



North Carolina Department of Environment and Natural Resources

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January 26, 2015

MEMORANDUM

TO: ENVIRONMENTAL REVIEW COMMISSION
The Honorable Mike Hager, Co-Chair
The Honorable Brent Jackson, Co-Chair

FROM: Neal Robbins, Director of Legislative Affairs

SUBJECT: Study Use of Contaminated Property, Risk Based Report

DATE: January 26, 2015

Pursuant to S.L. 2014-120, the Department of Environment and Natural Resources shall study ways to improve the timeliness of actions necessary to address contaminated properties such that the property is safe for productive use, threats to the environment and public health are minimized to acceptable levels, and the risk of taxpayer-funded remediation is reduced. Please consider the attached as the formal submission this report.

If you have any questions or need additional information, please contact me by phone at (919) 707-8618 or via e-mail at neal.robbs@ncdenr.gov.

cc: Tom Reeder, Assistant Secretary for Environment, NCDENR
Linda Culpepper, Director, Division of Waste Management, NCDENR
Jimmy Broughton, Deputy Chief of Staff, Office of the Governor

SL 2014-120 Regulatory Reform Section 56.(a) – Study Use of Contaminated Property

SL 2014-120 directed the Department of Environment and Natural Resources (the Department) to “study ways to improve the timeliness of actions necessary to address contaminated properties such that the property is safe for productive use, threats to the environment and public health are minimized to acceptable levels, and the risk of taxpayer funded remediation is reduced.”

SL 2014-120 directed the Department to specifically consider all of the following subjects, and sections of this study correspond to each of these items:

- 1) *The expansion of risk-based remediation of groundwater to all remediation programs under the Department.*
- 2) *The resources needed within the Department to oversee remediation, including the potential to expand the use of Department-approved private environmental consulting and engineering firms to implement and oversee remedial actions.*
- 3) *That rules adopted by the Environmental Management Commission for water quality standards applicable to groundwater be no more stringent than the lower of the federal or State maximum contaminant levels for drinking water in cases where the maximum contaminant levels have been adopted.*
- 4) *Liability protection for innocent purchasers of nonresidential property who take actions consistent with the federal Comprehensive Environmental Response, Compensation, and Liability Act for due diligence and due care regarding investigations and contaminants found.*
- 5) *Other matters the Department deems appropriate to further the goals of this study.*

1 EXECUTIVE SUMMARY

When conducting a “Risk-based Cleanup”, the remediating party evaluates risks at a site, then designs and implements a site-specific risk-based remedy such that there are no unacceptable risks for the site’s current use and reasonably anticipated future use. Evaluating risk means looking at the ways that people or the environment come in contact with contamination from the site (e.g., by drinking impacted groundwater, by contacting contaminated soil at or below the surface; by breathing vapors emanating from soil or groundwater, etc.) and determining if the level of contaminants for each pathway may be harmful.

North Carolina has successfully implemented risk-based remedies in regulatory programs for underground storage tanks that contain petroleum products and dry-cleaning sites covered under the Dry-cleaning Solvent Cleanup Act (DCSA), and in the Brownfields Program.

A party proposing to conduct a risk-based remediation project would need to gather sufficient information to define the nature and extent of contamination, ensure the contaminant plume was stabilized and identify the uses of all property comprising the contaminated site before evaluating the appropriate method of remediation and/or combination of institutional controls that would need to be established. At some sites, contaminant source removal or active remediation would also be required to the extent necessary to ensure the movement of contaminated groundwater was stabilized, and to eliminate exposure to contaminants.

EXPANSION OF RISK-BASED REMEDIATION: Currently, risk-based remediation of groundwater is an option for sites with releases from (1) underground storage tanks, (2) drycleaners, (3) pre-regulatory landfills, and (4) manufacturing or industrial use sites where contamination has not migrated off the property, as well as when addressing groundwater contamination at Brownfields properties. If the General Assembly expands the use of risk-based remedies for groundwater contamination to all remediation programs under the Department, it would allow more consistent remediation of groundwater contamination across the state – for example, petroleum releases from an aboveground storage tank at an industrial site with off-site contamination, would be remediated to the same standards as a release from an underground petroleum storage tank.

Current statutes that allow risk-based remediation require recordation of site-specific land-use restrictions to address protection of human health and the environment where contamination remains above unrestricted use levels. Exceptions to this requirement are allowed in two programs. The DSCA allows the Division of Waste Management (DWM) to place deed notices citing either local government ordinances or state laws that govern the use of groundwater, in lieu of site-specific land-use restrictions at properties other than source properties. A policy option to consider is whether the Department, where appropriate, should implement all programs consistently. In other words, should all programs rely on site-specific deed restrictions defining allowable future land uses or should they also allow broader reliance on existing State or Local Government ordinances or laws, in lieu of site-specific land use restrictions.

Under an expanded risk-based remediation approach, permits at active facilities would continue to provide conditions to minimize potential releases of contaminants and ensure unrestricted use standards are achieved at compliance boundaries. Policy considerations include whether risk-based remediation should be implemented consistently across all programs in cases where a release resulted

in contaminated groundwater beyond the compliance boundary of a permitted site regardless of the nature of the site.

Further policy considerations under an expanded risk-based remediation approach include allowing the Department discretion to reduce, or eliminate entirely, financial assurance requirements as a condition for the implementation of risk-based remedies. Current law for risk-based remediation of industrial sites, G.S. 130A-310.67(c), established a March 1, 2011 cutoff date for reporting a release to the Department in order to qualify for risk-based remediation only at manufacturing or industrial sites. This report summarizes the arguments for leaving the current cutoff date in place, moving the cutoff date out five years, or eliminating the cutoff date entirely.

RESOURCES TO IMPLEMENT EXPANSION: If risk-based remedies are implemented at a large number of sites where contamination has migrated beyond facility boundaries, as is currently allowed for under the UST and DSCA programs, the Department would need additional resources to evaluate the additional groundwater modeling and risk assessment expertise to ensure protection of those owning or using off-site properties. The existing fee provisions in G.S. 130A- 310.76 can be modified to address the additional oversight duties associated with the risk-based remediation.

REC EXPANSION: While at times controversial, minor modifications to current statutes would allow for expanding the use of Department-approved private environmental consulting and engineering firms to implement and oversee remedial actions into programs beyond the Inactive Hazardous Sites Cleanup Program (IHS). The current IHS Registered Environmental Consultants (REC) Program is implemented primarily through rule. As in IHS, it will be advisable to develop rules and guidance specific to each cleanup program, which would then develop training, oversight, auditing procedures and customer service specific to the needs of the regulated public for that program. Care should be taken to clearly define a consistent standard to satisfy risk-based compliance. The public should be protected to the same extent whether the source was a dry-cleaner or a manufacturing site. Consideration should be given on whether to allow PEs and PGs to satisfy REC certification requirements as the professional bodies that regulate those professions have the necessary enforcement authority to protect the public, to keep the certification program the same, or to enhance the certification with more clearly defined endpoints to ensure those certifying risk-based remedies can do so in an economical and consistent manner.

GROUNDWATER STANDARDS: North Carolina's groundwater standards are resource protection standards, while federally-established (EPA) Maximum Contaminant Levels (MCLs) are set for drinking water quality ready for distribution and human consumption and are the legal limit for compliance with the Safe Drinking Water Act. The groundwater standards recognize that North Carolina's groundwater often is of better quality than the MCLs and seek to protect groundwater where it is of better quality. As a result, the groundwater standards are not always the same as the MCLs. EPA does not typically revisit MCLs if the agency has not found significant issues with contaminants in finished drinking water or problems with public water systems maintaining compliance with existing standards. The MCLs represent values for which additional cleanup costs are not justified when weighed against public health benefits. Consideration should be given to relying exclusively on MCLs as groundwater standards for those constituents with an MCL.

LIABILITY PROTECTION FOR INNOCENT PURCHASES OF NONRESIDENTIAL PROPERTIES: North Carolina's environmental cleanup statutes do not provide for express owner liability at contaminated sites in all of the State's cleanup programs. Unresolved environmental obligations at contaminated sites

impede the efforts of innocent landowners, prospective purchasers, local governments, or lenders to conduct property transfers and to establish or maintain commercial activities.

A simple way to afford liability protection from enforcement by the State to innocent purchasers of nonresidential property would be to make any such protection conditional on the purchaser taking actions consistent with those described in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 40 CFR Part 312. The scope of the liability protections from state action could be similar in most respects to those provided under CERCLA and could be self-implementing.

STAKEHOLDER PROCESS: Two stakeholder meetings were held (October 2nd and 9th, 2014) to gain insight from consultants, engineers, a developer, industry, farmers, and environmental non-profit organizations. Discussions during those meetings greatly aided the preparation of this study report.

Earlier this year the Department formed a team of staff to compile information related to the study topic, and gather information about how to best accomplish broader application of risk-based remediation in a consistent manner throughout all programs. The ongoing work of this team is also intended to initiate efforts in each cleanup program to develop the technical resources and clear guidance that will be needed for Department staff at all levels and for remediating parties to work together toward cost-effective and protective risk-based remedies. The team produced a summary table comparing current statutes and rules that govern use of risk-based remedies in Department cleanup programs, included here as Appendix A.

2 CONTENTS

1	Executive Summary.....	2
3	Expansion of risk-based remediation of groundwater to all remediation programs under the Department.....	7
3.1	Risk-based Clean-up Overview.....	7
3.1.1	Benefits of Allowing Broader Application of Risk-based Remediation	7
3.1.2	Policy Options to Broaden Qualifying Criteria:	8
3.2	Active Remediation, Engineering Controls, and Institutional Controls Used to Manage Risks....	8
3.2.1	Policy Options for Allowable Types of Land Use Controls:	9
3.3	Risk-based remedies at Permitted Facilities	9
3.3.1	Policy Options for Risk-based Remedies at Permitted Facilities:.....	10
3.4	Financial Assurance Requirements	10
3.4.1	Policy Options for Financial Assurance Requirements as a Condition for Risk- Based Remedies:.....	10
3.5	Cutoff Date for Eligibility for Risk-Based Remediation	11
3.5.1	Policy Options Regarding the Eligibility Cutoff Date:.....	12
4	The resources needed within the Department to oversee remediation, including the potential to expand the use of Department-approved private environmental consulting and engineering firms to implement and oversee remedial actions	13
4.1	Resources Needed for Department Oversight of Risk-based Remediation.....	13
4.1.1	Policy Options for Adjusting the Fee Paid by Applicants Seeking Approval of Risk-based Remedies:.....	14
4.2	Potential to Expand the Use of Department-Approved Private Environmental Consulting and Engineering Firms to Implement and Oversee Remedial Actions.	14
4.2.1	Policy Options for Expansion of Privatized Oversight Program to Other Department Programs:.....	15
5	That rules adopted by the Environmental Management Commission for water quality standards applicable to groundwater be no more stringent than the lower of the federal or state maximum contaminant level for drinking water in cases where the maximum contaminant levels have been adopted.....	16
5.1	Overview of Groundwater Standards	16
5.2	Federal and State Maximum Contaminant Levels for Drinking Water	17
5.3	Comparison of Existing EMC Groundwater Quality Standards to Federal Drinking Water Standards	18
5.4	Policy Options for Groundwater Standards:	19
6	Liability protection for innocent purchasers of nonresidential property who take actions consistent with the federal Comprehensive Environmental Response, Compensation, and Liability Act for due diligence and due care regarding investigations and contaminants found.....	20

6.1	Liability Protections under CERCLA.....	20
6.2	Policy Options for Liability Protection for Innocent Purchasers of Nonresidential Property:....	21
7	Other matters the Department deems appropriate to further the goals of this study.	22
7.1	High Level of Customer Service	22
8	Appendix A: Summary of Regulations Governing Risk-Based Remediation Programs.....	23
9	Appendix B: Controls for Risk-based Cleanups	24
9.1	Remediation.....	24
9.2	Engineering Controls.....	24
9.3	Institutional Controls	24
10	Appendix C: Current Use of Land-use Controls in Division of Waste Management Programs	27
10.1	Underground Storage Tank (UST) Program	27
10.2	Dry-cleaning Solvent Cleanup Act (DSCA) Program	29
10.3	Pre-Regulatory Landfill (PRLF) Program.....	29
10.4	Inactive Hazardous Sites Branch (IHSB) State-Lead Sites and Registered Environmental Consultant (REC) Program Sites	30
10.5	Hazardous Waste Section (RCRA)	31
10.6	Solid Waste Section.....	31
10.7	ATTACHMENT A to Appendix C - Excerpt from NC General Statutes - Chapter 143B Article 7..	32
10.8	ATTACHMENT B to Appendix C EXAMPLE UST NOTICE OF RESIDUAL PETROLEUM.....	37
10.9	ATTACHMENT C to Appendix C - EXAMPLE DPLUR IN INACTIVE HAZARDOUS SITES BRANCH ..	43
10.10	ATTACHMENT D of Appendix C - EXAMPLE DPLUR EMPLOYED BY THE NC DWM HAZARDOUS WASTE SECTION	51
10.11	ATTACHMENT E of Appendix C - EXAMPLE DPLUR EMPLOYED BY THE NC DWM SOLID WASTE SECTION.....	56
11	Appendix D: Examples of State and Local Controls Used in Lieu of LURs.....	65
12	Appendix E: Departmental Resources Needed to Ensure that Risk-based Remedies are Protective 67	
12.1	Department Review Costs - Assumes all HHRA, RA and GW modelling review conducted by outside DENR contractors.....	69
12.2	Department Review Costs - HHRA, RA and GW modelling review conducted by mix of in-house and outside DENR contractors.....	70
13	Appendix F: 2L Groundwater Standards	71

3 EXPANSION OF RISK-BASED REMEDIATION OF GROUNDWATER TO ALL REMEDIATION PROGRAMS UNDER THE DEPARTMENT

3.1 RISK-BASED CLEAN-UP OVERVIEW

When conducting a “Risk-based Cleanup”, the remediating party evaluates risks at a site, then designs and implements a site-specific risk-based remedy such that there are no unacceptable risks for the site’s current use and reasonably anticipated future use. Evaluating risk means looking at the ways that people or the environment can come in contact with contamination from the site (e.g., by drinking impacted groundwater, by contacting contaminated soil at or below the surface; by breathing vapors emanating from soil or groundwater, etc.) and determining if the level of contaminants for each pathway could be harmful.

Risk-based remedies typically require remediation to site-specific, risk-based standards as an alternative to cleanup that does not consider site-specific conditions. Remedies then rely on engineered barriers and institutional land use controls to prevent exposure to contaminants remaining at the sites

A risk-based cleanup inherently assumes contaminants will remain and that reliable controls can be put in place to prevent future contact with contamination and that current unacceptable risks have been eliminated.

Steps to cleanup:

1. Conduct site characterization to fully assess the nature and extent of contamination;
2. Eliminate current unacceptable risks through cleanup or engineered controls (e.g., provide alternate water supply to those with a contaminated drinking water well);
3. Evaluate the risks that remaining contaminants pose to current and reasonably anticipated future users of all the affected properties;
4. Establish a strategy to ensure that future potential exposures are controlled – by either conducting remediation to reduce contamination levels, or by implementing engineering controls where appropriate, or by placing use restrictions on properties to prevent activities that may expose people to contamination, or a combination of the above;
5. Seek and incorporate public input on the proposed strategy; and
6. Implement the approved strategy by conducting remediation as necessary and recording land-use controls in the chain of titles of the affected properties to document what the properties can and cannot be used for. This informs the current owner of what to do and not do with the property, and informs prospective buyers about the conditions and limitations of the use of the property.

3.1.1 Benefits of Allowing Broader Application of Risk-based Remediation

Allowing broader application of risk-based standards for cleanup would allow timelier and cost-effective cleanups at contaminated sites. It would provide for enhanced development opportunities by providing a mechanism protective of human health and the environment while incentivizing cleanups that are currently languishing. Those benefits would accrue to the remediating party, to those redeveloping or reusing the impacted properties, and to the economies of communities where the sites are located. The

expenses incurred by remediating parties to implement risk-based remedies may be significantly lower than expenses of cleanups that would meet the non-site specific standards currently required by statute at most sites. The time necessary to complete standards-based cleanups can be an impediment to the revitalization of communities. Delay in the cleanup of an individual contaminated property can thwart the complex coordination investors and local governments need to undertake the redevelopment of an entire district.

3.1.2 Policy Options to Broaden Qualifying Criteria:

- Expand use of risk-based remedies to non-industrial properties.
- Expand use of risk-based remedies to sites with contamination that has migrated off the source properties.
- Require that applicants demonstrate or take active measures to ensure that the extent of contamination will be stabilized.
- Expand use of risk-based remedies to sites having a release of petroleum originating from a source other than an underground storage tank.
- Allow responsible parties to enter the Brownfields Program if the redevelopment provides commensurate public and economic gain for the community. The application of Brownfields tax credits to responsible parties should be evaluated.

3.2 ACTIVE REMEDIATION, ENGINEERING CONTROLS, AND INSTITUTIONAL CONTROLS USED TO MANAGE RISKS

Successful risk-based cleanups rely on the use of three general types of controls as part of long-term risk management strategies: active remediation measures, engineering controls, and institutional controls. The characteristics and use of a property, along with the extent, concentration, and toxicity of contaminants help identify the types of controls that are best suited to ensuring long-term management of potential risks at a site.

While remediation measures reduce contaminant concentrations in the affected media, engineering controls are designed to prevent physical access to the contaminated media. Institutional controls are legal mechanisms recorded in the chain of title documenting the presence of contaminated media at the property and listing the conditions for safe future use of the property. Properties that have contaminants above unrestricted use levels will need an institutional control to document the conditions for continued safe use of the property. Institutional controls typically impose land-use restrictions to prohibit activities that may create contaminant exposures, and may also require that long-term engineering controls such as barriers, groundwater filter systems, or vapor mitigation systems be routinely maintained to ensure they operate as intended.

More detailed discussion can be found in Appendix B: *Controls for Risk-based Cleanups*.

Current risk-based programs utilize their statutory authorities to incorporate land-use restrictions into the selected remedy for a site. Owners of property where the release occurred (i.e., the source

property) or the remediating party must record and maintain land-use restrictions if contamination remains in place in order to receive a “no further action determination” for their property.

Description of current Department practice is provided in Appendix C: *Current Use of Land-use Controls in DWM*.

A significant obstacle for risk-based cleanups is application of land-use restrictions on property that is not the source of the contamination. Non-source property owners who did not cause or contribute to the contamination have little incentive to accept limitations on their property unless they can be made whole through some mechanism. Current statutes do not prevent remediating parties and affected parties to contract amongst themselves as part of a risk-based cleanup. On non-source properties, one alternative to land-use restrictions can be found in statutory authority provided under the Dry-cleaning Solvent Cleanup Act (DSCA) that allows, in lieu of property specific land use restrictions, noticing the applicability of State and local controls. Such options would be available in cases where those State or local controls provide a level of protection equivalent to property specific land-use restrictions. While current State and local controls are limited to controlling groundwater use, these controls are appropriate for non-source properties where the only risk that needs to be protected is future use of drinking water supply wells. The statutory authority that allows use of state and local government controls for DSCA sites could be granted to other Department cleanup programs.

Appendix D: *Examples of State and Local Controls Used in Lieu of LURs* provides three examples of these types of controls, each currently in effect at sites in the State.

