

## Methods to Quickly Achieve No Further Action Status for Mildly Contaminated Properties

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<http://deq.nc.gov/about/divisions/waste-management/superfund-section/inactive-hazardous-sites-program>

The purpose of this document is to provide guidance on methods for expedited completion of mildly contaminated properties under the Inactive Hazardous Sites Response Act (IHSRA). The solutions are primarily suited for sites with only soil contamination. However, also included is an option for attaining unrestricted use standards for groundwater and surface water by establishing and meeting background concentrations. Mildly contaminated properties for purposes of this document are those with only soil contamination that is limited in extent and/or contaminant levels. The soil contamination should not pose unacceptable risk to ecological receptors (no sensitive environments are present and affected). The assessment activities to support the evaluations described in this document should either be conducted independently by the remediating party with a later request for a No Further Action Review by the Inactive Hazardous Sites Branch (IHSB) or be conducted under an administrative agreement for voluntary assessment and cleanup under the IHSB's Registered Environmental Consultant Program.

This guidance is not intended for sites with groundwater contamination (outside establishing the attainment of background concentrations), with affected sensitive environments or with more extensive or complex contamination. At eligible sites under IHSRA voluntary cleanup agreements, alternate groundwater standards are possible using the process and guidance found on NC DEQ's web site at <http://deq.nc.gov/permits-regulations/risk-based-remediation>.

This document contains the following sections:

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- II. **Initial Screen Against Soil PSRGs**
- III. **Comparison to Background Concentrations**
- IV. **Averaging Soil Contaminant Levels**
- V. **Site-Specific Adjustments to Health-Based Remediation Goals**
- VI. **DPLUR-Only Remedies (no groundwater contamination)**
- VII. **Minor Independent Removals with No Further Action Review**

## **I. General Procedures**

In using this guidance, the first step is to complete an assessment delineating the extent of contamination in all media in each area of known or suspected hazardous substance release. The remediating party should review the IHSB *Guidelines for Assessment and Cleanup of Contaminated Sites* available on our website to ensure a proper assessment is conducted. All contamination should be delineated to unrestricted use levels. Laboratory quantitation limits should not be elevated more than 10X the method detection limit and generally be best achievable limits. Elevated quantitation limits may mask otherwise detectable contaminants.

Cleanup levels for **soils** under the Inactive Hazardous Sites Program have three components: (1) a "health-based" level or concentration acceptable for direct contact, (2) "protection of groundwater" levels/criteria, and (3) ecological risk (if applicable). If an ecological risk evaluation is determined to be necessary (refer to the program guidance), the results may alter the approach to remedial action or may alter the cleanup goals. This guidance is intended to assist in cases where no sensitive environments are present and contamination is primarily limited to soils.

Any request for closure must be accompanied by documentation demonstrating that assessment of contamination in all media is complete and unrestricted use standards and protection of groundwater standards have been met.

## **II. Initial Screen Against Soil PSRGs**

When the assessment is complete, compare your highest concentrations to the IHSB's Preliminary Soil Remediation Goals (PSRGs). Both the guidance referenced above and the PSRGs can be found on our website at the link below. Click on the "Guidance" link and then the link for the "Soil Remediation Goals Table" or the links for the various guidance documents.

<http://deq.nc.gov/about/divisions/waste-management/superfund-section/inactive-hazardous-sites-program>

Soils must meet the levels in both **(a) the Unrestricted Use Health Based PSRG** column and **(b) the Protection of Groundwater PSRG** column. If contaminants are below both of these PSRGs and no other media are contaminated, the site will be eligible for No Further Action status.

**Protection of Groundwater PSRG Options:** If there is not a value for a contaminant in the Protection of Groundwater PSRG column or if the concentration at the site exceeds the number on the table, the following additional methods may be used to show this portion of the PSRG has been met.

A. If groundwater data in the area of concern has been collected and shows that the contaminants do not exceed (1) the final and interim 15A NCAC 2L standards or are below quantitation limits for those contaminants without numeric standards and (2) the release occurred fifteen or more years ago, protection of groundwater PSRGs are considered to have been met. Note that quantitation limits may not exceed the standards or otherwise must be best achievable limits. If sampling confirms groundwater contamination in excess of the standards, methods B through D below cannot be used to demonstrate the protection of groundwater standard has been met. They may be used to aid in evaluating the volume of soil requiring removal or treatment to achieve the protection of groundwater PSRG. If groundwater

contamination is present and cannot be resolved by applying the methods in Section III of this document, this guidance does not apply and remediating parties should conduct actions under voluntary remedial action agreements to receive approval on contaminant remedies.

