

SECTION II. ACT 2 REMEDIATION PROCESS

~~A. Applying Land Recycling to Your Property~~

B. Remediation Standards

1. Background Standard

a) Introduction

This chapter presents procedures to be used in assessing site contamination and demonstrating attainment of the background standard. Use of this guidance and data submission formats should simplify reporting on the site and reduce delays in obtaining final report approval by the Department. This chapter is designed to help those involved understand and meet the requirement of the background standard under Act 2 and the regulations in Chapter 250. Environmental Cleanup [and Brownfields](#) Program staff in the Regional Offices are a valuable resource and will assist in answering questions on the background standard.

Background is the concentration of a regulated substance that is present at a site, but is not related to the release of regulated substances at the property. Attainment of the background standard for a regulated substance may be demonstrated by an analysis of environmental media within and around the site (Act 2 Section 302). Establishing the background concentration is discussed in Subsection II.B.1.d of this manual. In addition to Act 2, Section 302, Subchapter B under Chapter 250 of the regulations discusses the background standard requirements.

~~The background standard may result in higher than health-based level contamination (e.g. Statewide health standard Medium Specific Concentrations) moved onto the property from an adjacent property or constituents are naturally occurring. Background quality is the concentration of substances which are unrelated to the release on the site. The background standard is not a health-based standard. It is established by contamination moving onto a property from an adjacent property or by constituents that are naturally occurring. Final background standard remediations may result in concentrations that exceed the Statewide health standard. Background quality is the concentration of substances that are present on the site and which are unrelated to the release of regulated substances on the site.~~

In order to demonstrate compliance with the background standard, [persons remediators](#) should demonstrate that onsite media do not exceed the background standard for a regulated substance(s) by statistically developing representative contaminant concentrations through onsite and background reference samples of the environmental media ~~(mainly soils and water)~~. [Onsite media may include groundwater, soil, and sediment.](#) Subchapter G Chapter 250 of the regulations establishes statistical tests ~~(methods)~~ recognized by the Department for the demonstration of attainment. Background statistical attainment requirements are in Section 250.707(a)(1) of the regulations for background soils and Section

250.707(a)(2)or(3) of the regulations for background groundwater.

Demonstration of attainment for background is discussed in Subsection II.B.1.e.vi of this manual.

In reporting the completion of a remediation to the Department, a final report is required which contains a detailed description of the process taken to reach the background standard and the reasoning for choosing media for testing, ~~such as soil and groundwater~~. Section 250.204 in the regulations discusses the requirements for a final report. Also below in Section II.B.1.e of this manual is a discussion on the final report requirements for the background standard. Summaries of sampling methodology and analytical results showing attainment should be included with the report [Act 2, Section 302(b)(2)].

Institutional controls such as fencing and future land use restrictions on a site may not be used to attain the background standard. Institutional controls may be used to maintain the background standard after remediation occurs, ~~however~~ [Act 2, Section 302(b)(4)].

If the initial remediation chosen by the ~~remediator person~~ fails to attain the background standard, the ~~remediator at person~~ may choose instead to meet the Statewide health or site-specific standards [Act 2, Section 302(c)]. Sites attaining and demonstrating compliance with the background standard are not required to meet the deed acknowledgment requirements of the SWMA or the HSCA [Act 2, Section 302(d)] or the Uniform Environmental Covenant Act. An existing acknowledgment contained in a deed prior to demonstrating compliance with the background standard may be removed.

b) Process Checklist for the Background Standard

- Review the historic and current information and present use of regulated substances at the property.
- Begin the site investigation/characterization and gathering information about the area on and around the property.
- As an option, begin using the completeness list (See Section V.K) to help verify that all requirements have been met.
- Determine if property/site is affected by regulated substances not from the property.
- For the groundwater background concentration, establish if it is naturally occurring/area-wide or from an upgradient source. See Section 250.707 of the regulations.
- For the soils background concentration, establish if it is a naturally occurring or areawide problem. The Department has not established background concentrations for naturally occurring substances as they may vary considerably across the Commonwealth. ~~Some literature references are available for certain rock and soil types in Pennsylvania. Background concentrations will~~should be determined on a site-by-site basis.