3.2.1 Policy Options for Allowable Types of Land Use Controls:

- Allow a broader range of Department cleanup programs to approve risk-based remedies, where appropriate, that rely on land-use restrictions that provide adequate protection of human health and the environment for current and reasonably anticipated future uses.
- Grant a broader range of Department cleanup programs the authority, currently expressly granted to the DSCA Program, to approve risk-based remedies, where appropriate, that rely on existing state or local government laws governing the use of groundwater in lieu of site-specific land-use restrictions.
- Provide that controls in lieu of site-specific land-use restrictions be limited in use to remedies where the only risk that needs to be protected is future installation of drinking water supply wells.
- Consider whether or not these controls in lieu of land-use restrictions could be allowable, where appropriate, for source properties.

3.3 RISK-BASED REMEDIES AT PERMITTED FACILITIES

The Department, in discussions held internally and with stakeholders, has recognized the benefit of approving risk-based remedies designed to address contaminant releases that are demonstrated to be unrelated either to permitted waste handling activities at a facility or to releases from waste-management units having established permit-compliance boundaries. Those same discussions led to

general agreement that risk-based remedies should not be available as recourse to current permit holders that fail to implement measures to prevent releases or prevent contaminant exceedences beyond established compliance boundaries. Most considered it advisable to adopt a provision to make approval of risk-based remedies conditional on compliance with ongoing permit requirements at the subject facility. Strengthened enforcement of existing requirements could meet this goal.

Many older waste management units were designed and permitted at a time when the state of the art has since proven to be less reliable than the practices currently required of, or implemented by, facility operators. This, coupled with the success of risk based compliance programs currently being implemented, indicate that risk-based remedies for releases from waste management units where contaminants have migrated beyond established compliance boundaries should be considered.

At all facilities, but especially at those facilities where operators are struggling to stay in compliance and to stay in business, the availability of risk-based remediation may provide incentive for those operators to correct problems with their permitted units, or to successfully close those units out.

3.3.1 Policy Options for Risk-based Remedies at Permitted Facilities:

- For facilities having permitted waste management units, where the Department approves risk-based remedies for past releases that are not related to the permitted units at that facility, require that new or ongoing permitted activity at that facility would be conducted such that unrestricted use standards are met at permit compliance boundaries.
- Consider whether or not risk-based remedies should be allowed for addressing releases of contaminants from permitted waste management units that have migrated beyond established compliance boundaries for those permitted units.

3.4 FINANCIAL ASSURANCE REQUIREMENTS

Financial assurance requirements may be unnecessary as a condition for approval of risk-based remedies at some sites, given that those seeking risk-based remedies have typically already committed to expending resources to proceed through the cleanup process and close their sites. Successful closeout may serve as incentive enough to actively remediate historic contamination.

Financial assurance requirements can be a burden to those already marshalling the resources needed to conduct remedial investigations and to implement risk-based remedies, both for which costs are considerable.

Stakeholders have indicated that financial assurance requirements are an impediment to redevelopers.

3.4.1 Policy Options for Financial Assurance Requirements as a Condition for Risk- Based Remedies:

- Eliminate financial assurance requirements as a condition for the implementation of risk-based remedies, or

- Continue to allow the Department discretion to reduce financial assurance requirements as a condition for the implementation of risk-based remedies, if the use of such remedies is broadened to other Department programs.

3.5 CUTOFF DATE FOR ELIGIBILITY FOR RISK-BASED REMEDIATION

Reasons for keeping the Current Cutoff Date

Current risk-based law for industrial sites, G.S. 130A-310.67(c), establishes a March 1, 2011 cutoff date for reporting a release to the Department in order to qualify for risk-based remediation. Many potential sites were prohibited from pursuing risk based compliance since the statute did not allow for sites with off-site contamination to participate. In other cases the contamination was unknown at the time of the cutoff date.

The cost of cleanup of hazardous substance discharges is high and has thus served as incentive to take care in the handling of raw materials. If remediation costs were reduced through the expansion of risk-based remediation, the Department may need to increase enforcement activities and penalties to disincentivize new unauthorized releases. The Department's other existing risk-based remediation programs (DSCA and UST) have a companion component requiring education, regulation and compliance for product storage and handling that exists to prevent spills.

Reasons for Eliminating the Current Cutoff Date

Stakeholders have questioned the rationale for a cutoff date. If one remediating party qualifies through early reporting, why should their neighbors have stricter cleanup levels because they reported later? Often contamination is not discovered until an environmental audit is conducted for a lender during a property transfer. In many cases it is difficult to determine when the discharge happened and may have just been discovered.

Some Department programs that currently have risk-based cleanup options do not have a cutoff date for reporting of the release to be eligible. Eliminating the cutoff date would provide for a consistent approach across the programs.

Reasons for Revising the Cutoff Date

Revisions to G.S. 130A-310.67(c) to extend the deadline for a period of time could retain an incentive to properly handle and store chemicals and to discourage willful discharge. A revised cutoff date five years in the future would allow and encourage self-auditing and more immediate reporting of contamination. It provides a benefit to the public and surrounding property owners, since responsible parties would have incentive to identify potential exposure now rather than years down the road. Only about 10% of sites on the IHS inventory have parties currently volunteering to address contamination outside of other applicable regulatory/permitting programs. Since there is a cost to any remediation (including risk-based), there is concern that most of the parties not currently taking action will continue to remain inactive if and until the Department can compel a responsible party to take action.

Moving the cutoff date five years out would allow time for owners and responsible parties to evaluate property and discover contamination. This would not necessarily commit a party to remediation.

Conducting an environmental assessment and reporting releases to the Department within five years could preserve a party's (and a site's) eligibility for future risk-based remediation.

3.5.1 Policy Options Regarding the Eligibility Cutoff Date:

- If risk-based remediation is expanded beyond industrial sites, options include: (a) eliminate the cutoff date of March 1, 2011, (b) move the cutoff date to five years in the future with review by the legislature every five years, or (c) leave the cutoff date unchanged per G.S. 130A-310.67.

4 THE RESOURCES NEEDED WITHIN THE DEPARTMENT TO OVERSEE REMEDIATION, INCLUDING THE POTENTIAL TO EXPAND THE USE OF DEPARTMENT-APPROVED PRIVATE ENVIRONMENTAL CONSULTING AND ENGINEERING FIRMS TO IMPLEMENT AND OVERSEE REMEDIAL ACTIONS

4.1 RESOURCES NEEDED FOR DEPARTMENT OVERSIGHT OF RISK-BASED REMEDIATION

Allowing broader application of risk-based standards for remediation is expected to result in the need for additional resources for the Department's staffing and operational budgets because of the increased costs associated with the following two general types of responsibilities in order to ensure the protectiveness of risk-based remedies:

- a) Applicants' risk assessments and groundwater models will need to firmly demonstrate that contaminants left on site will not migrate in the future to places where they will adversely impact human health or the environment, and adequate review will require more time, more highly trained staff, and contractor support in some cases. Broader use of risk-based remedies for contamination spanning multiple properties, some of them in residential or commercial areas not owned by the remediating party, will entail more complex analysis of potential risk.
- b) Upon approval of risk-based remedies, the Department assumes a responsibility for the long-term oversight of permanent engineering and institutional controls needed to ensure that those remedies remain protective. Under current risk-based programs, the Department requires annual certification by landowners that engineered barriers are being maintained, that site-specific land-use restrictions are being adhered to, and that deed instruments remain in effect through sale or subdivision of the property. Currently, the Department's Brownfields Program applies some of its available resources to conduct periodic inspections of properties with completed Brownfields Agreements to further ensure that conditions of those agreements are adhered to. Such inspections would further ensure the protectiveness of Declarations of Permanent Land-use restrictions (DPLURs) or deed notices approved by all Department programs. Tracking adherence to the restrictions in a comprehensive Department-wide database provides a crucial supplement to documents held in local government tax records. Making remedy locations and linked file records available to the public in an easily usable GIS-based format provides a necessary and cost-effective way to further protect communities from inadvertent exposure to contaminants, and to protect and advise future prospective purchasers.

Discussion of the resources needed for the Department to assume these two types of responsibility are provided in Appendix E: *Departmental Resources Needed to Ensure that Risk-based Remedies are Protective*.

Modifications to the fee structure for applicants for risk-based remedies should address the expected need for necessary additional resources associated with risk-based remedial actions. Estimates of fees necessary to support the risk-based remediation program, shown in Appendix E, account only for the additional risk assessment and groundwater modeling reviews necessary to evaluate remedies that allow contamination above unrestricted use standards off property, which are evaluations not typically

needed for standards-based remedies. The fee estimate does not account for general staff oversight for the assessment and the remedial action already conducted by the Department for standards-based cleanups.

Stakeholders have suggested a phased approach to fees, where an initial fee would be paid for review, and a second fee would be assessed to pay for long-term stewardship once the site was closed out. In the case of privatized oversight of cleanups, as discussed in the subsection below, the estimated fees would supplement those already established to support privatized oversight. Adequate fees are necessary to ensure proper reviews are conducted to protect nearby property owners, whether residential or commercial/industrial.

4.1.1 Policy Options for Adjusting the Fee Paid by Applicants Seeking Approval of Risk-based Remedies:

- Consider a two-phased approach to fees; the first phase to provide the review of eligibility and review and approval of the remedial action plan (RAP) through an application fee, and the second phase, upon approval of the site specific RAP to provide for long term monitoring of the RAP implementation.
- If the use of risk-based remedies is broadened to off-site properties, adjust the current fee of \$4500 per acre of contaminated area, currently required for approval of risk-based remedies for on-site contamination at industrial properties, in a manner appropriate to meet Department resource needs to ensure protectiveness of those remedies.

4.2 POTENTIAL TO EXPAND THE USE OF DEPARTMENT-APPROVED PRIVATE ENVIRONMENTAL CONSULTING AND ENGINEERING FIRMS TO IMPLEMENT AND OVERSEE REMEDIAL ACTIONS.

Expansion of Privatized Oversight Program to Other DENR Programs

The Registered Environmental Consultant (REC) program currently exists for privatized oversight by consulting firms of the implementation of remedial actions at sites under the IHS Program. While controversial, this privatized oversight and approval program has facilitated remedial actions at lower risk sites, while State staff is then dedicated to work on the highest risk sites. Consideration should be given to exempting PEs and PGs from REC requirements based on the ability of their professional societies' enforcement authority. Establishing similar programs for other remediation programs in the Department would allow remedial actions at lower risk sites (including risk-based remedial actions) to proceed. RECs have expressed the need for clear end points for site closure. Such clarity should be kept in mind as the Department implements consistent cleanup goals across programs. Modification of the current statutes could allow for expansion of privatized oversight and approval into other department cleanup programs. For example, by requiring the responsible party to certify to the accuracy of the reported contamination based on reasonable reliance on Phase I and Phase II assessments, the scope of the oversight by the REC could be limited as to the extent of coverage of the RAP.

The current REC Program within the IHS Program is implemented largely by rule (15A NCAC 13C .0300). Those rules are specific to hazardous substance site cleanups governed by the Inactive Hazardous Sites Act, as are the Program's guidance documents and training materials. Certification of private environmental consultants for oversight in a broader range of Department programs would require training specific to each individual Department cleanup program. Broader Departmental

reliance on privatized oversight firms could be implemented such that each cleanup program develops and maintains program-specific rules, guidance, training and customer service that match the contaminant's behavior and associated regulatory requirements. The Department's experience in the current REC program has demonstrated the value of constantly improving training and detailed guidance documents for supporting the REC's in their efforts to conduct cost-effective, timely, and protective cleanups.

If a single certification was intended to serve for oversight in all programs, the amount of training required to attain certification might serve as an impediment for consultants. Program-specific certification would likely be preferable to consultants having specialized practices. The simplicity of a single certification could outweigh these considerations, but might also impede the Department's efforts to support the REC's in their roles.

4.2.1 Policy Options for Expansion of Privatized Oversight Program to Other Department Programs:

- Modify current statutes to allow for expansion of privatized oversight and approval into Department cleanup programs other than the IHS Program.
- Develop clear and consistent requirements for closure based on certified submittal by the responsible party.
- Develop rules specific to each cleanup program to implement privatized oversight and approval in those programs.
- Direct Departmental programs to develop training, guidance documents, auditing and customer service specific to the needs of the regulated public for that program.
- Consider recognizing PEs and PGs as REC without further certification; keeping the certification process the same; or enhancing the certification process.

5 THAT RULES ADOPTED BY THE ENVIRONMENTAL MANAGEMENT COMMISSION FOR WATER QUALITY STANDARDS APPLICABLE TO GROUNDWATER BE NO MORE STRINGENT THAN THE LOWER OF THE FEDERAL OR STATE MAXIMUM CONTAMINANT LEVEL FOR DRINKING WATER IN CASES WHERE THE MAXIMUM CONTAMINANT LEVELS HAVE BEEN ADOPTED.

5.1 OVERVIEW OF GROUNDWATER STANDARDS

The Environmental Management Commission (the Commission) is directed to adopt classifications and water quality standards for waters of the state under G.S. 143-214.1. In assigning classifications, the EMC is directed by G.S. 143-214.1(d)(5) to consider “the natural quality of the water below land surface and the condition of occurrences, recharge, movement and discharge, the vulnerability to pollution from wastewaters and other substances, and the potential for improvement of the quality and quantity of the water.” Implicit in this mandate is the realization that purely natural levels of various contaminants can and do exceed health-based standards. That is, groundwater in the complete absence of man-made impacts can exceed health-based standards.

On the basis of this mandate, the Commission has established, in 15A NCAC 2L, classifications and resource protection standards for groundwater that recognize: (1) the natural high quality of the groundwaters of the state; (2) the existing and potential future uses of the state’s groundwater as a source of drinking water; (3) the vulnerability of the groundwater to contamination; and (4) the difficulty of restoring the groundwater once contaminated.

Groundwater quality standards are established by 15A NCAC 02L .0202 as the lowest of the following six criteria:

1. A concentration protective of the non-cancer or systemic effects of a contaminant;
2. A concentration which corresponds to an incremental lifetime cancer risk of one-in-a-million;
3. The taste threshold limit value;
4. The odor threshold limit value;
5. The National Drinking Water Maximum Contaminant Level (MCL); or
6. The National Secondary Drinking Water Standard (SDWS).

The Commission may also establish groundwater standards less stringent than the existing maximum contaminant levels (MCL) for public water systems or national secondary drinking water standards noted above when the MCL or secondary standard is based on outdated risk assessment information. Where the groundwater standard for a substance is established at a level greater than the MCL, the Director of the Division of Water Resources shall apply the MCL as the groundwater standard at any private drinking water well or public water system well that may be impacted. Currently only one contaminant, 1,1 Dichloroethylene (1, 1 DCE), has a groundwater standard that has been established that is less stringent the federal MCL.

For substances for which no standard has been established, the default standard is the practical quantitation limit (PQL). The practical quantitation limit is the lowest concentration of a substance that can be reliably achieved by a laboratory. The practical quantitation limit may vary slightly from lab to lab due to sample matrix interference, dilution and other factors. The PQL-based default standard provides protection against potential health effects of drinking water contaminated by chemicals about which little may be known.

However, rule 15A NCAC 2L .0202 provides an avenue for relief from the PQL-based default standard while still maintaining health-based protections for use of groundwater as drinking water. Under paragraph (c) of the rule, any person may petition the Division of Water Resources Director to establish an interim maximum allowable concentration (IMAC) for a substance for which a standard has not been established under the rules. The petitioner is required to submit relevant toxicological and epidemiological data, study results, and calculations necessary to establish a standard in accordance with the groundwater rules in 15A NCAC 2L .0202. If the information submitted is adequate, the Director may establish an enforceable IMAC. The IMAC is considered for adoption during the next triennial review and re-adoption of the groundwater standards. Petitioners commonly represent persons owning or controlling a property where groundwater is contaminated above the PQL by one or more chemicals with no groundwater standard.

Where the standard for a substance is less than the practical quantitation limit, the detection of that substance at or above the practical quantitation limit constitutes a violation of the standard. Where naturally occurring substances exceed the established standard, the standard shall be the naturally occurring concentration as determined by the Division of Water Resources Director. Typically such determinations are made on a site-specific basis by evaluating site-specific data and studies provided by the person owning or controlling a contaminated or potentially contaminated site.

5.2 FEDERAL AND STATE MAXIMUM CONTAMINANT LEVELS FOR DRINKING WATER

Drinking water standards for public water systems are adopted in North Carolina by the Commission for Public Health. The Commission for Public Health is directed by G.S. 130A-315(b) to develop and enforce rules for public water systems which:

- “ (1) Specify contaminants which may have an adverse effect on the public health;
- (2) Specify for each contaminant either:
 - a. A maximum contaminant level which is acceptable in water for human consumption, if it is feasible to establish the level of the contaminant in water in public water systems; or
 - b. One or more treatment techniques which lead to a reduction in the level of contaminants sufficient to protect the public health, if it is not feasible to establish the level of the contaminants in water in a public water system....”

The Commission for Public Health has adopted rules in 15A NCAC 18C which establish MCLs for the quality of water provided by public water systems. MCLs within 15A NCAC 18C are adopted by reference from federal drinking water standards.

“Maximum contaminant level” is defined in G.S. 130A-313 as the maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are enforceable

standards applicable to public water systems. The federal MCLs (adopted by reference by the Commission for Public Health) take cost of treatment into consideration. USEPA, Drinking Water Contaminants, <http://water.epa.gov/drink/contaminants/> (accessed September 18, 2014). In addition, MCLs for some contaminants are established to balance the competing needs of protecting users from water-borne pathogens while simultaneously minimizing health risks to the population from the byproducts of disinfection methods used to eliminate pathogens.

The rules in 15A NCAC 18C also establish maximum contaminant level goals (MCLGs), and secondary drinking water standards for the quality of water provided by public water systems. A MCLG is defined by the EPA as the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are set by EPA for drinking water quality and are the legal limit for compliance with the Safe Drinking Water Act. EPA does not typically revisit MCLs if the agency has not found significant issues with contaminants in finished drinking water or problems with public water systems maintaining compliance with existing standards. The MCLs represent values for which additional cleanup costs are not justified when weighed against public health benefits. The Safe Drinking Water Act requires EPA to review each National Primary Drinking Water Regulation (NPDWR) at least once every six years and revise them, if appropriate, based on health effects assessments, changes in technology, or other factors that provide a health or technical basis to support a revision. New MCLs are typically only developed once a contaminant has been detected in finished drinking water supplies.

NSDWRs (or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

5.3 COMPARISON OF EXISTING EMC GROUNDWATER QUALITY STANDARDS TO FEDERAL DRINKING WATER STANDARDS

Groundwater Standards or IMACs have been established under 15A NCAC 2L .0202 for 147 parameters. A complete list of these parameters, the state groundwater standard, MCL, secondary drinking water standard, and MCLG is included as Appendix F of this report.

Of the 147 parameters for which state groundwater standards have been established, 88 parameters have no MCL. In addition, three parameters (coliform bacteria, acrylamide, and epichlorohydrin) have an MCL that is not directly comparable to the state groundwater standard. Eleven parameters have state groundwater standards equal to the secondary drinking water standard (Chloride, Color, Copper, Total Dissolved Solids, Foaming Agents, Iron, Manganese, pH, Sulfate, Zinc, and Fluoride).

For those parameters that do have an MCL, 37 have a state groundwater standard that is more stringent than the MCL; 18 have a state groundwater standard that is the same as the MCL, and one has a state groundwater standard that is less stringent than the MCL. In the case of those parameters where the state groundwater standard is more stringent than the MCL:

- 23 of the state groundwater standards are set at a concentration which corresponds to an incremental lifetime cancer risk of one-in-a-million;

- Eight of the state groundwater standards are set at a concentration protective of the non-cancer or systemic effects;
- Five of the state groundwater standards are set at the odor threshold; and
- One standard (fluoride) is set at the secondary drinking water standard.