B. For each contaminant, compare the *total* concentration (not leachable concentration) in soil to twenty times the final or interim 15A NCAC 2L standards. If the concentrations exceed the calculated values, consider using the procedure in paragraph C. If there is no final or interim 2L standard or for the contaminant, the procedure in paragraph D may be used.

C. Use site-specific data for porosity, bulk density, and organic carbon content to refine a value in the PSRG Table using the equation provided at the end of the table. Only the parameters noted should be modified and only site-specific data should be used. All calculations and data must be provided in any No Further Action review request. If contaminant concentrations exceed the Protection of Groundwater PSRG adjusted as described in this paragraph, consider using the procedure in paragraph D.

D. Determine the site soil's leachability by conducting the Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characterization Leaching Procedure (TCLP) on multiple site soil samples in the area of concern. If contaminant concentrations in the soil leachate exceed the final or interim 15A NCAC 2L standards, consider using the procedure described in paragraph E.

E. Protection of groundwater soil remediation goals can be determined using a combination of total and SPLP/TCLP sample results from the site. Several soil samples must be collected from various locations within the area of concern representing higher and lower concentrations. Each of the soil samples should be analyzed for (1) total soil concentrations (in mg/kg) and (2) leachate concentrations (in ug/L) using the SPLP or TCLP analysis, for each contaminant of concern. Each total contaminant concentration should be plotted against its companion leachate concentration to determine if there is a general linear correlation. The target protection of groundwater soil cleanup concentration then becomes the value corresponding to a leachate concentration at or below the 15A NCAC 2L standard for that contaminant. Where there is no interim or final 2L standard, groundwater testing will be required.

### **III. Comparison to Background Concentrations**

Four types of background contamination can be evaluated: natural, anthropogenic (certain contaminants), normal application of agricultural chemicals and upgradient groundwater and surface water sources. Cleanup below these background levels is not required. Thus, establishing background concentrations can potentially reduce the amount of remediation required.

A. Natural Background: Metals occur naturally in soils, groundwater, sediment and surface water. Site-specific natural background concentrations should be established through sampling in the immediate area of the site in locations free from contaminant sources. Samples should be located away from roadways, railways, parking areas and other potential sources of contamination. Enough samples should be collected to establish the range of concentrations present. Apparent outlier concentrations cannot be included for background consideration and may need remediation.

B. Anthropogenic Background: PAHs, dioxins and PCBs are commonly found in soils as a result of deposition from airborne fallout from industrial and non-industrial combustion sources and/or power grid/transformer discharges. Area-wide concentrations can be established through sampling for these chemicals. This should include samples on and off property to reflect the larger general area. A range of concentrations should be established and apparent outlier concentrations must be excluded. Additionally, vehicular exhaust around roadways, including adjoining drainage ditches, can be an anthropogenic source of PAHs and lead. Roadway areas are localized and do not represent area-wide anthropogenic background. If a contaminant area is separated in concentration and extent from the roadway area, concentrations in the roadway area cannot be used to assign remediation standards for soils. If a roadway adjoins the source area, then roadway anthropogenic background should be established by collecting samples away from the area of concern on a nearby stretch of the same roadway.

C. Normal Application of Agricultural Chemicals: Arsenic and 1,2-dichloropropane are sometimes found in groundwater due to normal application of pesticides. Other pesticides, if applied properly, are not as commonly found in groundwater due to their lower solubility. Many former agricultural properties, however, will have levels of pesticides or nitrates remaining in soils. Federal and state laws generally exempt concentrations associated with normal application of agricultural chemicals. Overuse and improper use do not qualify for that exemption. If the presence of agricultural chemicals can be shown to be due to normal application, their remediation is not required by the IHSRA and by most state and federal remediation law.