- If using the naturally occurring/area-wide background distinction - Request in writing and receive back in writing the Department's approval that the site is indeed in an area of wide spread contamination for the regulated substance on your property/site before submitting the Notice of Intent to Remediate. See Section 250.707(a)(3)(I) of the regulations.
- Continue with the site characterization and required activities needed to complete the final report. See Section 250.204 of the regulations.
- Submit a Notice of Intent to Remediate for the background standard. Also notice the municipality, publish a notice in a local newspaper, and obtain proof of [publication-required notices](#) for inclusion with the final report to the Department [Act 2 Section 302(e)(1)]. Procedures for submittal of notifications are contained in Section II.A.3 of this manual. Links to sample forms are provided in Section VI.D.
- Remediate the site to the background standard.
- Demonstrate attainment of the background standard. Section 302(b).
- Calculate mass of contaminants remediated using the procedure in Section III.C of this manual.
- Complete the final report summary [online and submit electronically as instructed on the Land Recycling Program webpage](#).
- Prepare and submit the final report, along with the optional completeness list (if used) to DEP Regional Office. See Act 2 Section 302(b)(2), Section 250.204 of the regulations, and Section II.B.1.e of this manual.
- If the final report is approved, the liability protection set forth in Act 2, Chapter 5 automatically applies.
- If engineering controls were used and post-remediation care is required to maintain the standard, continue with the post-remediation care program detailed in the final report. Post-remediation care would not normally be used for the background standard.
- When the background standard can be maintained without engineering controls operating, document this to the Department and receive approval to terminate the post-remediation care program.

c) Point of Compliance (POC) for the Background Standard

For the background standard the point of compliance (POC) for groundwater is throughout the area of contamination (plume) both from the offsite release on the property and any onsite release on the property, including areas to which the contamination has migrated off the property above the background standard as determined by the site characterization (See Figures [H-1](#) and [H-2](#)). This differs from the groundwater POC for the Statewide health and site-specific standards. (See Section 250.203(a) of the regulations).