In summary, North Carolina's groundwater standards are resource protection standards, while federally-established MCLs are product purity standards. Federally-established MCLs are set for drinking water quality and are the legal limit for compliance with the Safe Drinking Water Act. As a result, the groundwater standards are not always the same as the MCLs. EPA does not typically revisit MCLs if the agency has not found significant issues with contaminants in finished drinking water or problems with public water systems maintaining compliance with existing standards. The MCLs represent values for which additional cleanup costs are not justified when weighed against public health benefits.

5.4 POLICY OPTIONS FOR GROUNDWATER STANDARDS:

- Direct the Environmental Management Commission to amend 15A NCAC 02L .0202 to adopt the MCL (Federal drinking water standard for human consumption) for a parameter where there is an existing MCL; or
- Maintain the current framework for groundwater standards.

6 LIABILITY PROTECTION FOR INNOCENT PURCHASERS OF NONRESIDENTIAL PROPERTY WHO TAKE ACTIONS CONSISTENT WITH THE FEDERAL COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT FOR DUE DILIGENCE AND DUE CARE REGARDING INVESTIGATIONS AND CONTAMINANTS FOUND.

North Carolina's environmental cleanup statutes do not provide for express owner liability at contaminated sites in all of the State's cleanup programs. Unresolved environmental obligations at contaminated sites impede the efforts of innocent landowners, prospective purchasers, local governments, or lenders to conduct property transfers and to establish or maintain commercial activities.

Federal law sets forth criteria for innocent purchasers needed to gain liability protection under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This part of the Superfund Program is mostly self-implementing at the federal level, with the Agency's role, for the most part, limited to developing and disseminating effective guidance about the criteria.

Guidance can be found here: <http://www.epa.gov/brownfields/aai/>

A simple way to afford liability protection from enforcement by the State to innocent purchasers of nonresidential property would be to make any such protection conditional on the purchaser taking actions consistent with those described in CERCLA (40 CFR Part 312). The scope of the liability protections from State action could be similar in most respects to those provided under CERCLA and could be self-implementing.

6.1 LIABILITY PROTECTIONS UNDER CERCLA

CERCLA provides protection from liability for certain parties, provided they comply with specific criteria outlined in the statute. The types of parties are:

- Innocent landowners (CERCLA §101(35)(A));
- Contiguous property owners (CERCLA §107(q)); and
- Bona fide prospective purchasers (CERCLA §§101(40) and 107(r)).

To be eligible for liability protection under CERCLA as an innocent landowner, contiguous property owner or bona fide prospective purchaser, prospective property owners must:

- Conduct All Appropriate Inquiries into the previous ownership and uses of the facility in compliance with 40 CFR Part 312, prior to acquiring the property;
- Comply with all Continuing Obligations after acquiring the property (CERCLA §§101(40)(C – G) and §107(q)(A) (iii – viii)); and
- Not be affiliated with any liable party through any familial relationship or any contractual, corporate or financial relationship (other than a relationship created by the instrument by which title to the property is conveyed or financed).

All Appropriate Inquiries

“All Appropriate Inquiries” (“AAI”) is the process of conducting due diligence or a Phase I Environmental Site Assessment to determine prior uses and ownership of a property and assess conditions at the property that may be indicative of releases or threatened releases of hazardous substances at, on, in, or to the property. The individual who supervises or oversees the conduct of the AAI investigation and signs the final report required in the AAI regulation must meet the definition of an “Environmental Professional” provided in the AAI Final Rule (40 CFR §312.10).

Continuing Obligations

To maintain the liability protections after acquiring a property, landowners must comply with “continuing obligations” during their property ownership. The continuing obligations include:

1. Provide all legally required notices with respect to the discovery or release of a hazardous substance;
2. Exercise appropriate care, or due care with respect to the hazardous substances by taking reasonable steps to stop or prevent continuing or threatened future releases and exposures, and prevent or limit human and environmental exposure to previous releases;
3. Provide full cooperation, assistance, and access to persons authorized to conduct response actions or natural resource restoration;
4. Comply with land-use restrictions and not impede the effectiveness of institutional controls; and
5. Comply with information requests and subpoenas.

6.2 POLICY OPTIONS FOR LIABILITY PROTECTION FOR INNOCENT PURCHASERS OF NONRESIDENTIAL PROPERTY:

- Add provisions to the Inactive Hazardous Sites Act that afford liability protection from enforcement by the State to innocent purchasers of nonresidential property who take actions consistent with the federal CERCLA for due diligence and due care regarding investigations and contaminants found at those properties.
- Make such provisions self-implementing.
- Require that the individual who supervises or oversees the conduct of any required investigation, who determines which measures are appropriate and sufficient to meet the standards of due care, and signs the final reports required in the federal regulation, must meet the definition of an “Environmental Professional” provided in the federal AAI Final Rule (40 CFR §312.10).
- Require the “Environmental Professional” to also be either a Licensed Geologist or a Professional Engineer, and be licensed to practice in the State of North Carolina.
- Require the “Environmental Professional” to be a Registered Environmental Consultant certified by the Department, as per 15A NCAC 13C .0300.

7 OTHER MATTERS THE DEPARTMENT DEEMS APPROPRIATE TO FURTHER THE GOALS OF THIS STUDY.

7.1 HIGH LEVEL OF CUSTOMER SERVICE

Expanded use of risk-based remedies, along with the availability of the Brownfields Program, presents a range of options for the remediating party and redevelopers. In order to ensure they are protective, risk-based remedies require a high level of specialized expertise and evaluation by the Department and by consultants. Meeting early and communicating often with applicants has already proven invaluable in achieving cost effective risk-based remedies at industrial sites. By focusing on a collegial approach, DENR staff and applicants are learning to make best use of available site information, identify which tasks are needed and which are not, and to move sites toward closure in a timely and protective manner. Project staff in all programs will need to have the expertise and the commitment to provide up-front advice and strategize with applicants.

Earlier this year the Department formed a team of staff to compile information related to the study topic, and gather information about how to best accomplish broader application of risk-based remediation in a consistent manner throughout all programs. The ongoing work of this team is also intended to initiate efforts in each cleanup program to develop the technical resources and clear guidance that will be needed for Department staff at all levels and for remediating parties to work together toward cost-effective and protective risk-based remedies. The team produced a summary table comparing current statutes and rules that govern use of risk-based remedies in Department cleanup programs, included here as Appendix A.

Current risk-based remediation programs in the Department have successfully addressed releases. For example, there have been over 20,000 Commercial and Non-Commercial UST clean ups across the state, and 42 dry-cleaning site closures in the DSCA program to date with another 36 pending.

UST Release Management (FY 1989-FY 2014)			
Commercial UST Releases		Noncommercial UST Releases	
Releases Reported	18,841	Releases Reported	9,456
Cleaned Up to No Further Action	13,027	Cleaned Up to No Further Action	7,365

DSCA Site Statistics (FY 2001-FY 2014)		
Certification Status	Number	Percent of Total
Sites Certified	346	100
Certified Sites in Assessment/Remediation	268	77
Certified Sites Pending Closure	36	10
Certified Sites Closed	42	12

8 APPENDIX A: SUMMARY OF REGULATIONS GOVERNING RISK-BASED REMEDIATION PROGRAMS

SECTION	HAZ. WASTE	SUPERFUND				SOLID WASTE	UST	
		DSCA	Federal Remediation	Inactive Hazardous Sites	IHSB Pre-Regulatory Landfill		Petroleum USTs	Petroleum non-USTs & ASTs
GENERAL CLEANUP AUTHORITY	40 CFR 260-273 Federal Resource Conservation and Recovery Act of 1976 G.S. 130A-290 to 310 15A NCAC 13A.0100	The Dry-cleaning Solvent Cleanup Act of 1997: G.S. 143-215.104 15A NCAC 02S .0100	CERCLA 1980/SARA 1986	CERCLA 1980/SARA 1986 Inactive Hazardous Sites Response Act of 1987: G.S. 130A-310 15A NCAC 13C .0100 to .0300	CERCLA 1980/SARA 1986 Pre-Regulatory Landfill Program: G.S. 130A-310.6(c) State Legislation added provisions to Inactive Hazardous Sites Response Act in 2007 (SB1492).	15A NCAC 13B	40 CFR 280. Oil Pollution and Hazardous Substances Control Act of 1978: G.S. 143-215.75-104 15A NCAC 2N .0700	G.S. 143-215.1 G.S. 143-215.96 (ASTs) 15A NCAC 2L .0100s
CURRENT AUTHORITY FOR RISK-BASED REMEDIATION	Federal: 40 CFR 264.94(b) adopted in 15A NCAC 13A .0109(g) G.S. 130A-310.65 to 310.77	G.S. 143-215.104D(b)(3)	G.S. 130A-310.65 to 310.77	G.S. 130A-310.65 to 310.77	G.S. 130A-310.6(c)	No authority.	G.S. 143-215.94V 15A NCAC 2L .0400 recodified from 15A NCAC 02L .0115	No authority.
CURRENTLY ALLOWED MEDIA FOR RISK-BASED REMEDIATION	Soil/ Groundwater (on-property)/ Vapor	Soil/ Groundwater/ Vapor	Soil/ Groundwater (on-property)/ Vapor	Soil/ Groundwater (on-property)/ Vapor	Soil/ Groundwater/ Vapor	None	Soil/ Groundwater	None
CURRENT ELIGIBILITY REQUIREMENTS FOR RISK-BASED REMEDIATION	As defined in House Bill 45: 1. Site must have manufactured a commercial product. 2. Contamination must not extend off-property. 3. Contamination must not migrate off-property in the future. 4. Contamination must have been reported to Dept. prior to March 1, 2011.	1. Must have a dry cleaning solvent release. 2. Must be an active dry cleaning or solvent distribution facility. 3. Must be previous owner of active or abandoned DC facility, or owner of property on which active or abandoned facility is/was located. 4. Active facility must be in compliance	As defined in House Bill 45: 1. Site must have manufactured a commercial product. 2. Contamination must not extend off-property. 3. Contamination must not migrate off-property in the future. 4. Contamination must have been reported to Dept. prior to March 1, 2011.	As defined in House Bill 45: 1. Site must have manufactured a commercial product. 2. Contamination must not extend off-property. 3. Contamination must not migrate off-property in the future. 4. Contamination must have been reported to Dept. prior to March 1, 2011.	1. Must be a landfill that closed prior to January 1, 1983. 2. Must have been used for disposal of municipal (not industrial) waste.	No risk-based option available.	None. Currently, risk-based cleanup is mandatory at all petroleum UST sites under 2L .0400.	No risk-based option available.
CURRENT AUTHORITY FOR LAND USE RESTRICTIONS (LURS) ON SOURCE PROPERTIES	Authority to incorporate LURs into approved remedies: G.S. 143B-279. 9 Notice of Contaminated Site: G.S. 143B-279. 10	G.S. 143-215.104I(b) Notice of Dry-Cleaning Solvent Remediation: G.S. 143-215.104M	Authority to incorporate LURs into approved remedies: G.S. 143B-279. 9 Notice of Contaminated Site: G.S. 143B-279. 10	G.S. 130A-310.3(f) Notice of Inactive Hazardous Substance or Waste Disposal Site: G.S. 130A-310.8	G.S. 130A-310.3(f) Notice of Inactive Hazardous Substance or Waste Disposal Site: G.S. 130A-310.8	Authority to incorporate LURs into approved remedies: G.S. 143B-279. 9 Notice of Contaminated Site: G.S. 143B-279. 10	Authority to incorporate LURs into approved remedies: G.S. 143B-279. 9 Notice of Residual Petroleum: G.S. 143B-279.11(b).	No authority.
CURRENT AUTHORITY FOR OFF-PROPERTY LURS AND/OR NOTICES	No authority.	15A NCAC 02C .0107(b)(1) Allows a "2C Notice" on contaminated properties. G.S. 143-215 .104I(b1) allows that state and local ordinances be used in lieu of LURS.	No authority.	No authority.	No authority.	No authority.	No authority.	No authority.

9 APPENDIX B: CONTROLS FOR RISK-BASED CLEANUPS

To control current and future exposure to contaminants, risk-based cleanups rely on the use of one or more risk management controls. The types of controls that will provide a successful long-term risk management strategy will be specific for each site and may include one or more of the following:

- remediation;
- engineering controls; and
- institutional controls.

9.1 REMEDIATION

Remediation of contaminated media involves the removal, fixation, or destruction of contaminants such that they no longer pose an unacceptable risk. Remediation of all contaminants to unrestricted use levels will allow the remediated property to be used without limitations. Achieving unrestricted use levels is often cost-prohibitive and often not necessary to control risks to human health and the environment. As an alternative to unrestricted use levels, remediation of contaminated media may use risk-based cleanup goals if institutional controls (and engineering controls as necessary) are incorporated into the risk-management strategy.

9.2 ENGINEERING CONTROLS

Engineering controls are generally considered “physical” controls that are designed to minimize risk by preventing exposure to contaminants. Common examples include:

- a barrier such as fencing designed to prevent access to contaminated media;
- a soil cap to prevent or limit infiltration of rain water through contaminated soil to help control contaminant migration in groundwater;
- hydraulic control of groundwater flow in an aquifer to manage the migration of contaminated groundwater;
- providing an alternate clean water supply by connecting well users to a municipal water supply or by providing a filter system;
- a vapor intrusion mitigation system designed to prevent vapors from entering a structure;

Engineering controls can be highly effective in managing risks from exposure, but it is important to acknowledge and document how the engineering controls will be sustained for the long-term. Institutional controls can be an effective mechanism to document the specific controls that need to be maintained as part of the long-term risk management strategy.

9.3 INSTITUTIONAL CONTROLS

Institutional controls are a general term for legal mechanisms (e.g., deed notices and survey plats) that obligate a property owner to specific actions that must be maintained, and/or actions that must be avoided, as part of the long-term risk management strategy for the property. An evaluation of the risks

posed by remaining contamination will help identify land-use restrictions and/or engineering controls that are necessary for the long-term management of risk at affected property(ies). This risk evaluation will take into account the toxicity, locations, and concentrations of contaminants, as well as the current and reasonable anticipated future use of a property.

Typically, institutional controls used as part of an approved remedy apply in perpetuity to the property for which they are written, or until the owner can demonstrate to the satisfaction of the agency that the contaminants no longer pose a risk, and thus there is no need to retain the property use restrictions.

Institutional controls incorporated into a risk-management strategy will commonly include a documentary component and a survey plat component which are recorded in the deed book and the map book, respectively, in the register of deeds office in the county where the property is located. Both components are typically signed by the property owner and the agency's delegated authority prior to recordation.

The documentary component generally specifies the following:

- Property ownership;
- Agency authority for the institutional control;
- Land-use restrictions that include prohibited activities, preventive measures, maintenance of engineering controls; annual certification requirements, and right-of-entry obligations;
- Acknowledgment by the signatory of their right to obligate the property to the restrictions;
- Consequences of failing to comply with the land-use restrictions;
- Obligations when the property is sold, leased conveyed, or transferred;
- A cross-reference to the survey plat notice filed for the subject property; and
- A reduced plat map, and the legal property description.

The survey plat component generally includes:

1. a map which meets the requirements of G.S. 47-30 and displays the surveyed boundaries of the property that is the subject of the restrictions
2. groundwater and soil sampling locations that represent the basis for the restrictions being imposed

In general, properties that have contaminants above unrestricted use levels need an institutional control to document the conditions for continued safe use of the property when the agency determines that the future exposures can be reasonably controlled through land-use restrictions or the equivalent.

At many contaminated sites, the extent of soil contamination is often confined to the source property, while groundwater contamination and vapor intrusion impacts encompass multiple parcels. A substantial obstacle for risk-based cleanups is application of land-use restrictions on property that was not the source of the contamination. Non-source property owners who did not cause or create the contamination have no incentive to accept limitations on their property. State-lead Risk-based programs currently handle this somewhat differently:

- DSCA has statutory authority (GS 143-215.104I(b1)) to use state or local government controls in lieu of land-use restrictions as long as the controls used provide a measure of protection equivalent to land-use restrictions. Current State and local controls are primarily limited to

controlling the use of groundwater. As such, these controls in lieu of land-use restrictions are limited in use to non-source properties where the only risk that needs to be protected is future installation of a drinking water supply well. Examples of these types of state or local government controls can be found in Appendix D: *Examples of State and Local Controls Used in Lieu of LURs*.

- If property owner(s) are also responsible parties for the site and decide not to consent to a remedy, the Department can order the property owner(s) to conduct the remedy at their own cost (NCGS 130A 310.5). If the property owner(s), after having given consent, decide to retract their consent, the DWM can complete the remedy using the State's PRLF trust fund (NCGS 130A 310.5), and can seek cost recovery for any remedial activities that may have occurred (NCGS 130A 310.6(d)).
- The UST Program uses an institutional control for the source property of a petroleum release, but does not have the authority to apply restrictions to affected non-source properties.
- The authority for LURs in DWM programs is in NC General Statutes - Chapter 143B Article 7. Current risk-based legislation applies to sites with contamination that does not extend beyond the source property boundary, so LURs are applied only to the source property. Implementation of LURs is the responsibility of the remediating party and their enforcement and maintenance is the responsibility of the property owner.

The State-lead programs that have resources to pursue land-use restrictions at non-source properties are often resigned to (1) lengthy discussions and negotiations to convince these property owners that land-use restrictions are a practical long term solution; or (2) to potential lengthy legal challenges to the imposition of restrictions upon an innocent owner whose property has become impacted by migrating contaminants.

If land-use restrictions cannot be implemented at properties where controls are needed to manage future risks, then contaminant levels would need to be reduced to levels so that restrictions are no longer needed. This may seem a reasonable alternative from the perspective of an innocent adjacent landowner. In practice, such sites will not likely achieve "no further action" status, particularly in those many cases where contaminants persist in the aquifer at trace levels above the applicable groundwater standard, regardless of any active remedial efforts using current technology.

10 APPENDIX C: CURRENT USE OF LAND-USE CONTROLS IN DIVISION OF WASTE MANAGEMENT PROGRAMS

10.1 UNDERGROUND STORAGE TANK (UST) PROGRAM

The UST Section does not have specific provisions for land-use restrictions in their Statutes or Rules. A Notice of Residual Petroleum sets out any restrictions on the current or future use of the real property pursuant to G.S. 143B-279.11(b) (Attachment A). The following summaries describe legislation related to the Notice requirements and procedures that exist only for residual petroleum contamination related to USTs:

1. General Statutes 143-215.94V are the standards for petroleum underground storage tank cleanup (Effective January 1, 1998), and state that risk-based corrective action is a process that utilizes an approach where assessment and remediation activities are specifically tailored to the conditions and risks of a specific site. They direct the commission to adopt rules that will provide for risk-based assessment and cleanup of discharges and releases from petroleum underground storage tanks. These rules are intended to combine groundwater standards that protect current and potential future uses of groundwater with risk-based analysis to determine the appropriate cleanup levels and actions.
2. 15A NCAC 02L .0400 are the Rules developed for RISK-BASED ASSESSMENT AND CORRECTIVE ACTION FOR PETROLEUM UNDERGROUND STORAGE TANKS (Effective December 1, 2005, recodified from 15A NCAC 02L.0115, which were effective on January 2, 1998). All sites are ranked according to the level of risk: low, intermediate and high. For low-risk sites, the responsible party can submit a report demonstrating that soil contamination has been remediated to either the residential or industrial/commercial maximum soil contaminant concentration established by the Department. If the risk posed by a discharge or release is determined by the Department to be a low risk, the Department notifies the responsible party that no cleanup, no further cleanup or no further action will be required by the Department unless the Department later determines that the discharge or release poses an unacceptable risk or a potentially unacceptable risk to human health or the environment.

