. Instructions for preparing a Notice can be found under Guidance Documents on the Branch website at <http://portal.ncdenr.org/web/wm/sf/ihs/ihsguide>. Only items 1 and 2 of these instructions should be followed by the REC and land surveyor to prepare the draft Notice for submittal to the Branch.
3. Once the draft Notice is ready, it can be e-mailed to the Branch for review. After the review is complete and any necessary revisions made by the REC and the land surveyor that prepared the plat, the REC and RP will be informed that the draft Notice can be finalized for the RAP.

F.7 Procedures for Completing and Implementing a RAP for a Containment Remedy

1. After concurrence for the certified proposed containment remedy is issued by the Branch, the certified proposed RAP, correspondence regarding the Branch’s concurrence with the containment remedy, the final draft DPLUR, and the draft Notice will be placed in the public file. The Branch will then prepare a public notice for the certified proposed RAP in accordance with N.C.G.S. 130A-310.70, N.C.G.S. 130A-310.4(c)(2), and 15A NCAC 13C .0306(j). The public notice information and instructions will be e-mailed to the REC for certified mailing. The public notice is issued by the REC using certified mail and lasts for 30 days. See paragraph .0306(j) of this guidance for the public notice procedures.
2. After the public notice is completed, any comments received from the public must be addressed by the REC. Once the public comments are addressed satisfactorily, the Branch will instruct the REC and RP to submit the work-phase completion statement (Work Phase Completion Form No. WPC-III) for the RAP [see 15A NCAC 13C .0306(b)(5)] and the remedy can be implemented.

Note: The Branch will only be providing review and concurrence with the proposed containment remedy. It will not provide review and approval of the remedial action plan. The REC will provide approval

of the entire proposed remedy and RAP upon proper certification of the RAP document.

3. After any remedial construction activities are complete and the final Notice is prepared by the surveyor, the final DPLUR and final Notice must be signed and notarized by the property owner and forwarded to the Branch for signature by NCDEQ. After all signatures are obtained, the Branch will return the executed documents along with instructions to the REC for recordation at the appropriate register of deeds office.
4. Within 15 days after the executed DPLUR and Notice have been recorded, the remediating party and REC must have the documents recorded at the appropriate register of deeds office. The Notice must be recorded first because the map book and page numbers of the recorded Notice must be referenced on the DPLUR. The DPLUR will then be recorded and certified copies of each document must be made. The documents must also be indexed in the grantor index under the name(s) of the owner(s) of all affected property.

Note: Recordation of the documents may take place on the same date at the Register of Deeds office as long as they are recorded in the sequence outlined above and the map book and page number where the Notice is recorded is noted in the designated blanks on the DPLUR prior to it being recorded.

5. Within 15 days of document recordation, the REC must submit a certified copy of the recorded DPLUR and Notice and a copy of the relevant grantor index page(s) to the Branch. Depending on the stage of the project, these documents are typically provided with either the remedial action construction completion report [15A NCAC 13C .0306(n)], the first remedial action progress report [15A NCAC 13C .0306(o)], or the remedial action completion report [15A NCAC 13C .0306(n)]. All documents will be electronically filed in the public record.

Note: Failure of the responsible party and the REC to meet DPLUR and Notice document submittal deadlines issued by the Branch could be cause for revocation of Branch concurrence of the proposed containment remedy.

6. The restrictions in the executed and recorded DPLUR document include a requirement that the property owner submit an annual report regarding the status of the containment remedy. An annual report form to demonstrate compliance with the perpetual land use restrictions is provided as Attachment F-2 of this appendix.

F.8. Cancellation of Land Use Restrictions

If the owner believes that all hazards have been removed and that hazardous substances are no longer present at the site above unrestricted-use remediation goals, the owner may subsequently request Branch approval to cancel the land use restrictions. Canceling land use restrictions without prior Branch approval will cause automatic revocation of approval of the remedial action plan and will subject the party taking such action to enforcement.

Attachment F-1
Property Owner Consent to Land Use Restrictions

One of the following two statements should be completed and submitted to demonstrate the site property owner's provisional consent to the imposition of land use restrictions. Use the appropriate text that corresponds to the property's ownership (individual or corporate). This consent is subject to later withdrawal if the property owner has objections after reviewing the land use restrictions document.

Note: For land use restrictions recorded pursuant to N.C.G.S. 130A-310.65 - 310.77, NCDEQ is in the process of developing a form for owner consent.

Individual Ownership:

I, _____ *[name of owner]* _____, owner in fee simple of real property located at *[street address]* _____, *[town or city]* _____, _____ County, North Carolina, am agreeable to the imposition of Land Use Restrictions ("Restrictions") partially or completely in lieu of actual remediation of hazardous substances at the property. I understand that I may refuse to consent upon review of the actual Restrictions.

Signature
Signatory's name typed or printed

- Or -

Corporate Ownership:

_____ *[name of corporation]* _____, the owner in fee simple of real property located at *[street address]* _____, *[town or city]* _____, _____ County, North Carolina, hereby states that it is agreeable to the imposition of Land Use Restrictions ("Restrictions") partially or completely in lieu of actual remediation of hazardous substances at the property. Said corporation understands that it may refuse to consent upon review of the actual Restrictions.