Figure II-1
Point of Compliance for the Background Standard

Compliance with background from upgradient release with no on-property release

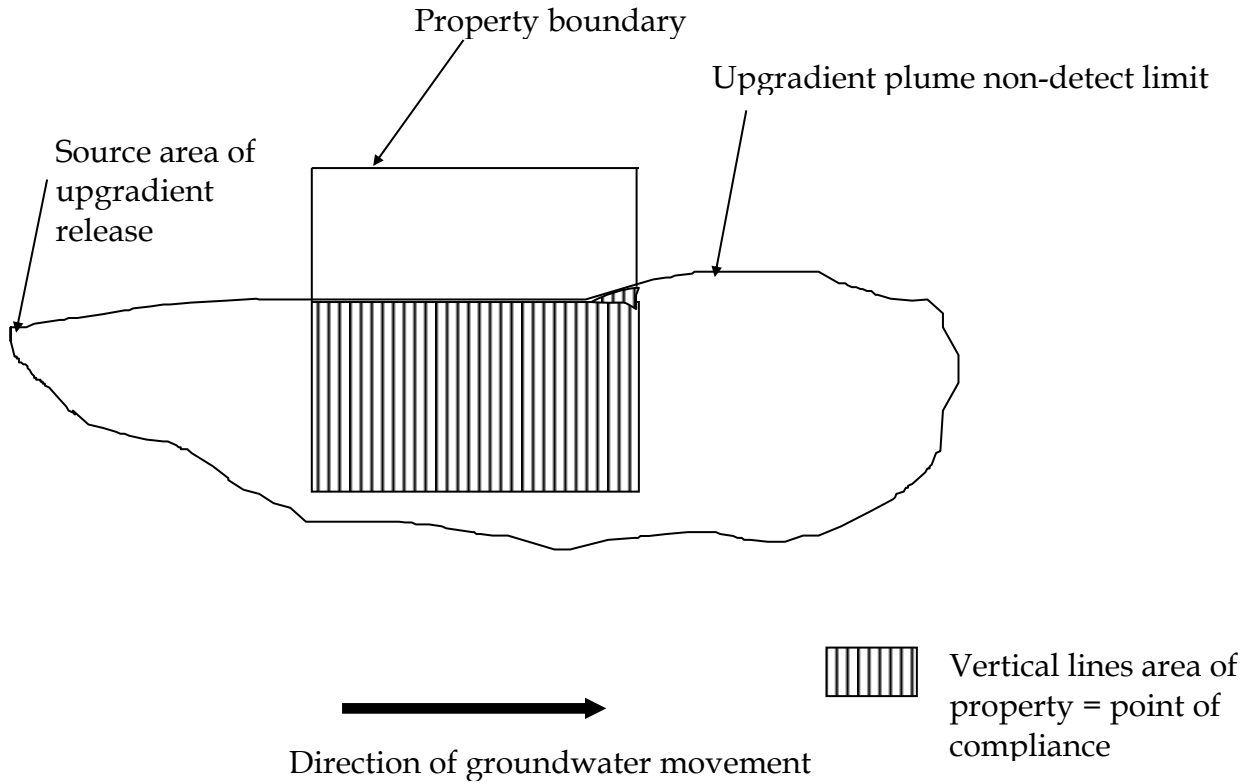
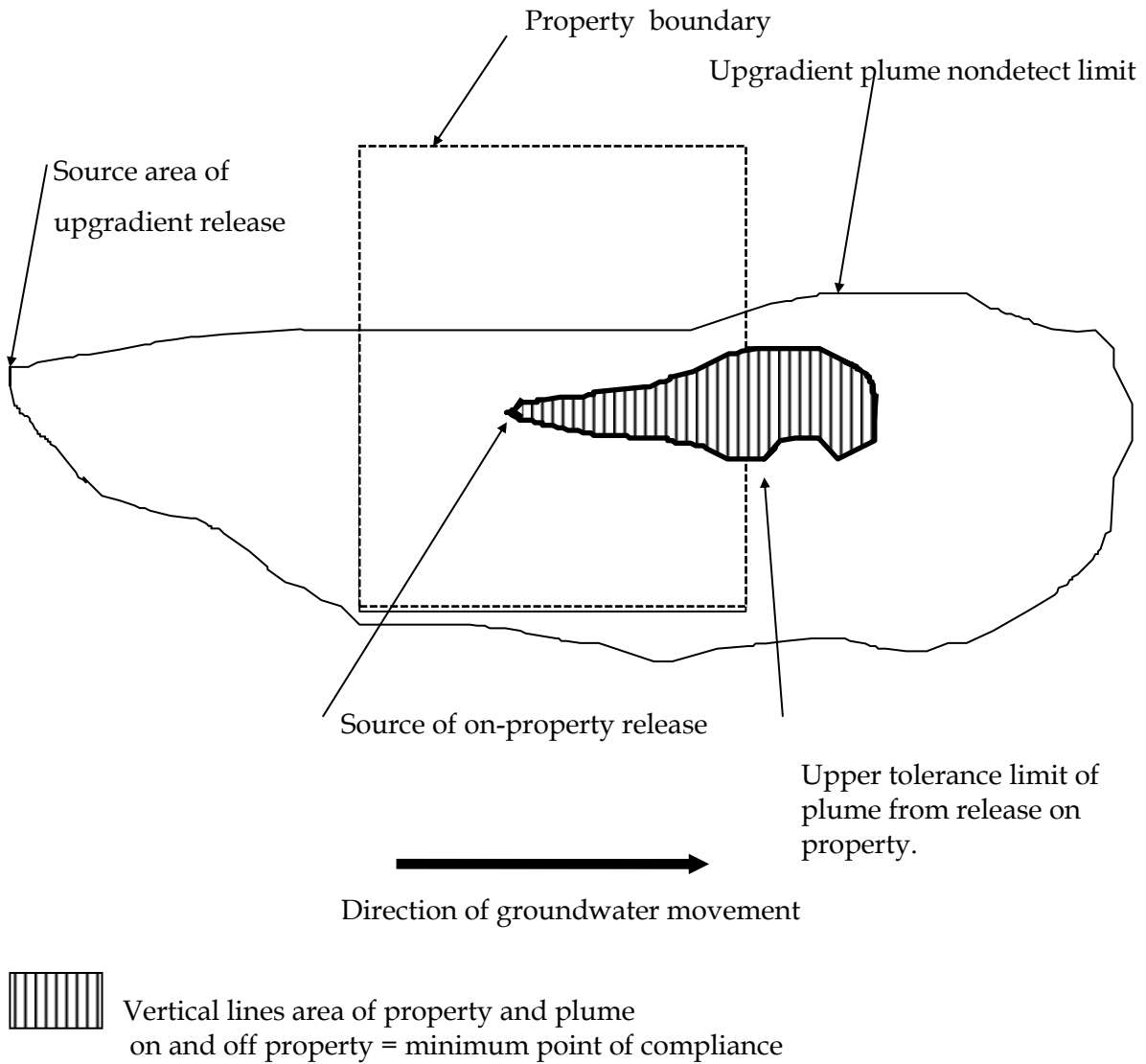