D. Upgradient Groundwater and Surface Water Sources: If it can be demonstrated that groundwater contamination is migrating onto the property from other source properties, the responsibility of remediation of that contamination resides with the responsible party for the other source. Property line wells demonstrating significantly higher concentrations of the contaminant or detections of non-site related contaminants could support such a contention. Whenever surface water samples are collected to determine if contaminated soils or groundwater from the site have entered surface water, an upstream sample should also be collected. This sample must be collected immediately upstream and not be influenced by site groundwater discharges in any way. If there are obstructions preventing a property line sample in the stream, the sample can be taken further upstream, but not further than fifty feet and in any case as close to the facility boundary as possible.

#### **IV. Averaging Soil Contaminant Levels**

For properties where contaminant concentrations are generally within about one order of magnitude of the unrestricted use health-based soil remediation goals (whether the PSRG or the adjusted SRGs described in Section V), averaging may demonstrate achievement of standards. Averaging only applies to health-based PSRGs and not to protection of groundwater PSRGs. However, both health-based and protection of groundwater PSRGs must be met.

This averaging procedure may then allow for unrestricted use of the property. The procedure may also be used for comparison to site-specific soil health-based remediation goals for restricted use. In such cases land use restrictions would be required as part of the site remedy. All of the following criteria must be met when averaging of soil concentration data:

- Only sample points within one-quarter-acre sectors may be averaged when comparing to unrestricted use remediation goals. Restricted industrial use (with land use restrictions approved as part of the remedial action plan) may allow for averaging over larger areas if the access and use across the area is consistent and no residential use is involved.
- The quarter-acre zone may be circle or a square or triangle of generally equal sides. One dimension of the zone's perimeter may not be highly disproportionately longer than another. For existing residential lots, averaging cannot exceed individual property boundaries.
- Samples must be generally evenly spaced over the zone of averaging (not forming a single line or skewed to one side).
- Visibly distinct areas of contaminant release and areas where the discharge is bounded by natural or engineered features controlling the perimeter of contamination should be evaluated as one zone. Concentrations may be averaged within that delineable zone. Areas outside the zone should not be included in the averaging.
- Only samples of the same vertical soil horizon may be averaged (0-6 inches for surface samples and no more than a 5-foot vertical spread for subsurface samples). Only actual sample data may be used for all points included in the average and not published averages for background concentrations. Quantitation limits may be used for samples in the area of averaging where a contaminant present at the site was below quantitation limits.
- No single sample point may exceed ten times the preliminary health-based soil remediation goal or the site-specific adjusted (see Section V for adjustment procedures) health-based remediation goal for all contaminants except lead. For lead, no single sample point used in an average may exceed 1000 ppm for unrestricted use and no more than three times the site-specific cleanup level for restricted use.
- Composite sample results may be included in an average, but must be weighted proportionally to the area they represent. For example, if one composite sample in an area represents  $\frac{1}{2}$  of the area and 5 others represent  $\frac{1}{10}$  of the area each, then the concentration of the first composite should be multiplied by 5, added to the sum of the other concentrations and then divided by 10 to compute the average concentration. Similarly, if a composite sample was collected over one half the area and 4 individual grabs covered the other half, multiply the composite covering one half the area by 4, add to the sum of the 4 grab sample concentrations and divide by 8.
- For characterizing soil contaminant concentrations over an area where there are not visible signs of extent, establish a sampling grid with a 50-foot grid node spacing for grab or composite sampling. For large areas that can be demonstrated to have had consistent use and a uniform release of contaminants (such as a large spray field), sampling grids can be set up with a grid node spacing larger than 50 feet. However, in such cases, the concentrations may not be averaged in quarter-acre zones. The upper end of the individual grid node concentrations is presumed to represent the entire area. If the upper end concentration exceeds unrestricted use cleanup levels, the entire area would require land use restrictions, active remediation or more detailed sampling across the entire area. An alternative for larger areas where the nature of the contaminant discharge is again generally uniform across the area, is to take one or more zones within the overall area that represent the range of environmental conditions present (various geologic and geographic conditions such as slope vs valley, wetter vs drier) to represent the overall area. Grids with 50-foot node spacing should be established across these representative areas. These areas can then be averaged if all the other criteria for averaging described in the above bullets is met. If all such areas meet the established remedial goals, then no active remediation would be required. If unrestricted use levels are exceeded but not restricted use levels, land use restrictions would be required as part

of the remedy. Refer to Section VI for more information on approval of land use restriction remedies.