If the risk is intermediate or high, the responsible party needs to submit a report demonstrating that soil contamination has been remediated to the lower of:

- a) the residential or industrial/commercial maximum soil contaminant concentration; or
- b) the "soil-to-groundwater" maximum soil contaminant concentration.

Notice Requirement.

A responsible party who submits a corrective action plan which proposes natural attenuation or to cleanup groundwater contamination to a standard other than a standard or interim standard established in 15A NCAC 02L .0202, or to cleanup soil other than to the standard for residential use or soil-to-groundwater contaminant concentration established pursuant to this Section, whichever is lowest, shall give notice to: the local Health Director and the chief administrative officer of each political jurisdiction in which the contamination occurs; all property owners and occupants within or contiguous to the area containing the contamination; and all property

owners and occupants within or contiguous to the area where the contamination is expected to migrate. Such notice shall describe the nature of the plan and the reasons supporting it.

3. General Statute 143B-279.11 (Attachment A) requires that the owner, operator, or other person responsible for a discharge or release of petroleum from a UST prepares and submits to the Department a proposed Notice entitled "Notice of Residual Petroleum" via certified mail and concurrent with the submittal of the corrective action plan. A template of the Notice is included as Attachment B.

Land-use restrictions may only be placed on the affected property(ies) owned by the RP, as stated in the following: *"Any restriction on the current or future use of real property pursuant to this subsection shall be enforceable only with respect to: (i) real property on which the source of contamination is located and (ii) any real property on which contamination is located at the time the remedial action plan is approved and that was owned or controlled by any owner or operator of the underground storage tank or other responsible party at the time the discharge or release of petroleum is discovered or reported or at any time thereafter."*

According to the UST Section Guidelines, "if the contamination is located on more than one parcel or tract of land, the Department may require that the owner, operator, or other person responsible for the discharge or release prepare a composite map or plat that shows all parcels or tracts. If the contamination is located on one parcel or tract of land, the owner, operator, or other person responsible for the discharge or release may prepare a map or plat that delineates the contamination but is not required to do so. When the Department has approved a map or plat, it shall be recorded in the office of the register of deeds and shall be incorporated into the Notice by reference."

The proposed Notice shall be submitted to the Department (i) before the property is conveyed, or (ii) when the Department issues a determination that no further action is required under the remedial action plan, whichever first occurs.

After the Department approves the Notice, the owner, operator, or other responsible party shall file a notarized copy of the approved Notice in the register of deeds office in the county or counties in which the real property is located. If the responsible party fails to submit and file the Notice required by this section within the time specified, the Secretary may prepare and file the Notice and seek cost recovery.

A Notice filed pursuant to this section can, at the request of the owner of the real property, be cancelled by the Secretary after the residual petroleum has been eliminated or remediated to unrestricted use standards.

To the extent feasible, the Department is required to maintain in each of the Department's regional offices a list of all petroleum underground storage tank discharges or releases discovered and reported to the Department within the region and those where a notification was issued.

Paragraph (d) of 143B 279.11 states that if the owner, operator, or other person responsible for the discharge or release fails to file the Notice as required by this section, any No Further Action (NFA) determination by the Department is void. Because the NFA can be issued before the NRP

is required to be filed (within 30 days of NFA), RPs or site owners can disappear with the NFA letter and never file the Notice. Work is progress to rectify this discrepancy in the Statute.

10.2 DRY-CLEANING SOLVENT CLEANUP ACT (DSCA) PROGRAM

General Statutes 143-215.104I(b) allows DSCA to incorporate land-use restrictions into the remedial strategy. A complete risk assessment of all remaining contaminants is conducted after site assessment is complete, all current risks are eliminated, and monitoring has shown that the groundwater contaminant plume is stable or decreasing. Based on the risk assessment, the site assessment data, and the monitoring data, the program prepares a risk management plan (RMP) to describe the steps needed to ensure the long-term control of future risks (i.e., the remedial strategy). The RMP includes the draft institutional controls and draft plat maps for all affected properties. Public comment is sought for any remedy that incorporates land-use restrictions. Public comments received must be addressed prior to proceeding with a recommendation for No Further Action.

Parties wishing to enter DSCA, must sign an agreement with DWM consenting to a risk-based cleanup and the use of land-use restrictions as part of whatever remedy is ultimately selected. Source property owners (with one exception to date) have consented to LURs in order to get a “no further action” (NFA) determination. [Note: the one owner who has refused to accept LURs is a subsequent source property owner of a site that was petitioned into the Program by the former dry-cleaner who leased the property from a previous property owner.

In situations where contaminants extend beyond the source property boundary, the program finds that non-source property owners who did not cause or create the contamination have no incentive to accept limitations on their property. To provide an alternative to land-use restrictions, DSCA sought and received statutory authority under 143-215.104I(b1) to use other state and local controls in lieu of land-use restrictions on properties other than the source property. Relevant State and local controls are primarily limited to controlling the use of groundwater. As such, these controls in lieu of land-use restrictions are limited in use to non-source properties where the only risk that needs to be protected is future installation of a drinking water supply well.

Use of state and local controls in lieu of land-use restrictions provides an alternative to LURs, but currently it is limited only to controlling future installation of water supply wells. If the risks at off-source properties involve vapor intrusion risks, DSCA must either rely on LURs at these non-source properties or remediate such that vapor intrusion restrictions are not needed to control potential future exposures.

10.3 PRE-REGULATORY LANDFILL (PRLF) PROGRAM

The authority to allow risk-based remediation for all contaminated media at Pre-Regulatory Landfill sites is found at G.S. 130A 310.6(c). The procedures for recording perpetual land-use restrictions on pre-regulatory landfill site properties are provided in the Inactive Hazardous Sites legislation at G.S. 130A 310.3(f).

Upon completion of the remedial investigation by either the Department or by the owner, permission to remediate is requested of the waste disposal area property owner prior to the Department’s development of the draft Remedial Action Plan (RAP). Upon receipt of consent to remediate from the

property owner, a Notice Plat and Declaration of Perpetual Land Used Restrictions (DPLUR) for the site is prepared in conjunction with, and included in, the Draft RAP. The PRLF Program considers the site to consist of all properties that contain the waste disposal area and associated contaminated media of which each could require a DPLUR. The properties upon which land-use restrictions will be imposed is determined by site-specific conditions and is handled on a case by case basis. The draft RAP is made available for public comment prior to implementation. Once the public comment period has ended, the RAP is finalized, the Notice Plat and DPLURs are recorded and then the RAP is implemented. The IHSB model DPLUR document is provided as Attachment C.

If property owner(s) are also responsible parties for the site and decide not to consent to a remedy, the Department can order the property owner(s) to conduct the remedy at their own cost (NCGS 130A 310.5). If the property owner(s), after having given consent, decide to retract their consent, the DWM can complete the remedy using the State's PRLF trust fund (NCGS 130A 310.5), and can seek cost recovery for any remedial activities that may have occurred (NCGS 130A 310.6(d)).

Once the remedy is implemented, the property owner must submit a notarized certification in January of each year confirming DPLURs are in compliance. It is anticipated that on-site inspections may be done by PRL staff on a 5 year schedule or when deemed necessary by the Department.

In the experience of the PRLF Program, it has taken over a year at some sites to develop and record DPLURs. A common source of delay is property owners' hesitancy to consent to the restrictions, as they potentially reduce property values, limit use, and commit the property owners to maintain the DPLURs. Often, owners submit the draft DPLURs to an attorney for review them and negotiate for revisions to prior to consenting.

10.4 INACTIVE HAZARDOUS SITES BRANCH (IHSB) STATE-LEAD SITES AND REGISTERED ENVIRONMENTAL CONSULTANT (REC) PROGRAM SITES

Current risk-based legislation for industrial sites (G.S. 130A-310. 65 to 77) allows cleanup to site-specific cleanup goals of source properties accompanied by institutional controls in the form of land-use restrictions. Under that current legislation, contamination that exists or has migrated off-property must be remediated to unrestricted use standards. As a result, there has not yet been a need to pursue off-property land-use restrictions. If the General Assembly expands the use of risk-based remediation to include sites with contamination on adjacent properties, remediators will need to implement land-use restrictions on those affected adjacent properties to ensure public safety.

Authority to record land-use restrictions as part of cleanup remedies currently exists for all Departmental remediation programs. However, many of the Department's cleanup programs have the flexibility in law to modify cleanup standards only for soil cleanup standards. At most sites, contaminated groundwater needs to be restored to unrestricted use standards unless the site is eligible for the risk-based cleanup allowed for industrial or manufacturing properties where groundwater contaminated above unrestricted use standards has not and will not migrate off the source property.

A general description of the authority and procedures for recording land-use restrictions and companion Notices on IHSB sites is presented below.

1. G.S. 130A-310.3(f) grants authority to impose land-use restrictions on the current or future use of the real property comprising any part of inactive hazardous substance or waste disposal site by an owner, operator or other responsible party. The restrictions must be agreed to by the owner of the real property and be part of a remedial action plan (RAP) for the site. The RAP must be approved by the Department and part of a remedial action program for the site. To participate in the remedial action program, specified in N.C.G.S. 130A-310.3 (b), the remediating party must sign an Administrative Agreement with the Department.
2. Restrictions may apply to activities on, over, or under the land, including, but not limited to, use of groundwater, building, and grading. Restrictions may be enforced by any owner, operator or other responsible party for the inactive hazardous substance or waste disposal site. The Department or any unit of local government having jurisdiction over any part of the site may also enforce the restrictions.
3. A Notice of Inactive Hazardous Substance or Waste Disposal Site (Notice) must also be recorded at sites imposing land-use restrictions. The Notice takes the form of a survey plat prepared in accordance with G.S. 130A-310.8 and IHSB Guidance.
4. The Declaration of Perpetual Land-Use Restrictions (DPLUR) Document is the IHS's land-use restriction instrument. The DPLUR model is used by the IHSB and is included as Attachment B. The DPLUR includes restrictions that can be adjusted for site-specific conditions and restrictions that are required for all properties that do not meet unrestricted use cleanup levels.
5. The IHSB requires the owner to submit an annual certification that the site is in compliance with the recorded restrictions. The IHSB may withdraw approval of the RAP if a site is not in compliance with the recorded restrictions.

10.5 HAZARDOUS WASTE SECTION (RCRA)

Statutes specific to the sites managed by the Hazardous Waste Section under RCRA do not provide for the recordation of land-use restrictions. Rather, G.S. 143B-279.9 and 279.10 (Attachment A) provides the Department the authority to incorporate land-use restrictions into approved remedies at the sites managed by that Section.

The Hazardous Waste Section is in the process of closing out a number of sites under the current risk-based legislation for industrial and manufacturing sites, which allows remediation of source properties to site-specific cleanup goals, accompanied by institutional controls in the form of land-use restrictions. The Hazardous Waste Section uses a DPLUR model document that is identical to the land-use restriction model used by the IHSB (Attachment B). An example of a DPLUR being employed as part of a risk-based remedy at a RCRA site is included as Attachment D.

10.6 SOLID WASTE SECTION

Statutes specific to the sites managed by the Solid Waste Section do not include provisions for the recordation of land-use restrictions. Rather, G.S. 143B-279.9 and 279.10 (Attachment A) provides the Department the authority to incorporate land-use restrictions into approved remedies at some of the sites managed by that Section.

The Solid Waste Section has in recent years approved monitored natural attenuation remedies for groundwater at a number of facilities where the facility operators have agreed to incorporate land-use restrictions into those remedies. The Section uses a DPLUR model document that is a version of the land-use restriction model used by the IHSB (Attachment B), modified to account for circumstances specific to solid waste management facilities. An example of a DPLUR being employed as part of a risk-based remedy approved by the Section is included as Attachment E.

10.7 ATTACHMENT A TO APPENDIX C - EXCERPT FROM NC GENERAL STATUTES - CHAPTER 143B ARTICLE 7.

http://www.ncga.state.nc.us/EnactedLegislation/Statutes/PDF/ByArticle/Chapter_143B/Article_7.pdf

§ 143B-279.9. Land-use restrictions may be imposed to reduce danger to public health at contaminated sites.

- (a) In order to reduce or eliminate the danger to public health or the environment posed by the presence of contamination at a site, an owner, operator, or other responsible party may impose restrictions on the current or future use of the real property comprising any part of the site where the contamination is located if the restrictions meet the requirements of this section. The restrictions must be agreed to by the owner of the real property, included in a remedial action plan for the site that has been approved by the Secretary, and implemented as a part of the remedial action program for the site. The Secretary may approve restrictions included in a remedial action plan in accordance with standards that the Secretary determines to be applicable to the site. Except as provided in subsection (b) of this section, if the remedial action is risk-based or will not require that the site meet unrestricted use standards, the remedial action plan must include an agreement by the owner, operator, or other responsible party to record approved land-use restrictions that meet the requirements of this section as provided in G.S. NC General Statutes - Chapter 143B Article 7, Section 143B-279.10 or G.S. 143B-279.11, whichever applies. Restrictions may apply to activities on, over, or under the land, including, but not limited to, use of groundwater, building, filling, grading, excavating, and mining. Any approved restriction shall be enforced by any owner of the land, operator of the facility, or other party responsible for the contaminated site. Any land-use restriction may also be enforced by the Department through the remedies provided by any provision of law that is implemented or enforced by the Department or by means of a civil action. The Department may enforce any land-use restriction without first having exhausted any available administrative remedies. A land-use restriction may also be enforced by any unit of local government having jurisdiction over any part of the site. A land-use restriction shall not be declared unenforceable due to lack of privity of estate or contract, due to lack of benefit to particular land, or due to lack of any property interest in particular land. Any person who owns or leases a property subject to a land-use restriction under this Part shall abide by the land-use restriction.
- (b) The definitions set out in G.S. 143-215.94A apply to this subsection. A remedial action plan for the cleanup of environmental damage resulting from a discharge or release of petroleum from an underground storage tank pursuant to Part 2A of Article 21A of Chapter 143 of the General Statutes must include an agreement by the owner, operator, or other party responsible for the discharge or release of petroleum to record a notice of any applicable land-use restrictions that meet the requirements of this subsection as provided in G.S. 143B-279.11. All of the provisions of this section shall apply except as specifically modified by this subsection and G.S. 143B-279.11. Any restriction on the current or future use of real property pursuant to this subsection shall be enforceable only with

respect to: (i) real property on which the source of contamination is located and (ii) any real property on which contamination is located at the time the remedial action plan is approved and that was owned or controlled by any owner or operator of the underground storage tank or other responsible party at the time the discharge or release of petroleum is discovered or reported or at any time thereafter. No restriction on the current or future use of real property shall apply to any portion of any parcel or tract of land on which contamination is not located. This subsection shall not be construed to require any person to record any notice of restriction on the current or future use of real property other than the real property described in this subsection. For purposes of this subsection and G.S. 143B-279.11, the Secretary may restrict current or future use of real property only as set out in any one or more of the following subdivisions:

- (1) Where soil contamination will remain in excess of unrestricted use standards, the property may be used for a primary or secondary residence, school, daycare center, nursing home, playground, park, recreation area, or other similar use only with the approval of the Department.
 - (2) Where soil contamination will remain in excess of unrestricted use standards and the property is used for a primary or secondary residence that was constructed before the release of petroleum that resulted in the contamination is discovered or reported, the Secretary may approve alternative restrictions that are sufficient to reduce the risk of exposure to contaminated soils to an acceptable level while allowing the real property to continue to be used for a residence.
 - (3) Where groundwater contamination will remain in excess of unrestricted use standards, installation or operation of any well usable as a source of water shall be prohibited.
 - (4) Any restriction on the current or future use of the real property that is agreed upon by both the owner of the real property and the Department.
- (c) This section does not alter any right, duty, obligation, or liability of any owner, operator, or other responsible party under any other provision of law.
- (d) As used in this section:
- (1) "Unrestricted use standards" means generally applicable standards, guidance, or established methods governing contaminants that are established by statute or adopted, published, or implemented by the Environmental Management Commission, the Commission for Public Health, or the Department. Cleanup or remediation of real property to unrestricted use standards means that the property is restored to a condition such that the property and any use that is made of the property does not pose a danger or risk to public health, the environment, or users of the property that is significantly greater than that posed by use of the property prior to its having been contaminated.
 - (2) "Risk-based", when used in connection with cleanup, remediation, or similar terms, means cleanup or remediation of contamination of real property to a level that, although not in compliance with unrestricted use standards, does not pose a significant danger or risk to public health, the environment, or users of the real property so long as the property remains in the condition and is used in a manner that is consistent with the assumptions as to the condition and use of the property on which the determination that the level of risk is acceptable is based. (1999-198, s. 1; 2000-51, s. 1; 2001-384, ss. 1, 12; 2002-90, s. 1; 2007-182, s. 2.)

§ 143B-279.10. Recordation of contaminated sites.

- (a) The owner of the real property on which a site is located that is subject to current or future use restrictions approved as provided in G.S. 143B-279.9(a) shall submit to the Department a survey plat as required by this section within 180 days after the owner is notified to do so. The survey plat shall

identify areas designated by the Department, shall be prepared and certified by a professional land surveyor, and shall be entitled "NOTICE OF CONTAMINATED SITE". Where a contaminated site is located on more than one parcel or tract of land, a composite map or plat showing all parcels or tracts may be recorded. The Notice shall include a legal description of the site that would be sufficient as a description in an instrument of conveyance, shall meet the requirements of G.S. 47-30 for maps and plats, and shall identify:

- (1) The location and dimensions of any disposal areas and areas of potential environmental concern with respect to permanently surveyed benchmarks.
 - (2) The type, location, and quantity of contamination known to the owner of the site to exist on the site.
 - (3) Any restriction approved by the Department on the current or future use of the site.
- (b) The Department shall review the proposed Notice to determine whether the Notice meets the requirements of this section and rules adopted to implement this section, and shall provide the owner of the site with a notarized copy of the approved Notice. After the Department approves the Notice, the owner of the site shall file a notarized copy of the approved Notice in the register of deeds office in the county or counties in which the land is located within 15 days of the date on which the owner receives approval of the Notice from the Department.
- (c) Repealed by Session Laws 2012-18, s. 1.22, effective July 1, 2012.
- (d) In the event that the owner of the site fails to submit and file the Notice required by this section within the time specified, the Secretary may prepare and file the Notice. The costs thereof may be recovered by the Secretary from any responsible party. In the event that an owner of a site who is not a responsible party submits and files the Notice required by this section, the owner may recover the reasonable costs thereof from any responsible party.
- (e) When a contaminated site that is subject to current or future land-use restrictions is sold, leased, conveyed, or transferred, the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the property is a contaminated site and a reference by book and page to the recordation of the Notice.
- (f) A Notice of Contaminated Site filed pursuant to this section shall, at the request of the owner of the land, be cancelled by the Secretary after the contamination has been eliminated or remediated to unrestricted use standards. If requested in writing by the owner of the land and if the Secretary concurs with the request, the Secretary shall send to the register of deeds of each county where the Notice is recorded a statement that the contamination has been eliminated, or that the contamination has been remediated to unrestricted use standards, and request that the Notice be cancelled of record. The Secretary's statement shall contain the names of the owners of the land as shown in the Notice and reference the plat book and page where the Notice is recorded.
- (g) This section does not apply to the cleanup pursuant to a remedial action plan that addresses environmental damage resulting from a discharge or release of petroleum from an underground storage tank pursuant to Part 2A of Article 21A of Chapter 143 of the General Statutes.
- (h) The definitions set out in G.S. 143B-279.9 apply to this section. (1999-198, s. 1; 2000-51, s. 2; 2001-384, s. 2; 2002-90, s. 2; 2012-18, s. 1.22.)