Figure II-2
Point of Compliance for the Background Standard

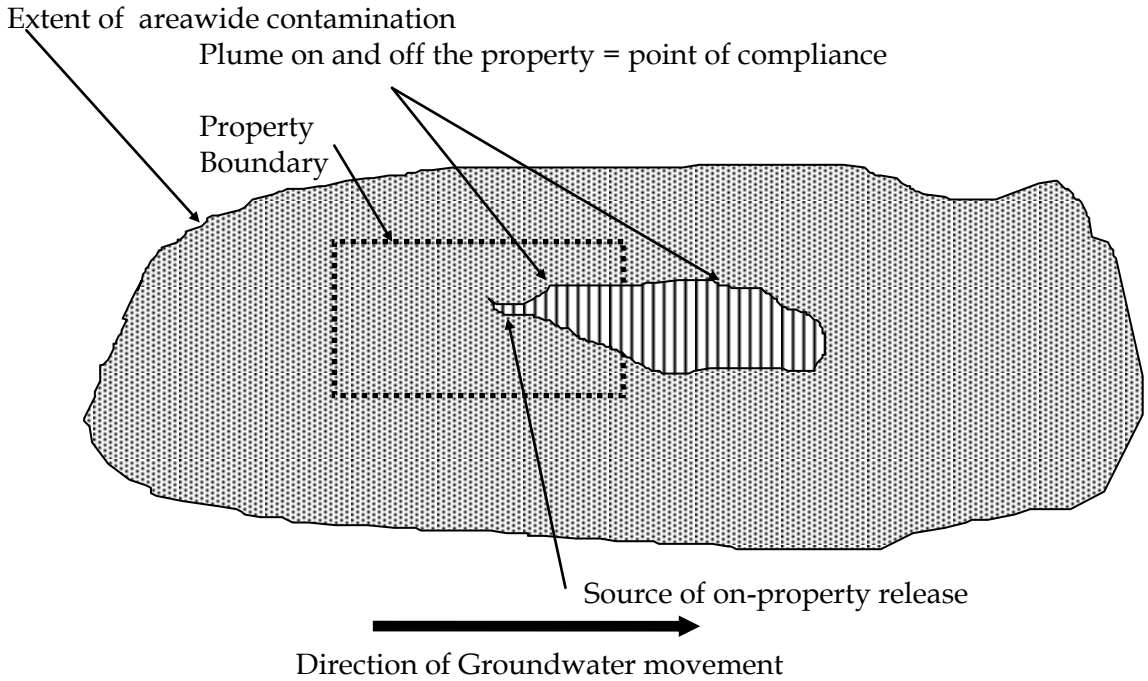
Off-property migration with an upgradient groundwater source area release