- For unique circumstances, contact the IHSB for further guidance.

#### **V. Site-Specific Adjustments to Health-Based Soil Remediation Goals**

If after applying the averaging procedures in Section IV, contaminant concentrations still exceed the IHSB PSRG table unrestricted use health-based remediation goals, site-specific adjustments can be conducted. The Division of Waste Management's risk calculator should be used to determine site-specific risk. You can plug in your highest concentrations and then print a report showing individual contaminant risks and the cumulative risk posed. You can then adjust these input numbers until a total carcinogenic risk (sum of risks of all the contaminants) of  $1 \times 10^{-4}$  and a non-cancer Hazard Index (sum of all the individual contaminant Hazard Quotient) of 1 is achieved. The resulting input concentrations can be used as site-specific health-based remediation goals for soils. If any scenarios other than residential/unrestricted use are entered into the calculator in order to derive remediation standards, land use restrictions approved by NC DEQ will be required. Refer to Section VI for more information. Click on the below link and select the calculator under "Calculating Risk."

<https://deq.nc.gov/permits-rules/risk-based-remediation/risk-evaluation-resources>

#### **VI DPLUR-Only Remedies (no groundwater contamination)**

A remedy that relies on a Declaration of Perpetual Land Use Restrictions (DPLURs) approved by DEQ may be an appropriate way to achieve No Further Action Status at sites having only soil contamination. After completing sufficient sampling to determine the nature and extent of all known and suspected hazardous substance releases, a site may be determined to meet protection of groundwater PSRGs as described in Section II but have soil contamination exceeding unrestricted use PSRGs. If the methods in Sections III- V do not provide relief and the only remediation required includes simple land use restrictions and/or minimal active soil remediation, this Section may apply. Examples of restrictions might include: no subsurface disturbance without an approved plan; using the property for non-residential, non-child occupied uses only; and maintenance of a barrier such as an asphaltic cap. Sites with actual or potential groundwater contamination will need to be addressed through the Risk-Based Remediation Program process or otherwise restored to the 15A NCAC 2L standards. For more information on the risk-based remediation process, use the web link provided earlier in this document and contact the IHSB.

Sites with only soil contamination requiring minimal active remediation and/or DPLURs are most often lower risk cases. The IHSB does not have the staff resources to dedicate to reviewing lower risk cases outside of its privatized oversight program, known as the Registered Environmental Consultant Program (REC Program). However, the REC Program has streamlined a process for this type of site. The remediating party and their REC would sign a special shortened agreement for this type of case. If interested in this option, contact the REC Program staff for a copy of this special REC agreement.

The steps for this process are as follows.

- The Remediating Party notifies the REC Program of their interest in conducting this process and a draft agreement is prepared.

- The agreement is public noticed for 30 days.
- The Remediating Party, their REC and the NC Superfund Section sign the agreement.
- The agreement includes certification pages for the REC to attest that the remedial investigation has been completed and complies with specific provisions of the REC rules. If an assessment report has already been prepared and some items required by the rules were not included, the REC can prepare an informational supplement to provide those items.
- Once the REC certifies the assessment is complete, they should discuss potential restricted uses of the property with IHSB REC Program staff.
- The REC Program provides the Remediating Party and the REC a draft land use restriction document to review.
- The REC prepares and submits a brief remedial action plan describing the land use restrictions that will be applied and includes as appendices the agreed upon, but unsigned DPLUR and a draft notice survey plat of the contaminated area/property.
- Once the REC Program concurs with the remedy, the REC shall provide public notice on the RAP for a minimum of 30 days. After the notice period runs, barring unresolved public comment, the REC can certify the RAP, record the land use restrictions and the notice survey plat thus completing the remedy.

## **VII Minor Independent Removals with No Further Action Review**

If a minor amount of soil contamination is found after a complete assessment of the nature and extent of known and suspected contaminant discharges at the site, a party may elect to remove and properly dispose of that material independently without state review. Afterward if that party believes their actions have completed all work, they may request a No Further Action Review by our office. Note there is a fee for the review. More information on the fees is provided on our website.