§ 143B-279.11. Recordation of residual petroleum from an underground storage tank.

- (a) The definitions set out in G.S. 143-215.94A and G.S. 143B-279.9 apply to this section. This section applies only to a cleanup pursuant to a remedial action plan that addresses environmental damage resulting from a discharge or release of petroleum from an underground storage tank pursuant to Part 2A of Article 21A of Chapter 143 of the General Statutes.
- (b) The owner, operator, or other person responsible for a discharge or release of petroleum from an underground storage tank shall prepare and submit to the Department a proposed Notice that meets the requirements of this section. The proposed Notice shall be submitted to the Department (i) before

the property is conveyed, or (ii) when the owner, operator, or other person responsible for the discharge or release requests that the Department issue a determination that no further action is required under the remedial action plan, whichever first occurs. The Notice shall be entitled "NOTICE OF RESIDUAL PETROLEUM". The Notice shall include a description that would be sufficient as a description in an instrument of conveyance of the (i) real property on which the source of contamination is located and (ii) any real property on which contamination is located at the time the remedial action plan is approved and that was owned or controlled by any owner or operator of the underground storage tank or other responsible party at the time the discharge or release of petroleum is discovered or reported or at any time thereafter. The Notice shall identify the location of any residual petroleum known to exist on the real property at the time the Notice is prepared. The Notice shall also identify the location of any residual petroleum known, at the time the Notice is prepared, to exist on other real property that is a result of the discharge or release.

The Notice shall set out any restrictions on the current or future use of the real property that are imposed by the Secretary pursuant to G.S. 143B-279.9(b) to protect public health, the environment, or users of the property.

- (c) If the contamination is located on more than one parcel or tract of land, the Department may require that the owner, operator, or other person responsible for the discharge or release prepare a composite map or plat that shows all parcels or tracts. If the contamination is located on one parcel or tract of land, the owner, operator, or other person responsible for the discharge or release may prepare a map or plat that shows the parcel but is not required to do so. A map or plat shall be prepared and certified by a professional land surveyor, shall meet the requirements of G.S. 47-30, and shall be submitted to the Department for approval. When the Department has approved a map or plat, it shall be recorded in the office of the register of deeds and shall be incorporated into the Notice by reference.
- (d) The Department shall review the proposed Notice to determine whether the Notice meets the requirements of this section and rules adopted to implement this section and shall provide the owner, operator, or other person responsible for the discharge or release of petroleum from an underground storage tank with a notarized copy of the approved Notice. After the Department approves the Notice, the owner, operator, or other person responsible for the discharge or release of petroleum from an underground storage tank shall file a notarized copy of the approved Notice in the register of deeds office in the county or counties in which the real property is located (i) before the property is conveyed or (ii) within 30 days after the owner, operator, or other person responsible for the discharge or release receives notice from the Department that no further action is required under the remedial action plan, whichever first occurs. If the owner, operator, or other person responsible for the discharge or release fails to file the Notice as required by this section, any determination by the Department that no further action is required is void. The owner, operator, or other person responsible for the discharge or release, may record the Notice required by this section without the agreement of the owner of the real property. The owner, operator, or other person responsible for the discharge or release shall submit a certified copy of the Notice as filed in the register of deeds office to the Department.
- (e) Repealed by Session Laws 2012-18, s. 1.23, effective July 1, 2012.
- (f) In the event that the owner, operator, or other person responsible for the discharge or release fails to submit and file the Notice required by this section within the time specified, the Secretary may prepare and file the Notice. The costs thereof may be recovered by the Secretary from any responsible party. In the event that an owner of the real property who is not a responsible party submits and files the Notice required by this section, the owner may recover the reasonable costs thereof from any responsible party.
- (g) A Notice filed pursuant to this section shall, at the request of the owner of the real property, be cancelled by the Secretary after the residual petroleum has been eliminated or remediated to unrestricted use standards. If requested in writing by the owner of the land, the Secretary shall send to the register of deeds of each county where the Notice is recorded a statement that the residual petroleum has been eliminated, or that the residual petroleum has been remediated to unrestricted use

standards, and request that the Notice be cancelled of record. The Secretary's statement shall contain the names of the owners of the land as shown in the Notice and reference the plat book and page where the Notice is recorded. (2001-384, s. 3; 2002-90, ss. 3-5; 2012-18, s. 1.23.)

10.8 ATTACHMENT B TO APPENDIX C EXAMPLE UST NOTICE OF RESIDUAL PETROLEUM

_____, _____ County, North Carolina

(site name)

The property that is the subject of this Notice (hereinafter referred to as the "Site") contains residual petroleum and is an Underground Storage Tank (UST) incident under North Carolina's Statutes and Regulations, which consist of N.C.G.S. 143-215.94 and regulations adopted thereunder. This Notice is part of a remedial action for the Site that has been approved by the Secretary (or his/her delegate) of the North Carolina Department of Environment and Natural Resources (or its successor in function), as authorized by N.C.G.S. Section 143B-279.9 and 143B-279.11. The North Carolina Department of Environment and Natural Resources shall hereinafter be referred to as "DENR".

NOTICE

Petroleum product was released and/or discharged at the Site. **Petroleum constituents remain on the site, but are not a danger to public health and the environment, provided that the restrictions described herein, and any other measures required by DENR pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11, are strictly complied with.** This "Notice of Residual Petroleum" is composed of a description of the property, the location of the residual petroleum, and the land-use restrictions on the Site. The Notice has been approved and notarized by DENR pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11 and has/shall be recorded at the

Register of Deeds' office Book _____, Page _____.

(name of county)

Any map or plat required by DENR has been/shall be recorded at the _____ Register of

(name of county)

Deeds' office Book _____, Page _____, and has been/shall be incorporated into the Notice by this reference.

Source Property

_____ of is the owner in fee (owner's name) _____ (city & state of homeowner)

simple of all or a portion of the Site, which is located in the County of _____, State of North Carolina, and is known and legally described as:

Additional Affected Property Also Subject to Restrictions

_____ of _____ is the owner in fee simple of a portion of

_____ (owner's name) _____ (city & state of owner)

the Site, which is located in the County of _____, State of North Carolina. Petroleum contamination is located on this property at the time this Notice is approved. This property was also owned or controlled by the underground storage tank owner or operator or another party responsible for the petroleum discharge or release at the time the discharge or release was discovered or reported, or at any time thereafter. This property is known and legally described as:

(Insert Real Property Description Here for Additional Properties Owned or Controlled by Any Owner or Operator of the Underground Storage Tank or Other Responsible Party, if Applicable)

For protection of public health and the environment, the following land-use restrictions required by N.C.G.S. Section 143B-279.9(b) shall apply to all of the above-described real property. These restrictions shall continue in effect as long as residual petroleum remains on the site in excess of unrestricted use standards and cannot be amended or cancelled unless and until the _____ County Register of Deed receives and records the written concurrence of the Secretary (or his/her delegate) of DENR (or its successor in function).

Additional Affected Property Not Subject to Restrictions

Additionally residual petroleum is also located on the following property. The following property is not subject to land-use restrictions pursuant to N.C.G.S. Section 143B-279.9(b). The following property is known and legally described as:

(Insert Legal Description of Other Real Property Affected by Residual Petroleum Not Owned or Controlled by Any Owner or Operator of the Underground Storage Tank or Other Responsible Party, if Applicable)

PERPETUAL LAND-USE RESTRICTIONS

[Restrictions apply to activities on, over, or under the land. Choose one or more of the following as appropriate.]

Soil:

Alternate 1) Soil containing residual petroleum, above applicable regulatory standard(s), remains on the site at/within/etc. (Description of specific location on the site of remaining petroleum contaminated soil). No soil shall be excavated or disturbed, within _____feet of (Description of specific location on the site of remaining petroleum contaminated soil), except to remediate the soil in accordance with all applicable state and federal statutes, regulations and guidelines.

Alternate 2) Soil containing residual petroleum above applicable regulatory standard(s) remains on the site in the area identified in Figure 1, Attachment A (Refer to extent of contamination as diagrammed in an existing report and attach copy of that figure(s)). No soil shall be excavated or disturbed within 3 feet of the area identified in Figure 1, Attachment A except to remediate the soil in accordance with all applicable state and federal statutes, regulations and guidelines.

Groundwater:

Groundwater from the site is prohibited from use as a water supply. Water supply wells of any kind shall not be installed or operated on the site.

ENFORCEMENT

The above land-use restriction(s) shall be enforced by any owner, operator, or other party responsible for the Site. The above land-use restriction(s) may also be enforced by DENR through any of the remedies provided by law or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Notice without the approval of DENR (or its successor in function) shall be subject to enforcement by DENR to the full extent of the law. Failure by any party required or authorized to enforce any of the above restriction(s) shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

IN WITNESS WHEREOF, _____ has caused this Notice to be executed pursuant to N.C.G.S. Sections 143B-279.9 and 143B-279.11, this _____ day of _____, 200_.

By:

(name of responsible party if agent is signing)

(signature of responsible party, attorney or other agent if there is one)

(title of agent for responsible party if there is one)

Signatory's name typed or printed:

Choice One: Instrument signed by one person

NORTH CAROLINA _____ COUNTY

(Name of county in which acknowledgment was taken)

I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document:

Date: _____

(Official Seal)

(signature of Notary Public)

(printed or typed name of Notary Public)

Notary Public

My commission expires _____

Choice Two: Acknowledge by attorney in fact

NORTH CAROLINA

_____ COUNTY

(Name of county in which acknowledgment was taken)

I, _____, a Notary Public for said County and State, do hereby certify that, attorney in fact for _____, personally appeared before me this day, and being by me duly sworn, says that he executed the foregoing and annexed instrument for and in behalf of the said, and that his authority to execute and acknowledge said instrument is contained in an instrument duly executed, acknowledged, and recorded in the office of _____ in the County of _____, State of _____, on the _____ day of _____, 200_ and that this instrument was executed under and by virtue of the authority given by said instrument granting him power of attorney.

I do further certify that the said _____ acknowledged the due execution of the foregoing and annexed instrument for the purposes therein expressed for and in behalf of the said.

WITNESS my hand and official seal, this the _____ day of _____, 200_.

(Official Seal)

(signature of Notary Public)

(printed or typed name of Notary Public)

Notary Public

My commission expires: _____

Choice Three: Conveying security interest in personal property of a corporation

NORTH CAROLINA

_____ COUNTY

(Name of county in which acknowledgment was taken)

I, _____, a Notary Public for said County and State, do hereby certify that _____ personally came before me this day and acknowledged that he is of _____ and acknowledged, on behalf of _____, the grantor the due execution of the foregoing instrument.

WITNESS my hand and official seal, this the _____ day of _____, 200_.

(Official Seal)

(signature of Notary Public)

(printed or typed name of Notary Public)

Notary Public

My commission expires:

Approved for the purposes of N.C.G.S. 143B-279.11

(signature of Regional Supervisor)

_____, Regional Supervisor

(printed name of Regional Supervisor)

_____ Regional Office

UST Section

Division of Waste Management

Department of Environment and Natural Resources

NORTH CAROLINA

_____ COUNTY

(Name of county in which acknowledgment was taken)

I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: *(full printed name of Regional Supervisor)*

Date: _____

(Official Seal)

(signature of Notary Public)

(printed or typed name of Notary Public)

Notary Public

My commission expires: _____

10.9 ATTACHMENT C TO APPENDIX C - EXAMPLE DPLUR IN INACTIVE HAZARDOUS SITES BRANCH

DECLARATION OF PERPETUAL LAND-USE RESTRICTIONS

Yellow highlighted items are instructions for DPLUR preparation.

For Property Owned By: [insert owner name as exactly as appears on the deed;

The real property which is the subject of this Declaration of Perpetual Land-use restrictions ("Declaration") is contaminated with hazardous substances, and is *[insert "part of" if the contamination goes beyond the property boundary of the property that is the subject of this DPLUR; in other words the Site (the contamination) extends across multiple properties, whether or not each will have land-use restrictions]* an INACTIVE HAZARDOUS SUBSTANCE OR WASTE DISPOSAL SITE ("the Site") as defined by North Carolina's Inactive Hazardous Sites Response Act of 1987, which consists of Section 130A-310 through Section 130A-310.19 of the North Carolina General Statutes ("N.C.G.S."). This Declaration is part of a Remedial Action Plan for the Site that has been approved by the Secretary of the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Superfund Section (or its successor in function), or his/her delegate, as authorized by N.C.G.S. Section 130A-310.3(f). The North Carolina Department of Environment and Natural Resources shall hereinafter be referred to as "DENR." Hereafter, the Division of Waste Management, Superfund Section shall be referred to as "Superfund Section".

[insert owner's name], *[insert city & state of HQ if not a person]* is the owner in fee simple of the Property ("the Property"), which is located at *[insert property address]* in the County of *[insert county]*, City of *[insert city]*, State of North Carolina, and is the real property legally described in Deed Book *[insert deed bk #]*, Page *[insert pg #]* in the Office of the Register of Deeds for *[insert county]* County. The Property is also shown on a Notice of Inactive Hazardous Substance or Waste Disposal Site, in the form of a survey plat ("Survey Plat"), which has been recorded prior to the recordation of this Declaration in Map Book____Page____ in the Office of the Register of Deeds for *[insert county]* County. A copy of the Survey Plat is included as Exhibit A to this Declaration.

For the purpose of protecting public health and the environment, *[insert owner's name]* hereby declares that all of the Property shall be held, sold and conveyed subject to the following perpetual land-use restrictions, which shall run with the land; shall be binding on all parties having any right, title or interest in the Property or any part thereof, their heirs, successors and assigns; and shall, as provided in N.C.G.S. Section 130A-310.3(f), be enforceable without regard to lack of privity of estate or contract, lack of benefit to particular land, or lack of any property interest in particular land. These restrictions shall continue in perpetuity and cannot be amended or canceled unless and until the *[insert county]* County Register of Deeds receives and records the written concurrence of the Secretary of DENR (or its successor in function), or his/her delegate. If any provision of this Declaration is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

PERPETUAL LAND-USE RESTRICTIONS

Select any combination of the following restrictive covenants and modify as needed. Make sure to review our Principles for Recordation of DPLURs and our standard guidance document prior to preparation.

If the property will have one set of restrictive covenants for a specific area of the property and then other covenants for the entire property, will need to label the area with separate restrictions something like "Area A" or other designation on the Notice. The list of restrictive covenants should be introduced with the following text. When there is no Area A and restrictions will apply to entire property no introductory text is needed; just begin listing the restrictive covenants.

The following restrictions shall apply only to Area A of the Property:

- 1.

The following restrictions shall apply to both Area A and the entire Property:

- 1.

Covenant when restricting all uses at a property containing a landfill:

Activities necessary to maintain the security and structural integrity of the landfill at the Property are permitted, with prior written approval by the Superfund Section or its successor in function. All other uses at the Property are prohibited, except as approved in writing by the Superfund Section or its successor in function.

For industrial/commercial-use scenario:

1. The Property shall be used exclusively for commercial or industrial purposes but shall not be used for or contain for child care facilities, schools, parks, recreational areas, or athletic fields.

For park-use scenario where soils at surface meet park remediation goals:

1. The Property shall be used for open space only and for no other purpose. "Open space" for purposes of this restriction means an undeveloped, natural area where the sole human use shall be non-dermal recreational activities such as biking, hiking, running, hunting, fishing, and bird watching. The Property shall not be developed or utilized for residential, commercial or industrial purposes.

If the Property has an earthen/crushed stone cap as part of the remedy, additional restrictions on erosional park activities (e.g., biking/horse riding rinks/dirt biking) must be specifically listed. Incorporate in previous restriction or set out separately as an additional covenant like the following:

1. The Property shall not be used for:

Recreation Sports
Agriculture, grazing or timber production

Mining, extraction of coal, oil, gas or any other minerals or non-mineral substances Kennel or private animal pens

Horseback riding

Bike riding

To allow for only specific uses, provide a list similar to the following:

1. The Property shall not be used for any purpose except those specified below:

Paved industrial parking lot

Any time contamination exceeds industrial levels at industrial property or park levels at park property below clean fill or a cap of any sort, one or both of the following (1 or 2 coupled with 3) will be required:

1. No above- or below-ground construction or improvements (including, but not limited to, utilities, roads, sidewalks, and landscaping) are allowed without prior written approval by the Superfund Section or its successor in function.
2. No alteration or disturbance of the existing soil, landscape and contours shall occur other than erosion control measures without prior written approval by the Superfund Section or its successor in function.
3. Mowing of vegetation and tree pruning is allowed on the Property.

Other restrictions to consider:

1. Surface water or underground water (groundwater) shall not be used for any purpose.
2. The installation of groundwater wells or other devices for access to groundwater for any purpose other than monitoring groundwater quality is prohibited without prior written approval by the Superfund Section or its successor in function.

For any Property requiring the maintenance of barriers, fences, or other items as part of the remedial action and necessary to prevent exposure, select from the following and add any others:

1. The following standard maintenance activities shall be performed at the Property: *[list the maintenance activities that were included in the remedy]*

Asphalt *[or "Concrete" or "Concrete flooring"]* shall be maintained across the property *[or "Area A" or "XXX building"]* in good condition. Cracks shall be repaired promptly upon discovery.

Soil cover *[or "crushed stone"]* of a thickness of *[fill in]* shall be maintained over the geotextile erosional marker covering Area A. Erosion of the soil cover shall be repaired promptly upon discovery.

All fencing shall be inspected at least annually and maintained in the specific location depicted on the Notice, in it's original condition and in a manner that secures Area A.

[for fenced areas with limited access and thus higher concentrations allowed] Signs indicating the presence of contamination and restricting *["disturbance of soil" and/or "access"]* shall be located at each corner and along the perimeter of fencing in Area A. The front of each sign shall face away from Area A. Each sign shall be located at a maximum distance of 100 feet apart and in a manner such they are easily visible along the perimeter of Area A at all times. The signs shall state the following using similar font with a minimum of one-half (0.5) inch font size:

NOTICE

RESTRICTED ACCESS - CONTAMINATED AREA

Contact the Property Owner
Regarding Land-use restrictions
Prior to *["Access" or "Disturbing Soil"]*

All signage required by this instrument shall be inspected at least annually and maintained in it's original condition.

The following restrictions are always required:

2. No surface or subsurface native or fill earthen materials may be removed from the Property without prior written approval by the Superfund Section or its successor in function.
3. Each person who owns any portion of the Property shall 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 Office of the *[insert county]* County Register of Deeds, that activities and conditions at the Property remain in compliance with the land-use restrictions herein, and that the Property has not been subdivided since the last letter report submitted to the Superfund Section. *[Include any inspection reporting requirements that need annual certification by the property owner.]*
4. No person conducting environmental assessment or remediation at the Site, or involved in determining compliance with applicable land-use restrictions at the Property, at the direction of,

or pursuant to a permit or order issued by the Superfund Section or its successor in function may be denied access to the Property for the purpose of conducting such activities.

5. Each person who owns any portion of the Property shall cause the instrument of any sale, lease, grant, or other transfer of any interest in the Property to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land-use restriction in this Declaration.