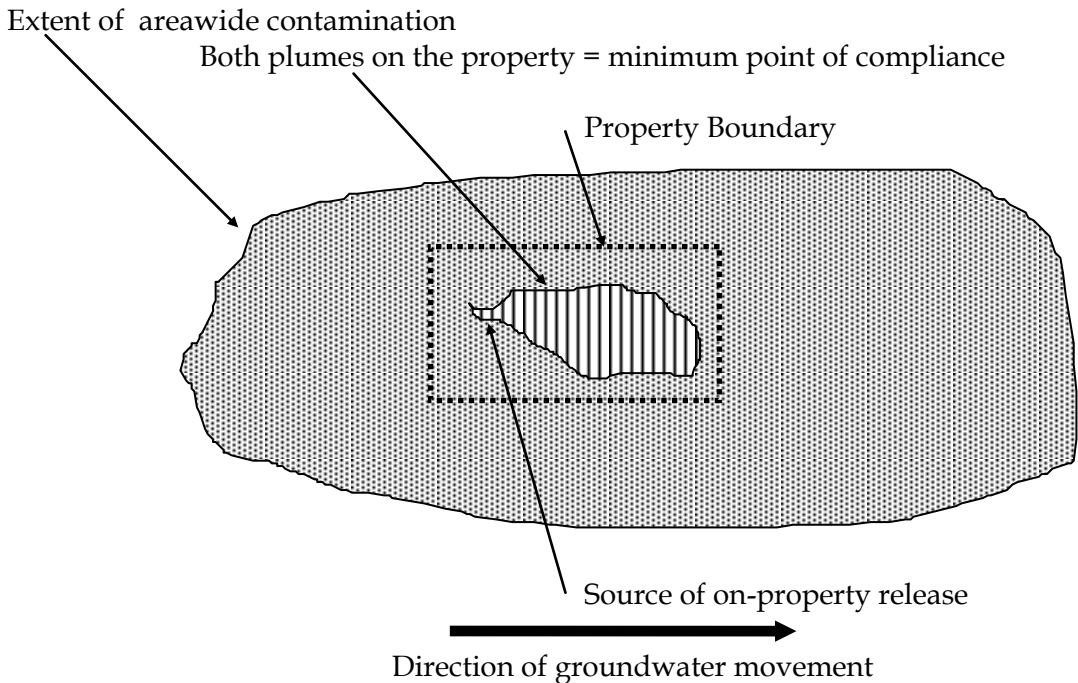
For a property located within areawide contamination the minimum required point of compliance is the extent of plume contamination on and off the property if the plume from an on-property release migrated off the property, as shown in ~~Figure II-3~~ Figure . A person-remediator may choose to use a larger point of compliance by including all areas on the property which have been affected by a release not on the property. For example, in the case just described, the remediator could choose to use the entire area shown as being affected by the release not on his property as the point of compliance. In such a case, the remediator would receive liability protection for the entire area affected by the upgradient release.

Figure II-3
Areawide Contamination

Areawide contamination with release above the area wide background concentration on site that extends off property. The plume on and off the property must attain the concentration of the areawide contamination



Areawide contamination with release that stays on the property. The entire plume must attain the standard.



The point of compliance for the background standard in soil is throughout the area of the soil that has been contaminated (See Section 250.203(b) of the regulations).

For surface water, point source discharges shall be measured at the point of discharge in accordance with limits in the National Pollutant Discharge Elimination System (NPDES) permit (See Section 250.203(c) of the regulations). ~~Under the background standard, for~~ For spring or diffuse groundwater flow to surface waters, ~~the attainment of the background standard for groundwater, which is the source of the diffuse groundwater flow, satisfies will satisfy~~ Act 2.