Signature of Corporation Representative:
Signatory's name typed or printed
Title

Attachment F-2

Annual Report Form for Perpetual Land Use Restrictions

The following form is an example of a signed and notarized statement that is required for submittal to verify that the DPLUR and Notice remain recorded at the Register of Deeds office and activities at the site are in compliance with the land use restrictions. Current and future property owners, operators and other responsible parties are required under N.C.G.S. 130A-310.3(f) to enforce the LURs and are expected to take action immediately upon discovery of a violation of the LURs. Failure to do so could cause automatic revocation of Branch concurrence of the remedial action.

Annual Report Form for Perpetual Land Use Restrictions

Site Name and ID: _____

Site Address: _____

1. All restrictions in the recorded Declaration of Perpetual Land Use Restrictions (DPLUR) document are still in compliance.
2. All posted signs and demarcations that identify the restricted area(s) are visible and readable.
3. The contact information on the signs is current.
4. All physical markers and barriers (e.g., berms, fences, paved areas, etc.) are in place and intact.
5. The DPLUR and Notice are still recorded at the county register of deeds office.

Comments:

Note: Any violations of the perpetual land use restrictions must be reported immediately to NCDEQ or its successor in function.

Property Owner Certification Statement

After first being duly sworn or affirmed, I, _____, hereby state that: I am over the age of eighteen, I am competent to make this certification based upon my own personal knowledge and belief and, to the best of my knowledge and belief, after thorough investigation, the information contained herein is accurate and complete. I am aware that there are significant penalties for willfully submitting false, inaccurate or incomplete information.

(Signature of Property Owner)

(Date)

(Printed Name and Title of Property Owner)

(Printed Name of Company)

STATE OF _____, COUNTY OF _____

I, _____, a Notary Public of said County and State, do hereby certify that _____ personally appeared before me this day, produced proper identification in the form of _____, was duly sworn and/or affirmed, and declared that he or she is the owner of the property referenced above or is a duly authorized agent of said owner and that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certification is accurate and complete, and he or she then signed this Certification in my presence.

WITNESS my hand and official seal the _____ day of _____, 20____.

Notary Public (signature)

My commission expires: _____

(OFFICIAL SEAL)

Appendix G Certification Statements

The Inactive Hazardous Sites Branch views certification of documents and work phase completions as a critical and primary means of ensuring the compliance and integrity of the REC Program and that public health is being protected in absence of state review. Below are the instructions for proper certification of documents and work phase completion certification. The certification forms that are discussed must be completed for submittal with the appropriate document and/or work phase completion statement. **Please review Section .0306(b) for further instructions.** The forms to be completed need to be downloaded at <http://portal.ncdenr.org/web/wm/sf/ihs/recprogram/RECcertForms>. REC Program staff should be contacted regarding any difficulties downloading the forms.

G.1. Certification of Documents

In accordance with .0306(b)(1) and (b)(2), all work phase completion statements, project schedules, work plans, and reports submitted to the Branch must include a specific notarized certification statement from the remediating party and a specific notarized certification statement from the RSM. The remediating party must sign and have notarized their document content certification **prior** to the RSM's certification. There is specific certification language for the remediating party (*Document Certification Form No. DC-I*) and for the RSM (*Document Certification Form No. DC-II*). The language in the certification statements is specified in the Rules and may not be modified under any circumstances. **Therefore, these specific certification statement forms cannot be reproduced in any way and need to be used for all certifications. The signatures of both the remediating party and RSM on the certification statements must be properly notarized using only the notary text shown on the forms.**

NOTE: The RSM certifies all documents LAST. Failure to do so is a violation of 15A NCAC 13C .0306(b)(2) of the REC Program Rules and subject to possible enforcement action against the REC and/or RSM.

G.2 Certification of Work Phase Completion

Work phase completion certification forms must be used to certify the completion of work phases in accordance with .0306(b)(5) and (b)(6). These certifications are in addition to the document content certifications. They do not have to be submitted with a document, but must be submitted prior to the next work phase. All work phase completion forms (whether they accompany a document or are sent to the Branch separately) must be certified by Document Certification Forms DC-I and DC-II. Therefore, the work phase completion forms should pre-date the document certifications discussed above. The work phase completion forms are:

1. Phase I Remedial Investigation Completion Certification (*Work Phase Completion Form No. WPC-I*)
2. Remedial Investigation Completion Certification (*Work Phase Completion Form No. WPC-II*)
3. Proposed Remedial Action Plan Completion Certification (*Work Phase Completion Form No. WPC-III*)

4. Remedial Design Completion Certification (*Work Phase Completion Form No. WPC-IV*)
5. Construction Completion Certification (*Work Phase Completion Form No. WPC-V*)
6. Remedial Action Completion Certification (*Work Phase Completion Form No. WPC-VI*)
7. Remedial Action Completion Certification “for Remedy with Land Use Restrictions” (*Work Phase Completion Form No. WPC-VII*)
8. Combined Remedial Investigation & Remedial Action Completion Certification “for No Action Remedy” (*Work Phase Completion Form No. WPC-VIII*)

G.3 Completing Certification Forms

The RSM needs to download these certification forms from the Branch’s website only. **These specific certification statement forms cannot be reproduced in any way and need to be used for all certifications.** Forms that have been modified, retyped or regenerated are unacceptable. All information entered on the forms needs to be typed or neatly printed. **The signature of the RSM on the statement forms must be properly notarized as indicated on the forms.**