REPRESENTATIONS AND WARRANTIES

The owner of the Property hereby represents and warrants to the other signatories hereto:

that the owner of the Property is the sole owner of the Property;

Select one of the following 2 items

that the owner of the Property holds fee simple title to the Property free, clear and unencumbered;

or

that the owner of the Property holds *[insert "fee simple" if applicable]* title subject to the interests or encumbrances identified in Exhibit *[insert exhibit reference]* attached hereto and incorporated by reference herein;

that the owner of the Property has the power and authority to enter into this Declaration, to grant the rights and interests herein provided and to carry out all obligations hereunder;

that the owner of the Property has provided to the Superfund Section the names of all other persons that own an interest in or hold an encumbrance on the Property and has notified such persons of the owner's intention to enter into this Declaration;

[add if applicable] that to the extent that any other interest in or encumbrances on the Property conflict with the restrictions and requirements set forth in this Declaration, the persons who own such interests or hold such encumbrances have agreed to subordinate such interest or encumbrances to this Declaration and the subordination agreement[s] is *[are]* attached hereto as Exhibit *[insert exhibit reference]*; and

that this Declaration will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which the owner of the Property is a party or by which the owner of the Property may be bound or affected.

ENFORCEMENT

The above land-use restrictions are an integral part of the remedy for the contamination at the Site. Adherence to the restrictions is necessary to protect public health and the environment. These land-use restrictions shall be enforced by any owner, operator, or other party responsible for any part of the Site. The above land-use restrictions may also be enforced by the Superfund Section through the remedies provided in N.C.G.S. Chapter 130A, Article 1, Part 2 or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Declaration without the approval of the Superfund Section or its successor in function shall constitute noncompliance with the Remedial Action Plan approved by the Superfund Section for the Site, and shall be subject to enforcement by the Superfund Section to the full extent of the law. Failure by any party required or authorized to enforce any of the above restrictions shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

FUTURE SALES, LEASES, CONVEYANCES AND TRANSFERS

When any portion of the Property is sold, leased, conveyed or transferred, pursuant to N.C.G.S. Section 130A-310.8(e) the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the real property being sold, leased, conveyed, or transferred has been used as a hazardous substance or waste disposal site and a reference by book and page to the recordation of the Notice of Inactive Hazardous Substance or Waste Disposal Site referenced in this Declaration.

OWNER SIGNATURE

Use the following when owner is an individual acting for himself/herself and then continue with notary language below. Note that if an individual is a sole owner of a company and that company is the owner on the deed, use the next option instead:

IN WITNESS WHEREOF, I execute these presents on this _____ day of _____, 20__.

Signatory's name typed or printed:

Signature:

Use the following when owner is a company/corporation/organization and an individual representing that entity will sign or if the owner is a person and another individual acting through power of attorney will sign:

IN WITNESS WHEREOF, I, exercising power of attorney for [insert owner's name] execute these presents on this day of _____, 20 _____.

Signatory's name typed or printed: _____

Include for business/organization representatives only

Signatory's title typed or printed: _____

Include for business/organization representatives only

Owner name typed or printed: _____

[if owner is a business entity and a corporate officer or partner is signing, insert “declared that” “he” or “she” “is the” insert title of signatory “of” insert owner company name “and that by authority duly given, and as the act of” insert owner company name “he” or “she” “has signed this Declaration.”]

WITNESS my hand and official seal this _____ day of _____, 20__.

Notary Public
My Commission expires: _____

[SEAL]

APPROVAL AND CERTIFICATION OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

The foregoing Declaration of Perpetual Land-use restrictions is hereby approved and certified.

By:

Jim Bateson, Chief Superfund Section
Division of Waste Management

North Carolina Department of Environment and Natural Resources
STATE OF NORTH CAROLINA
COUNTY OF

I, _____, a Notary Public, do hereby certify that proper identification in the form of personally appeared before me this day, produced _____, and signed this Declaration.

WITNESS my hand and official seal this _____ day of _____, 20__.

Notary Public
My Commission expires: _____

[SEAL]

REGISTER OF DEEDS CERTIFICATION

The foregoing Declaration of Perpetual Land-use restrictions is certified to be duly recorded at the date and time, and the Book and Page, shown on the first page hereof.

Register of Deeds for [*insert county*] County

By: _____
Signature

Type or print name and title

10.10 ATTACHMENT D OF APPENDIX C - EXAMPLE DPLUR EMPLOYED BY THE NC DWM
HAZARDOUS WASTE SECTION

DECLARATION OF PERPETUAL LAND-USE RESTRICTIONS

For Property Owned By: XXXXXXXXXXXXX
XXXXXXXXXXXX Site, XXXXXXXX County, North Carolina

The real property which is the subject of this Declaration of Perpetual Land-use restrictions ("Declaration") is that portion of the "Site" that is contaminated with hazardous waste or hazardous constituents identified as "Area A" and "Area B" on the Survey Plat attached hereto as Exhibit A and is a Contaminated Site for Hazardous Waste or Solid Waste Management Unit Disposal Site based on the contamination in Areas A and B. Nothing herein shall apply to any portion of the Site on which contamination is not located, to wit: nothing herein applies to any portion of the Site other than "Area A" and "Area B."

This Declaration is part of a remedial action plan that has been approved by the Secretary of the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Hazardous Waste Section, as authorized by N.C.G.S.

§ 143B-279.9. The North Carolina Department of Environment and Natural Resources shall hereinafter be referred to as "DENR." Hereafter, the Division of Waste Management, Hazardous Waste Section shall be referred to as "Hazardous Waste Section."

XXXXXXXXXXXX, a North Carolina limited liability company, is the owner in fee simple of the Site, which is located at XXXXXXXXXXXXX in the County of XXXXXXXX, City of XXXXXXXX, State of North Carolina, and is legally described in Deed Book 15583, Page 2489 in the Office of the Register of Deeds for XXXXXXXX County. The Site is also shown on a Notice of Contaminated Site for Hazardous Waste or Solid Waste Management Unit Disposal Site in the form of a survey plat, hereinafter referred to as the "Survey Plat", which has been recorded immediately prior to the recordation of this Declaration in Map Book Page in the Office of the Register of Deeds for XXXXXXXX County. A copy of the Survey Plat showing the Site along with Areas A and B is included as Exhibit A to this Declaration.

For the purpose of reducing and/or eliminating the potential danger to the public health and the environment based on the contamination at Area A and Area B of the Site, Aventura Place, LLC, hereby declares that Areas A and B shall be held, sold and conveyed subject to the following perpetual land-use restrictions, which shall run with the land; shall be binding on all parties having any right, title or interest in the Parcel of Property or any part thereof, their heirs, successors and assigns; and shall, as provided in N.C.G.S. § 143B-279.9, be enforceable without regard to lack of privity of estate or contract, lack of benefit to particular land, or lack of any property interest in particular land. These restrictions shall continue in perpetuity and cannot be amended or canceled unless and until the Wake County Register of Deeds receives and records the written concurrence of the Secretary of DENR (or its successor in function), or his/her delegate. If any provision of this Declaration is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired. The parties hereto expressly agree and acknowledge that there are no known current impacts to any person or persons and/or to the environment based on the contamination at Area A and Area B of the Site.

PERPETUAL LAND-USE RESTRICTIONS

The following restrictions shall apply only to Area A:

1. Area A shall be used exclusively for commercial or industrial purposes but shall not be used for child care centers, schools, parks, recreational areas, or athletic fields.
2. Any use of groundwater located at or under Area A is prohibited. This includes the use of groundwater for drinking, bathing, irrigation, industrial processes, or any other purpose which would cause groundwater to come into contact, either directly or indirectly, with people, animals, surface vegetation, or the atmosphere.
3. No below-ground construction or improvements (including, but not limited to, utilities, roads, and sidewalks) may be installed at or under Area A unless approved in writing in advance by the Hazardous Waste Section or its successor in function. No alteration or disturbance of the existing soil, landscape and contours shall occur other than erosion control measures approved by the Hazardous Waste Section or its successor in function.
4. No alteration or disturbance of the existing soil, landscape and contours shall occur at or under Area A other than (a) erosion control measures approved in writing by the Hazardous Waste Section or its successor in function and/or (b) the alteration or disturbance of existing soil, landscape and contours caused by nature and/or an act of God.
5. No surface or subsurface native or fill earthen materials may be removed from Area A without prior written approval by the Hazardous Waste Section or its successor in function.
6. Each person who owns any portion of Area A shall submit a letter report, containing the notarized signature of the owner, in January of each year on or before January 31st, to the Hazardous Waste Section, or its successor in function, confirming that this Declaration is still recorded in the Office of the Wake County Register of Deeds, that activities and conditions at Area A remain in compliance with the land-use restrictions herein, and that Area A has not been subdivided since the last letter report submitted to the Hazardous Waste Section.
7. Each person who owns any portion of Area A shall cause the instrument of any sale, lease, grant, or other transfer of any interest in Area A to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land-use restriction in this Declaration.
8. DENR and/or its agents and representatives who are involved in determining compliance with applicable land-use restrictions at Area A may not be denied access for the purpose of conducting such activities with reasonable notice to the owner or owners of any portion of the Site.

To further protect human health and the environment, a 100-foot buffer zone, designated as Area B, has been defined. The following restriction shall apply to both Area A and Area B:

1. The installation of groundwater wells or other devices for access to groundwater located at or under Areas A and B for any purpose other than monitoring groundwater quality is prohibited without prior written approval by the Hazardous Waste Section or its successor in function.
2. Each person who owns any portion of Area B shall submit a letter report, containing the notarized signature of the owner, in January of each year on or before January 31st, to the Hazardous Waste Section, or its successor in function, confirming that this Declaration is still recorded in the Office of the Wake County Register of Deeds, that activities and conditions at Area B remain in

compliance with the land-use restrictions herein, and that Area B has not been subdivided since the last letter report submitted to the Hazardous Waste Section.

3. Each person who owns any portion of Area B shall cause the instrument of any sale, lease, grant, or other transfer of any interest in Area B to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land-use restriction in this Declaration.
4. DENR and/or its agents and representatives who are involved in determining compliance with applicable land-use restrictions at Area B may not be denied access for the purpose of conducting such activities with reasonable notice to the owner or owners of any portion of the Site.

REPRESENTATIONS AND WARRANTIES

The owner of the Site hereby represents and warrants to the other signatories hereto:

- that the owner of the Site is the sole owner;
- that the owner of the Site holds fee simple title to the property free, clear and unencumbered;
- that the owner of the Site has the power and authority to enter into this Declaration, to grant the rights and interests herein provided and to carry out all obligations hereunder;
- that the owner of the Site has provided to the Hazardous Waste Section the names of all other persons that own an interest in or hold an encumbrance on the property and has notified such persons of the owner's intention to enter into this Declaration;
- that this Declaration will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which the owner of the property is a party or by which the owner of the property may be bound or affected.

ENFORCEMENT

The above land-use restrictions are an integral part of the remedy for the contamination at the Areas A and B of the Site. Adherence to the restrictions is necessary to protect public health and the environment. These land-use restrictions shall be enforced by any owner, operator, or other party responsible for Areas A and B. The above land-use restrictions may also be enforced by the Hazardous Waste Section through the remedies provided in N.C.G.S. § 130A, Article 1, Part 2, or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Declaration without the approval of the Hazardous Waste Section or its successor in function shall constitute noncompliance with the remedial action plan approved by the Hazardous Waste Section for the Site, and shall be subject to enforcement by the Hazardous Waste Section to the full extent of the law. Failure by any party required or authorized to enforce any of the above restrictions shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

FUTURE SALES, LEASES, CONVEYANCES AND TRANSFERS

When any portion of Areas A or B are sold, leased, conveyed or transferred, pursuant to N.C.G.S. Section 143B-279.10(e) the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the real property being sold, leased, conveyed, or transferred is a contaminated site and a reference by book and

page to the recordation of the Notice of Contaminated Site for Hazardous Waste or Solid Waste Management Unit Disposal Site referenced in this Declaration.

OWNER SIGNATURE

IN WITNESS WHEREOF, XXXX, LLC, a North Carolina limited liability company, has executed these presents on this _____ day of _____, 2014.

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
a XXXXXXXXXXXXXXXXXXXX company

By: _____, Managing Member

STATE OF NORTH CAROLINA
COUNTY OF _____

I, _____, a Notary Public, do hereby certify that XXXXXXXXXXXXXXX personally appeared before me this day, produced proper identification in the form of _____, and declared that he is the Managing Member of signatory of XXXXXXXXXXXXXXX, and that by authority duly given, and as the act of such entity, he has signed this Declaration.

WITNESS my hand and official seal this _____ day of _____, 20XX.

Notary Public

My Commission expires:

[SEAL]

APPROVAL AND CERTIFICATION OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

The foregoing Declaration of Perpetual Land-use restrictions is hereby approved and certified.

By: _____

Linda Culpepper, Director
Division of Waste Management
North Carolina Department of Environment and Natural Resources

STATE OF NORTH CAROLINA
COUNTY OF _____

I, _____ a Notary Public, do hereby certify that personally appeared before me this day, produced proper identification in the form of _____, and signed this Declaration.

WITNESS my hand and official seal this _____ day of _____, 2014.

Notary Public

My Commission expires:

[SEAL]

REGISTER OF DEEDS CERTIFICATION

The foregoing Declaration of Perpetual Land-use restrictions is certified to be duly recorded at the date and time, and the Book and Page, shown on the first page hereof.

Register of Deeds for XXXXXXXXX County

By: _____
(signature)

(type or print name and title)

**10.11 ATTACHMENT E OF APPENDIX C - EXAMPLE DPLUR EMPLOYED BY THE NC DWM
SOLID WASTE SECTION**

See document on following page.



86

Box 165

DECLARATION OF PERPETUAL LAND USE RESTRICTIONS

For Property Owned By:

Sanitary Landfill, Solid Waste Permit Number
North Carolina

The real property which is the subject of this Declaration is a closed sanitary solid waste landfill. The North Carolina Department of Environment and Natural Resources shall hereinafter be referred to as "DENR."

**Authorities: N.C.G.S. §§ 130A-301 (a) – (e)
N.C.G.S. §§ 143B-279.9(a) and 279.10**

owns property in fee simple absolute located on as recorded in Deed Book 2975, Page 2644-2648 in the Forsyth County Deed Registry (the "Property"). The 156.96 acre Property, bordered on the east by Leak Branch, contains an area that was previously used as a sanitary solid waste landfill. The waste disposal area of the landfill comprises 16.693 acres.

A Survey Plat Map entitled "Notice of Contaminated Site" has been approved by the Division of Waste Management in accordance with N.C.G.S. § 143B-279.10. The Plat Map, which depicts the Property, the landfill waste disposal area, an engineered anchor trench, a 300 foot buffer zone, groundwater monitoring wells located on both the Property and on adjacent property, and surface water monitoring locations, is recorded in Map Book , Page the County Registry. For purposes of this Agreement, the landfill and the engineered anchor trench are collectively referred to as "Landfill" and the Landfill and the 300-foot buffer area are collectively referred to as "the Landfill Area". The Landfill and Landfill Area are the subject of this Declaration of Perpetual Land Use Restrictions ("Declaration") and are hereby restricted from future use and development in accordance with this Declaration.

This Declaration is part of a remedial action and post-closure plan that has been approved by the Secretary of the North Carolina Department of Environment and Natural Resources, or his delegate, as provided in N.C.G.S. §§ 143B-279.9(a) and 279.10 and the rules for sanitary landfills promulgated under N.C.G.S. § 130A-294(b), codified at 15A N.C. Administrative Code 13B §§ .0201, .0501 and .0601.

The Land Use Restrictions are imposed as part of protecting public health and the environment.

SUMMARY HISTORY OF THE SOLID WASTE LANDFILL

1. In 1986 the predecessor agency of the Division of Waste Management, Solid Waste Section, now within the Department of Environment and Natural Resources (DENR), issued Permit #34-05 to [] to operate an unlined industrial landfill on the Property.
2. [] recorded Permit #34-05 on May 29, 1986, in the [] County Registry, where it is recorded at Deed Book 1550, Page 215.
3. Thereafter, DENR issued to [] several amendments to the landfill permit, including amendments for expansion of the landfill.
4. Types of solid waste disposed in the landfill include coal combustion fly ash and bottom ash, ash from an incinerator which burned cigarette packaging materials and cellophane, construction and demolition waste from [] industrial facilities, oily gravel removed from a [] fuel tank farm, oily soil removed from the area of a leaking oil line at the plant, and zeolite resin beads.
5. [] ceased receipt of waste at the landfill on December 31, 2002.
6. On December 23, 2003, [] submitted landfill closure documentation and plans for post-closure maintenance and water quality monitoring to the Solid Waste Section. On February 26, 2004, the Solid Waste Section requested that the water quality updates proposed by [] be incorporated into the post-closure maintenance and monitoring plan. On April 17, 2004, [] submitted an Amended Monitoring Plan for Closure.
7. On October 3, 2007, [] sold the Property to []. On November 18, 2010, [] re-purchased the Property from [].
8. [] initiated a phased water quality assessment in 2009. At the time of this filing, [] is required to conduct semi-annual sampling and analysis of ground and surface water in the vicinity of the waste disposal area. Groundwater monitoring wells and surface water sampling locations are depicted on the recorded Plat Map.

9. [] completed the installation of an engineered closure cap on the waste disposal area with a surrounding anchor trench area in 2012.

10. At the time of this filing, there are potable wells located within 3,000 feet from the edge of waste, and there are residences located within 1,500 feet from the edge of waste.

Therefore, for the purpose of protecting public health and the environment, [] hereby declares that the Landfill Area shall be held, sold, conveyed or otherwise transferred, or leased subject to the following perpetual land use restrictions, which shall run with the land; shall be binding on all parties having any right, title or interest in the Landfill Area, their heirs, successors and assigns; and shall, as provided in N.C.G.S. 143B-279.9, be enforceable without regard to lack of privity of estate or contract, lack of benefit to particular land, or lack of any property interest in particular land. These restrictions shall continue in perpetuity and cannot be amended or canceled unless and until the [] County Register of Deeds receives and records the written concurrence of the Secretary of DENR (or its successor in function), or his/her delegate. If any provision of this Declaration is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

PERPETUAL LAND USE RESTRICTIONS

1. The Landfill Area shall not be developed or utilized for residential, commercial, industrial, institutional, agricultural (unless for use as hay) or recreational purposes unless approved in advance in writing by DENR or its successor in function.

2. No alteration, disturbance or removal of any surface or subsurface native or earthen fill or waste materials may occur from and within the Landfill Area other than DENR approved erosion control measures or as part of general site maintenance at the Property without the advance written permission of DENR or its successor in function.

3. The Landfill Area shall not be used for any above- or below-ground construction, parking lots, or other improvements, including, but not limited to, buildings, shelters, communications towers or installations, utilities, roads, and sidewalks unless approved in advance in writing by DENR or its successor in function.

4. The Landfill Area shall not be used for agricultural or grazing purposes or for timber production, except that mowed cover vegetation on the Landfill Area may be used as hay.

5. The Landfill Area shall not be used for kennels, animal shelters or pens, or for equestrian riding clubs or equestrian trail rides.

6. Groundwater wells or other devices beneath the Landfill and within a radius of 500 feet of the Landfill for access to groundwater for any purpose other than monitoring groundwater quality is prohibited without prior written approval by DENR, or its successor in function.

7. The Landfill Area shall not be used for mining, extraction of coal, oil, gas or minerals.

8. Hunting, fishing, and camping on the Landfill Area are prohibited. Firing ranges on the Landfill Area are prohibited. Off-road vehicle use on the Landfill Area is prohibited, unless necessary for Landfill maintenance, monitoring, investigation or remediation activities, or for power line maintenance and repairs.

9. Vehicles, mobile offices, and any other machinery or equipment shall not be parked or stored on the Landfill Area unless they are necessary to implement a DENR approved remediation plan, for maintenance and monitoring of the Landfill, for general site maintenance of the Property, or for examination of the Property for other reasons as authorized by [redacted] or its successor in function may park vehicles, machinery, or equipment on the 300 foot buffer zone for maintenance and repair of the power lines and related easement.

10. Solid waste, junked vehicles, mobile homes, appliances, and waste materials shall not be disposed of or stored on the Landfill Area. No other materials may be stored on the Landfill Area unless they are necessary to implement a DENR approved remediation plan or for maintenance and monitoring of the Landfill or approved in advance in writing by DENR or its successors in function.

11. Public access to the Landfill Area via the access road shall be prevented using current measures and such means for prevention shall be maintained. "No Trespassing" signs shall be posted on the access road.

12. Mowing and sowing of vegetation on the Landfill Area is allowed, in accordance with approved post-closure plans and maintenance requirements.

13. The Landfill Area may be used for any remedial investigation and remedial action activities approved by DENR or its successors in function.

14. Activities necessary to maintain the security of the Landfill Area, prevent human exposure to contaminated materials and water, and to prevent erosion and maintain the structural stability of the Landfill Area are permitted.

15. All other uses of the Landfill Area by [redacted] or its successor in function that are not already allowed by these land use restrictions are prohibited, except as approved in advance in writing by DENR or its successor in function.

16. [redacted] or its successor in function shall maintain all groundwater monitoring wells located on the Property, in accordance with approved remediation and post-closure monitoring plans. This maintenance shall be for the duration of the required post-closure monitoring period, as determined by DENR or its successor agency, its successors and assigns.

17. No authorized DENR personnel or other person conducting environmental assessment or remediation at the Landfill Area, or involved in determining compliance with applicable land use restrictions, at the direction of, or pursuant to a permit or order issued by DENR or its successor in function, may be denied access to the Landfill Area for the purpose of conducting such activities. Entry onto the Landfill Area shall be upon reasonable notice to RJR or its successor in function and at reasonable times unless it is determined that immediate entry is necessary to protect human health or the environment.

18. The owner(s) of any of the Landfill Area which is the subject of this Declaration shall cause any lease, grant, or other transfer of any interest in the Landfill Area to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land use restriction in this Declaration to the Landfill Area.

19. Annually on or before the anniversary date of the recordation of this Declaration, the owner(s) of the Property shall submit a letter containing the notarized signature(s) of the owner(s), to DENR, or its successor in function, confirming that this Declaration is still recorded in the Office of the [redacted] County Register of Deeds and that activities and conditions at the Landfill Area remain in compliance with the land use restrictions herein.

REPRESENTATIONS AND WARRANTIES

The owner hereby represents and warrants to the other signatories hereto:

that the owner is the sole owner of the Property;

that the owner holds fee simple title to the Property free, clear and unencumbered;

that this Declaration will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which the owner is a party or by which the owner may be bound or affected.

ENFORCEMENT

The above land use restrictions are an integral part of the post closure conditions of the Landfill and the Settlement Agreement in Case Number 09 EHR 3298 between [redacted] and DENR executed on July 1, 2011. The restrictions are also necessary to ensure the structural integrity of the Landfill and the Landfill cap. Adherence to the restrictions is necessary to protect public health and the environment. These land use restrictions shall be enforced by any owner, operator, or other party responsible for any part of the Landfill Area. The above land use restrictions may also be enforced by DENR through the remedies provided in N.C.G.S. Chapter 130A, Article 1, Part 2 or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Landfill Area, as provided in N.C.G.S. §143B-279.9. Any attempt to cancel this Declaration without the approval of DENR or its successor in function shall be subject to enforcement by DENR to the full extent of the law. Failure by any party required or authorized to enforce any of the above restrictions shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

FUTURE SALES, LEASES, CONVEYANCES AND TRANSFERS

When any portion of the Landfill Area is sold, leased, conveyed or transferred, pursuant to N.C.G.S. §130A-301(e) and N.C.G.S. §143B-279.10(e), the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the real property being sold, leased, conveyed, or transferred has been used as a Landfill and a reference by book and page number to the recordation of this Declaration and to the recordation of the "Notice of Contaminated Site" (Plat Map) referenced in this Declaration.

OWNER SIGNATURE



STATE OF NORTH CAROLINA

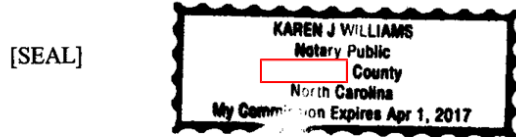
COUNTY OF

I, Karen J. Williams, a Notary Public, do hereby certify that Gregory H. Colner, personally appeared before me this day and declared that he is the Senior Director Supply Finance of and that by authority duly given, of he signed this Declaration.

WITNESS my hand and official seal this 9th day of December 2013.

Karen J. Williams
Notary Public

My Commission expires: April 1, 2017



**APPROVAL AND CERTIFICATION OF THE NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL RESOURCES**

The foregoing Declaration of Perpetual Land Use Restrictions is hereby approved and certified.

By: Michael E. Scott 11/25/13
Michael E. Scott, Chief
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and
Natural Resources

REGISTER OF DEEDS CERTIFICATION

The foregoing Declaration of Perpetual Land Use Restrictions is certified to be duly recorded at the date and time, and the Book and Page, shown on the first page hereof.

Register of Deeds for County

By: _____
(signature)

(type or print name and title)

Date

11 APPENDIX D: EXAMPLES OF STATE AND LOCAL CONTROLS USED IN LIEU OF LURs

In situations where contaminants extend beyond the source property boundary, the program finds that non - source property owners who did not cause or create the contamination have no incentive to accept limitations on their property. To provide an alternative to land - use restrictions, the Dry-cleaning Solvent Cleanup Program (DSCA) sought and received statutory authority under 143 - 215.104I(b1) to use other state and local controls in lieu of land - use restrictions on properties other than the source property.

Relevant State and local controls that are currently on the books are primarily limited to controlling the use of groundwater. As such, these controls in lieu of land - use restrictions are limited in use to non - source properties where the only risk that needs to be protected is future installation of a drinking water supply well.

1. Authority under 15A NCAC 02C:
“Groundwater on this property contains contaminants that exceed unrestricted use standards. Pursuant to 15A North Carolina Administrative Code 02C .0107(b)(1), “(t)he source of water for any water supply well shall not be from a water bearing zone or aquifer that is contaminated.” Therefore, state law prohibits construction of a water supply well on this property unless it can be demonstrated that the water pumped from the well is not contaminated. Further, pursuant to North Carolina General Statute 87 - 88(c) and 15A North Carolina Administrative Code 02C .0112(a), no well may be constructed or maintained in a manner whereby it could be a source or channel of contamination of the groundwater supply or any aquifer.”
2. Mecklenburg County Well Regulations, Chapter VII:
“This property lies within an Area of Regulated Groundwater Usage established pursuant to the Mecklenburg County Groundwater Well Regulations. Because a public water supply is available, no new water supply well will be permitted on this property because it is located within 1,000 feet of a contamination site.”
3. Town of Walnut Cove Ordinance Relating to Water/Sewer/Garbage, Section 2:
“The Town of Walnut Cove (Town) Ordinance Relating to Water/Sewer/Garbage, Section 2 states that each owner of improved property located upon or within a distance of three - hundred (300) feet of any Town water line shall connect the plumbing system of their premises with the Town water system, provided that any such owner who already has in use a private well may, in lieu of connecting their premises with the Town water system, pay the minimum monthly charge established for water services and may continue the use of the of well for domestic household water use as long as the well remains suitable for such use or for a period of ten (10) years, whichever comes first. Should the well cease to be suitable, said owner will be required to connect to the Town water system and will not be allowed a replacement well. Therefore, because this property does not currently have its own supply well, and this property is located within 300 feet of the Town water line, the property is required to be connected to the Town water system.”

Use of state and local controls in lieu of land - use restrictions provides an alternative to LURs, but currently it is limited only to controlling future installation of water supply wells. If the risks at off - source properties involve vapor intrusion risks, DSCA must either rely on LURs at these non - source properties or remediate such that vapor intrusion restrictions are not needed to control potential future exposures.

12 APPENDIX E: DEPARTMENTAL RESOURCES NEEDED TO ENSURE THAT RISK - BASED REMEDIES ARE PROTECTIVE

Department Review Costs

Staff review of remedies designed to meet standards - based cleanup goals, while rarely simple and easy, is straightforward with respect to the fact that a site is not closed out until after the remediating party provides sample data to demonstrate that established cleanup goals for unrestricted use have been met. Those remedies are more easily judged to be adequately protective because the universal State and Federal standards that support site cleanup goals for groundwater or surface water are conservative in their construct, as they are designed to serve in worst - case scenarios. Also, during the period before cleanup goals are met and the site is closed out, the remediating party is engaged in insuring that no one is exposed to contamination from, for example, a drinking water supply well near the site, or soil that needs to be removed before site closeout.

In contrast, staff review of risk - based remedies requires a relatively higher level of specialized expertise and review. Applicants would use a broader mix of site - specific data in conceptual models and in mathematical models to demonstrate that contaminants left on site at levels that meet less stringent cleanup goals will not migrate in the future to places where they will adversely impact human health or the environment. Calculation of site - specific cleanup goals requires site - specific exposure assessments and risk evaluations. Broader use of risk - based remedies for contamination spanning multiple properties, some of them in residential or commercial areas not owned by the remediating party, will entail more complexity and less easily predictable potential risk to public health and the environment. In order to ensure that remedies are protective, the agency will need longer review times and more highly trained staff.

Recordation of plats showing the restricted areas, plus the recordation of Declarations of Permanent Land - use restrictions (DPLURS) in deed books require a significant amount Department legal and technical staff review.

Long - term Oversight Costs to Ensure Remedies Remain Protective

In order to prevent future exposure to contaminated media, risk - based remedies will in many cases require the maintenance of engineered barriers and the permanent adherence to land - use restrictions by future land owners. Remedies approved by the Department under current risk - based programs require the annual certification by landowners that engineered barriers are being maintained, that site - specific land - use restrictions are being adhered to, and that deed instruments remain in effect through sale or subdivision of the property. Currently, the Department's Brownfields Program applies some of its available resources to conduct periodic inspections of properties with completed Brownfields Agreements to further ensure that conditions of those agreements are adhered to. Such inspections would further ensure the protectiveness of DPLURs or deed notices approved by all Department programs.

Individual Department programs currently each track approved controls in separate informal internal databases or lists. Tracking this information in a comprehensive Department - wide database and making locations and linked file records available to the public in an easily usable GIS - based format will require

Departmental resources that are modest on a per - site basis, but that have significant cumulative long - term resource needs. Such measures are a necessary and cost - effective way to further protect communities from inadvertent exposure to contaminants, and to protect and advise future prospective purchasers.

12.1 DEPARTMENT REVIEW COSTS - ASSUMES ALL HHRA, RA AND GW MODELLING REVIEW CONDUCTED BY OUTSIDE DENR CONTRACTORS.

<u>DENR Tasks for Review, Implementation, and Long-Term Maintenance of Risk Based Remedies</u> (These tasks are those conducted in addition to tasks conducted by DENR prior to remedy selection, or in the review and implementation of standards-based remedies.)	Percentage of Submittals Needing Each Task	HOURS	FTE's	Annual Salary Plus Fringe (or Contract Bid Rate x 1800 hrs)	Average Cost per Site
Technical staff preliminary review and meetings with RP and consultants to determine project eligibility, discuss conceptual models, and identify cost-effective approaches.	100%	40 To 80	0.022 To 0.044	\$95,000	\$2,111 To \$4,222
<i>Human Health Risk Assessment Review (Contractor; \$138/hr)</i>	100%	80 To 80			\$11,040 To \$11,040
<i>Groundwater Modelling Review (Contractor; \$157/hr)</i>	100%	40 To 120			\$6,280 To \$18,840
<i>Ecological Risk Assessment Review (Contractor; \$138/hr)</i>	65%	80 To 160			\$11,040 To \$22,080
Review of Financial Assurance Instrument	100%	2 To 8	0.001 To 0.004	\$70,000	\$78 To \$311
Legal Review of DPLUR and Plat	100%	8 To 16	0.004 To 0.009	\$120,000	\$533 To \$1,067
NC Geodetic Survey Review of Plat	100%	2 To 4	0.001 To 0.002	\$95,000	\$106 To \$211
Review of Annual Certification of LURs, Site Inspections (30 years)	100%	16 To 240	0.009 To 0.133	\$80,000	\$711 To \$10,667
Public Portal Access, LUR Database Support (30 years)	100%	16 To 32	0.009 To 0.018	\$110,000	\$978 To \$1,956
Ranges of Totals for All Tasks:		284 To 740			\$32,877 To \$70,393

12.2 DEPARTMENT REVIEW COSTS - HHRA, RA AND GW MODELLING REVIEW CONDUCTED BY MIX OF IN-HOUSE AND OUTSIDE DENR CONTRACTORS

<u>DENR Tasks for Review, Implementation, and Long-Term Maintenance of Risk Based Remedies</u> (These tasks are those conducted in addition to tasks conducted by DENR prior to remedy selection, or in the review and implementation of standards-based remedies.)	Percentage of Submittals Needing Each Task	HOURS	FTE's	Annual Salary Plus Fringe (or Contract Bid Rate x 1800 hrs)	Average Cost per Site
Technical staff preliminary review and meetings with RP and consultants to determine project eligibility, discuss conceptual models, and identify cost-effective approaches.	100%	40 To 80	0.022 To 0.044	\$95,000	\$2,111 To \$4,222
Human Health Risk Assessment Review (In-House)	80%	40 To 60	0.022 To 0.033	\$95,000	\$1,689 To \$2,533
<i>Human Health Risk Assessment Review (Contractor; \$138/hr)</i>	20%	80 To 80			\$2,208 To \$2,208
Groundwater Modelling Review (In-House)	50%	20 To 120	0.011 To 0.067	\$95,000	\$528 To \$3,167
<i>Groundwater Modelling Review (Contractor; \$157/hr)</i>	50%	40 To 120			\$3,140 To \$9,420
Ecological Risk Assessment Review (In-House)	10%	40 To 160	0.022 To 0.089	\$95,000	\$211 To \$844
<i>Ecological Risk Assessment Review (Contractor; \$138/hr)</i>	60%	80 To 160			\$6,624 To \$13,248
Review of Financial Assurance Instrument	100%	2 To 8	0.001 To 0.004	\$70,000	\$78 To \$311
Legal Review of DPLUR and Plat	100%	8 To 16	0.004 To 0.009	\$120,000	\$533 To \$1,067
NC Geodetic Survey Review of Plat	100%	2 To 4	0.001 To 0.002	\$95,000	\$106 To \$211
Review of Annual Certification of LURs, Site Inspections (30 years)	100%	16 To 240	0.009 To 0.133	\$80,000	\$711 To \$10,667
Public Portal Access, LUR Database Support (30 years)	100%	16 To 32	0.009 To 0.018	\$110,000	\$978 To \$1,956
Ranges of Totals for All Tasks:		384 To 1080			\$18,916 To \$49,854

13 APPENDIX F: 2L GROUNDWATER STANDARDS

Pollutant	CAS #	Current 15A NCAC 2L Standard or Interim Maximum Allowable Concentration	Relation of 2L standard to MCL	Criterion Used to Set 2L Standard (for parameters with MCLs only)	Maximum Contaminant Level (MCL)	National Secondary Drinking Water Standard	Maximum Contaminant Level Goal (MCLG)	Calculated Threshold Concentration	Taste Threshold	Odor Threshold
					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Acenaphthene	83329	80	No MCL		NA	NA	NA	400 ¹	NA	80 ³
Acenaphthylene	208968	200	No MCL		NA	NA	NA	200 ¹	NA	NA
Acetone	67641	6 mg/L	No MCL		NA	NA	NA	6 mg/L ¹	NA	20 mg/L ⁴
Acrylamide	79061	0.008	No relevant MCL		Treatment Technique (TT): 0.05% dosed at 1 mg/L (or ⁶	NA	NA	0.008 ¹	NA	NA
Anthracene	120127	2 mg/L	No MCL		NA	NA	NA	2 mg/L ¹	NA	NA
Arsenic	744038	10	Same as MCL		10 ⁶	NA	0	0.02 ¹	NA	NA
Atrazine and chlorotriazine	191224	3	Same as MCL		3 ⁶	NA	3	200 ¹	NA	NA
Barium	744039 ³	700	Less than MCL	Non-cancer or systemic effects (#1)	2,000 ⁶	NA	2000	700 ¹	NA	NA
Benzene	71432	1	Less than MCL	1 in a million lifetime cancer risk (#2)	5 ⁶	NA	0	1 ¹	NA	NA
Benzo(a)anthracene	56553	0.05	No MCL		NA	NA	NA	0.05 ¹	NA	NA
Benzo(b)fluoranthene	205992	0.05	No MCL		NA	NA	NA	0.05 ¹	NA	NA

Pollutant	CAS #	Current 15A NCAC 2L Standard or Interim Maximum Allowable Concentration	Relation of 2L standard to MCL	Criterion Used to Set 2L Standard (for parameters with MCLs only)	Maximum Contaminant Level (MCL)	National Secondary Drinking Water Standard	Maximum Contaminant Level Goal (MCLG)	Calculated Threshold Concentration	Taste Threshold	Odor Threshold
					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Benzo(k)fluoranthene	207089	0.5	No MCL		NA	NA	NA	0.5 ¹	NA	NA
Benzoic Acid	65850	30 mg/L	No MCL		NA	NA	NA	30 mg/L ¹	NA	NA
Benzo(g,h,i)perylene	191242	200	No MCL		NA	NA	NA	200 ¹	NA	NA
Benzo(a)pyrene	50328	0.005	Less than MCL	1 in a million lifetime cancer risk (#2)	0.2 ⁶	NA	0	0.005 ¹	NA	NA
Bis(chloroethyl)ether	111444	0.03	No MCL		NA	NA	NA	0.03 ¹	NA	NA
Bis(2-ethylhexyl) phthalate	117817	3	Less than MCL	1 in a million lifetime cancer risk (#2)	6 ⁶	NA	NA	3 ¹	NA	NA
Boron	744042	700	No MCL		NA	NA	NA	700 ¹	NA	NA
Bromodichloromethane	75274	0.6	Less than MCL	1 in a million lifetime cancer risk (#2)	80 ⁶	NA	0	0.6 ¹	NA	NA
Bromoform	75252	4	Less than MCL	1 in a million lifetime cancer risk (#2)	80 ⁶	NA	0	4 ¹	NA	510 ⁴
n-Butylbenzene	104518	70	No MCL		NA	NA	NA	NA	NA	NA
sec-Butylbenzene	135988	70	No MCL		NA	NA	NA	NA	NA	NA
tert-Butylbenzene	98066	70	No MCL		NA	NA	NA	NA	NA	NA
Butylbenzyl Phthalate	85687	1 mg/L	No MCL		NA	NA	NA	1 mg/L ¹	NA	NA
Cadmium	7440439	2	Less than MCL	Non-cancer or systemic effects (#1)	5 ⁶	NA	5	2 ¹	NA	NA
Caprolactam	105602	4 mg/L	No MCL		NA	NA	NA	4 mg/L ¹	NA	NA
Carbofuran	156366	40	Same as MCL		40 ⁶	NA	40	40 ¹	NA	NA
Carbon Disulfide	75150	700	No MCL		NA	NA	NA	700 ¹	NA	NA
Carbon Tetrachloride	56235	0.3	Less than MCL	1 in a million lifetime cancer risk (#2)	5 ⁶	NA	0	0.3 ¹	NA	NA

Pollutant	CAS #	Current 15A NCAC 2L Standard or Interim Maximum Allowable Concentration	Relation of 2L standard to MCL	Criterion Used to Set 2L Standard (for parameters with MCLs only)	Maximum Contaminant Level (MCL)	National Secondary Drinking Water Standard	Maximum Contaminant Level Goal (MCLG)	Calculated Threshold Concentration	Taste Threshold	Odor Threshold
					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Chlordane	1278903 ⁶	0.1	Less than MCL	1 in a million lifetime cancer risk (#2)	2 ⁶	NA	0	0.1 ¹	NA	NA
Chloride	1688700	250 mg/L	No MCL		NA	250 mg/L ⁶	NA	NA	NA	NA
Chlorobenzene	108907	50	Less than MCL	Odor thresh	100 ⁶	NA	100	100 ¹	NA	50 ⁴
Chloroethane	75003	3,000	No MCL		NA	NA	NA	NA	NA	NA
Chloroform	67663	70	Less than MCL	Non-cancer or systemic effects (#1)	80 ⁶	NA	70	70 ¹	2,000 ¹⁰	NA
Chloromethane	74873	3	No MCL		NA	NA	NA	3 ^{5, 16}	NA	NA
2-Chlorophenol	95578	0.4	No MCL		NA	NA	NA	40 ¹	0.97 ¹⁰	0.36 ¹⁰
2-Chlorotoluene	95498	100	No MCL		NA	NA	NA	100 ¹	NA	NA
Chromium	1854029 ⁹	10	Less than MCL	Non-cancer or systemic effects (#1)	100 ⁶	NA	10	10 ¹	NA	NA
Chrysene	218019	5	No MCL		NA	NA	NA	5 ¹	NA	NA
Coliform, Total		1 per 100 mL	No relevant MCL		5% ⁶	NA	NA	NA	NA	NA
Color		15 color units	No MCL		NA	15 color units ⁶	NA	NA	NA	NA
Copper	744050	1 mg/L	No MCL		NA	1 mg/L ⁶	NA	NA	NA	NA
Cyanide, free	57125	70	Less than MCL	Non-cancer or systemic effects (#1)	200 ⁶	NA	200	70 ¹	NA	170 ⁴
2,4-D	94757	70	Same as MCL		70 ⁶	NA		70 ¹	NA	NA
DDD	72548	0.1	No MCL		NA	NA	NA	0.1 ¹	NA	NA
DDT	50293	0.1	No MCL		NA	NA	NA	0.1 ¹	NA	NA

Pollutant	CAS #	Current 15A NCAC 2L Standard or Interim Maximum Allowable Concentration	Relation of 2L standard to MCL	Criterion Used to Set 2L Standard (for parameters with MCLs only)	Maximum Contaminant Level (MCL)	National Secondary Drinking Water Standard	Maximum Contaminant Level Goal (MCLG)	Calculated Threshold Concentration	Taste Threshold	Odor Threshold
					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Dibenzo(a,h)anthracene	53703	0.005	No MCL		NA	NA	NA	0.005 ¹	NA	NA
Dibromochloromethane	124481	0.4	Less than MCL	1 in a million lifetime cancer risk (#2)	80 ¹¹	NA	60	0.4 ¹	NA	NA
1,2-Dibromo-3-chloropropane	96128	0.04	Less than MCL	1 in a million lifetime cancer risk (#2)	0.2 ⁶	NA	0	0.04 ^{5, 20}	NA	NA
Dibutyl Phthalate	84742	700	No MCL		NA	NA	NA	700 ¹	NA	NA
1,2-Dichlorobenzene	95501	20	Less than MCL	Odor threshold (#4)	600 ⁶	NA	600	600 ¹	NA	24 ⁴
1,3-Dichlorobenzene	541731	200	No MCL		NA	NA	NA	600.0	NA	170 ¹⁰
1,4-Dichlorobenzene	106467	6	Less than MCL	1 in a million lifetime cancer risk (#2)	75 ⁶	NA	75	6 ^{5, 18}	32 ¹⁰	18 ¹⁰
Dichlorodifluoromethane	75718	1 mg/L	No MCL		NA	NA	NA	1 mg/L ¹	NA	NA
1,1-Dichloroethane	75343	6	No MCL		NA	NA	NA	6 ^{5, 18}	NA	NA
1,2-Dichloroethane	107062	0.4	Less than MCL	1 in a million lifetime cancer risk (#2)	5 ⁶	NA	0	0.4 ¹	NA	20,000 ³
1,2-Dichloroethene (cis)	156592	70	Same as MCL		70 ⁶	NA	70	10 ¹	NA	NA
1,2-Dichloroethene (trans)	156605	100	Same as MCL		100 ⁶	NA	100	100 ¹	NA	NA
1,1-Dichloroethylene	75354	350	Greater than MCL		7 ⁶	NA	7	350 ¹	NA	NA
1,2-Dichloropropane	78875	0.6	Less than MCL	1 in a million lifetime cancer risk (#2)	5 ⁶	NA	0	0.6 ¹¹	NA	NA
1,3-Dichloropropene (cis and trans isomers)	542756	0.4	No MCL		NA	NA	NA	0.4 ¹	NA	NA
Dieldrin	60571	0.002	No MCL		NA	NA	NA	0.002 ¹	NA	NA
Diethylphthalate	84662	6 mg/L	No MCL		NA	NA	NA	5.6 mg/L ¹	NA	NA

Pollutant	CAS #	Current 15A NCAC 2L Standard or Interim Maximum Allowable Concentration	Relation of 2L standard to MCL	Criterion Used to Set 2L Standard (for parameters with MCLs only)	Maximum Contaminant Level (MCL)	National Secondary Drinking Water Standard	Maximum Contaminant Level Goal (MCLG)	Calculated Threshold Concentration	Taste Threshold	Odor Threshold
					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
2,4-Dimethylphenol	105679	100	No MCL		NA	NA	NA	100 ¹	NA	NA
Di-n-octyl phthalate	117840	100	No MCL		NA	NA	NA	NA	NA	NA
1,4-Dioxane	123911	3	No MCL		NA	NA	NA	3 ¹	NA	230,000 ⁴
Dioxin (2,3,7,8-TCDD)	1746016	0.0002 ng/L	Less than MCL	1 in a million lifetime cancer risk (#2)	0.03 ng/L ⁶	NA	0	0.0002 ng/L ¹¹	NA	NA
1,1-Diphenyl	92524	400	No MCL		NA	NA	NA	400 ¹	NA	NA
Dissolved Solids, Total		500 mg/L	No MCL; Same as secondary DWS		NA	500 mg/L ⁶	NA	NA	NA	NA
Disulfoton	298044	0.3	No MCL		NA	NA	NA	0.3 ¹	NA	NA
Diundecyl Phthalate	364820	100	No MCL		NA	NA	NA	NA	NA	NA
Endosulfan	115297	40	No MCL		NA	NA	NA	40 ¹	NA	NA
Endrin, total (includes endrin, endrin aldehyde, and endrin ketone)	72208	2	Same as MCL		2 ⁶	NA	2	2 ¹	NA	NA
Epichlorohydrin	106898	4	No relevant MCL		0.01% dosed @ 20 mg/L ⁶	NA	0	4 ¹	NA	NA
Ethyl acetate	141786	3 mg/L	No MCL		NA	NA	3	6 mg/L ¹	NA	2.6 mg/L ⁴
Ethylbenzene	100414	600	Less than MCL	Odor thresh	700 ⁶	NA	700	700 ¹	780 ¹⁰	550 ¹⁰
Ethylene dibromide	106934	0.02	Less than MCL	1 in a million lifetime cancer risk (#2)	0.05 ⁶	NA	0	0.02 ¹	NA	NA
Ethylene glycol	107211	10 mg/L	No MCL		NA	NA	NA	10 mg/L ¹	NA	NA
Fluoranthene	206440	300	No MCL		NA	NA	NA	300 ¹	NA	NA
Fluorene	86737	300	No MCL		NA	NA	NA	300 ¹	NA	NA
Fluoride	16984488	2 mg/L	Less than MCL; 2L set by Secondary DWS	Secondary Drinking Water Standard (MCL)	4 mg/L ⁶	2 mg/L ⁶	NA	1 mg/L ¹ (not used)	NA	NA
Foaming Agents		500	No MCL		NA	500 ⁶	NA	NA	NA	NA
Formaldehyde	50000	600	No MCL		NA	NA	NA	1000 ¹	NA	640 ⁴

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					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Gross Alpha Particle Activity		15 pCi/L	Same as MCL		15 pCi/L ⁶	NA	0	NA	NA	NA
Heptachlor	76448	0.008	Less than MCL	1 in a million lifetime cancer risk (#2)	0.4 ⁶	NA	0	0.008 ¹	NA	NA
Heptachlor Epoxide	1024573	0.004	Less than MCL	1 in a million lifetime cancer risk (#2)	0.2 ⁶	NA	0	0.004 ¹	NA	NA
Heptane	142825	400	No MCL		NA	NA	NA	400 ¹⁶	NA	NA
Hexachlorobenzene	118741	0.02	Less than MCL	1 in a million lifetime cancer risk (#2)	1 ⁶	NA	0	0.02 ¹	NA	NA
Hexachlorobutadiene	87683	0.4	No MCL		NA	NA	NA	0.4 ¹	NA	NA
Hexachlorocyclohexane isomers (technical)	608731	0.02	No MCL		NA	NA	NA	0.02 ¹	NA	NA
n-Hexane	110543	400	No MCL		NA	NA	NA	400 ¹⁶	NA	NA
Indeno(1,2,3-cd)pyrene	193395	0.05	No MCL		NA	NA	NA	0.05 ^{5,17}	NA	NA
Iron	743989	300	No MCL		NA	300 ⁶	NA	3,000 ^{5,20}	NA	NA
Isophorone	78591	40	No MCL		NA	NA	0	40 ¹	NA	NA
Isopropylbenzene	98828	70	No MCL		NA	NA	NA	700 ¹	NA	70 ¹⁰
Isopropyl ether	108203	70	No MCL		NA	NA	NA	NA	NA	NA
Lead	7439921	15	Same as MCL		15 ⁶ (TT action level)	NA	0	NA	NA	NA
Lindane	58899	0.03	Less than MCL	1 in a million lifetime cancer risk (#2)	0.2 ¹¹	NA	0.2	0.03 ^{5,18}	NA	NA
Manganese	7439965	50	No MCL		NA	50 ¹¹	50	2,000 ¹	NA	NA

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					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Mercury	7487947	1	Less than MCL	Non-cancer or systemic effects (#1)	2 ⁶	NA	2	1 ¹	NA	NA
Methanol	67561	4 mg/L	No MCL		NA	NA	NA	4 mg/L ¹	NA	NA
Methoxychlor	72435	40	Same as MCL		40 ¹¹	NA	40	40 ¹	NA	NA
Methylene chloride	75092	5	Same as MCL		5 ⁶	NA	0	5 ¹	NA	9,100 ⁴
Methyl ethyl ketone	78933	4 mg/L	No MCL		NA	NA	NA	4 mg/L ¹	NA	8.4 mg/L ⁴
2-Methylnaphthalene	91576	30	No MCL		NA	NA	NA	30 ¹	NA	NA
3-Methylphenol	108394	400	No MCL		NA	NA	NA	400 ¹	NA	NA
4-Methylphenol	106445	40	No MCL		NA	NA	NA	40 ¹⁶	NA	NA
Methyl tert-butyl ether	1634044	20	No MCL		NA	NA	NA	20 ^{5,18}	20-40 or below ¹²	20-40 or below ¹²
Naphthalene	91203	6	No MCL		NA	NA	NA	100 ¹	50 ¹⁰	6 ¹⁰ ; 21 ⁴
Nickel		100	No MCL		NA	NA	NA	100 ¹	NA	NA
Nitrate (as N)	14797558	10 mg/L	Same as MCL		10 mg/L ⁶	NA	10	10 mg/L ¹	NA	NA
Nitrite (as N)	14797650	1 mg/L	Same as MCL		1 mg/L ⁶	NA	1	0.6 mg/L ¹	NA	NA
N-nitrosodimethylamine	62759	0.0007	No MCL		NA	NA	NA	0.0007 ¹	NA	NA
Oxamyl	2313522	200	Same as MCL		200 ⁶	NA	200	200 ¹	NA	NA
Pentachlorophenol	87865	0.3	Less than MCL	1 in a million lifetime cancer risk (#2)	1 ¹¹	NA	0	0.3 ¹	NA	23 ¹⁰
Petroleum aliphatic carbon fraction class C5-		400	No MCL		NA	NA	NA	400 ¹⁶	NA	NA

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					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Petroleum aliphatic carbon fraction class C9-		700	No MCL		NA	NA	NA	700 ¹⁵	NA	NA
Petroleum aliphatic carbon fraction class		10 mg/L	No MCL		NA	NA	NA	10 mg/L ¹⁵	NA	NA
Petroleum aromatic carbon fraction class C9-		200	No MCL		NA	NA	NA	200 ¹⁵	NA	NA
pH		6.5 - 8.5	No MCL		NA	6.5 - 8.5 ^b	NA	NA	NA	NA
Phenanthrene	85018	200	No MCL		NA	NA	NA	200 ¹	NA	NA
Phenol	108952	30	No MCL		NA	NA	NA	2,000 ¹	NA	31 ¹⁰
Phorate	298022	1	No MCL		NA	NA	NA	5.16	NA	NA
n-Propylbenzene	103651	70	No MCL		NA	NA	NA	NA	NA	NA
Pyrene	129000	200	No MCL		NA	NA	NA	200 ¹	NA	NA
Selenium	778249 2	20	Less than MCL	Non-cancer or systemic effects (#1)	50 ⁶	NA	50	20 ¹	NA	NA
Silver	744022	20	No MCL		NA	100 ⁶	NA	20 ¹	NA	NA
Simazine	122349	4	Same as MCL		4 ⁶	NA	4	40 ¹	NA	NA
Styrene	100425	70	Less than MCL	Odor thresh	100 ⁶	NA	100	1,000 ¹	NA	65 ¹⁰
Sulfate	775782	250 mg/L	No MCL		NA	250 mg/L ⁶	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	79345	0.2	No MCL		NA	NA	NA	0.2 ¹	NA	500 ⁴
Tetrachloroethylene	127184	0.7	Less than MCL	1 in a million lifetime cancer risk (#2)	5 ⁶	NA	0	0.7	NA	300 ¹³
2,3,4,6-Tetrachlorophenol	58902	200	No MCL		NA	NA	NA	200 ¹	NA	NA
Toluene	108883	600	Less than MCL	Non-cancer or systemic effects (#1)	1,000 ⁶	NA	1000	600 ¹	NA	NA
Toxaphene	800135 2	0.03	Less than MCL	1 in a million lifetime cancer risk (#2)	3 ⁶	NA	0	0.03 ¹	NA	NA
2,4,5-TP	93721	50	Same as MCL		50 ⁶	NA	50	60 ¹	NA	NA
1,2,4-Trichlorobenzene	120821	70	Same as MCL		70 ⁶	NA	70	70 ¹	NA	NA
1,1,1-Trichloroethane	71556	200	Same as MCL		200 ⁶	NA	200	300 ¹¹	NA	20,000 ¹⁰

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					Criteria # 5	Criteria # 6		Criteria #1 or #2	Criteria # 3	Criteria # 4
		ug/L except where noted			ug/L except where noted	ug/L except where noted		ug/L except where noted	ug/L except where noted	ug/L except where noted
Trichloroethylene	79016	3	Less than MCL	1 in a million lifetime cancer risk (#2)	5 6	NA	3	3 11	NA	NA
Trichlorofluoromethane	75694	2 mg/L	No MCL		NA	NA	NA	2 mg/L ¹	NA	NA
1,2,3-Trichloropropane	96184	0.005	No MCL		NA	NA	NA	0.005 ^{5,1b}	NA	NA
1,2,4-Trimethylbenzene	95636	400	No MCL		NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	108678	400	No MCL		NA	NA	NA	NA	NA	NA
1,1,2-trichloro-1,2,2-	76131	200 mg/L	No MCL		NA	NA	NA	200 mg/L ¹	NA	NA
Vinyl chloride	75014	0.03	Less than MCL	1 in a million lifetime cancer risk (#2)	2 11	NA	0	0.03 ¹	NA	NA
Xylenes (o-, m-, p-)	133020	500	Less than MCL	Odor thresh	10,000 ¹¹	NA	10000	1,000 ¹	NA	1,800 (o-), 1,100 (m-
Zinc	744066	1 mg/L	No MCL		NA	5 mg/L ^b	NA	1 mg/L ¹	NA	NA

	Non carcinogen - calculated threshold concentration based on reference dose
	Carcinogen - calculated threshold concentration based on carcinogenic potency factor

References:

- 1 IRIS: <http://cfpub.epa.gov/ncea/iris/index.cfm>
- 2 RAIS: http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=nrad
- 3 Verschueren 1996
- 4 Amoores & Hautala 1983
- 5 US EPA Regional Screening Levels <http://epa-prgs.ornl.gov/chemicals/download.shtml> (formerly EPA Region 9 PRGs)
- 6 EPA Drinking Water Standards: <http://www.epa.gov/safewater/consumer/pdf/mcl.pdf>
- 7 Alachlor; RED 1998: <http://www.epa.gov/oppsrrd1/REDS/0063.pdf>
- 8 NRWQC 06: <http://www.epa.gov/waterscience/criteria/wqcriteria.html>
- 9 EPA Region 4 Human Health Risk Assessment Bulletins (TEFs for cPAH's): <http://www.epa.gov/region4/waste/ots/healthbul.htm>
- 10 Young et al. 1996
- 11 EPA 2006 Edition of the Drinking Water Standards and Health Advisories: <http://www.epa.gov/waterscience/criteria/drinking/dwstandards.html>
- 12 EPA Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Methyl Tertiary-butyl Ether (MTBE): <http://www.epa.gov/waterscience/criteria/drinking/mtbefact.pdf>
- 13 Agency for Toxic Substances and Disease Registry Toxicological Profile for Tetrachloroethylene (PERC): <http://www.atsdr.cdc.gov/tfacts18.html>
- 14 Agency for Toxic Substances and Disease Registry Toxicological Profile for Xylenes: <http://www.atsdr.cdc.gov/tfacts71.html>
- 15 Massachusetts Department of Environmental Protection. Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology. Nov 2003 <http://www.mass.gov/dep/cleanup/laws/tphtox03.pdf>

16 Health Effects Assessment Summary Tables FY 1997 Update (EPA 540-R-97-036)

17 EPA Region 3 Risk Based Concentration Tables (October 2007): <http://www.epa.gov/reg3hwmd/risk/human/rbc/RBCoct07.pdf> (incorporated into the EPA Regional Screening Levels)

18 California Environmental Protection Agency OEHHA toxicity database: <http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>

19 Treatment Technique: When acrylamide is used in drinking water systems, the combination (or product) of dose and monomer level shall not exceed that equivalent to a polyacrylamide polymer containing 0.05% monomer dosed at 1 mg/L.D 20 PPRTV: EPA Provisional Peer Reviewed Toxicity Value distributed on request by EPA Superfund Health Risk Technical Support Center.

ND = No data available