~~The background standard may allow a higher than health based level of cleanup, since the standard is established by the contamination moving to the property from an adjacent property or constituents that are naturally occurring. Background quality is the concentration of substances that have moved onto the site and which are unrelated to the release of regulated substances on the site.~~

d) Establishing Background Concentration(s)

~~The b~~Background concentrations ~~will be~~ determined using analysis of samples of regulated substances present at the property under investigation but not related to any release at the property. If all areas on the property are affected by a release at the property, then background samples will be taken in an area free of contamination from any release at the site including representative off-property areas. Persons may not obtain Chapter 5 relief-cleanup liability protection by using a contaminated area as a background reference area when they are responsible for the contamination.

Background soil sampling locations must be representative of background conditions for the site, including soil type; physical, chemical, or biological characteristics; and depth below ground surface. Randomization of sampling at background and onsite locations must be comparable (See Section 250.204(f)(7) of the regulations).

Any wells that are used to establish groundwater concentration(s) must be hydrogeologically upgradient or otherwise justified from the groundwater onsite that is affected by any release at the property and that characterizes the flow onto the site. Upgradient wells may not be appropriate to detect movement of a dense non-aqueous phase liquid (DNAPL) since geologic structure rather than hydrogeologic gradient may influence DNAPL movement.

Background concentrations determination will be by a statistically valid method that is consistent with the methods used to demonstrate attainment. Statistical methods are included in Section 250.707 of the regulations and in Section II.B.1.e.vi of this manual.

For non-naturally occurring regulated substances (primarily organic compounds) the affected area shall be shown to be related to sources other than the release of regulated substance on the site. This may include transport of regulated substances onto the property in the gaseous, liquid or solid phases and associated mixing with or partitioning to onsite gaseous- liquid- or solid-phase

media. For background conditions which are related to ongoing flux onto the site (e.g., regulated substances dissolved in groundwater flowing onto the site ~~or soil vapor transport onto the site~~), the background concentrations shall be determined by monitoring the concentrations of regulated substances associated with this flux where it enters the property. For background conditions which are not related to a continuing source of chemical flux onto the property (e.g., historical accumulation of airborne contaminants including particulate and associated deposition in surficial soils), the determination of background concentrations shall include the identification of the source(s), if possible, and a demonstration that the areal distribution of the background conditions extends beyond the limits of the property.

These same determinations should be made for naturally occurring regulated substances. However, an additional determination should be made as to the naturally occurring concentrations of these regulated substances independent of impacts from the release(s) or other background sources. Therefore, for naturally occurring regulated substances, the background standard would include the naturally occurring concentration plus contributions from sources not on the property.

Use of breakdown products of a regulated substance from offsite which form on the site undergoing remediation can be included in the assessment of attainment of the background standard. The Department is willing to consider breakdown products of substances released upgradient of the property. The remediator should submit historical information and fate and transport analyses to demonstrate that the substances onsite are a result of chemical breakdown and not a result of a release on the property. Likewise, a conclusion that of contamination entering a subject property which transforms or degrades to a compound similar to a spill which occurred on the subject property will be supported by the combined sample analysis and fate and transport analysis determination. The remediator should must demonstrate to the Department that the concentrations are the result only of transformation or direct migration of chemicals from the background area.

The establishment of the groundwater background concentrations for a site using sampling and analysis allows for two different background conditions, as described in Section 250.707(a) of the regulations:

- Background from a known upgradient release of regulated substance.
- Background from naturally occurring or area-wide contamination (this can also apply to soils).

The Department provides different procedures to establish the background groundwater concentration depending on which background condition is present upgradient and adjacent to the property. The method used when establishing background and determining attainment of the background standard for a site must be the same.

i) Background from a Known Upgradient Release of a Regulated Substance

This groundwater distinction occurs when an adjacent or nearby property has had a release of the same regulated substance that flows onto the property under consideration for an Act 2 remediation. One option for determining background conditions is through the use of monitoring wells sampled during the site characterization to establish the well with the highest concentration of the groundwater migrating onto the site. Another option is to compare the statistical distribution of the background area with the impacted area onsite. Section 250.707(a)(2) in the regulations, Section II.B.1.e.vi of this manual, and also the statistical requirements in Section III.B of this manual discuss the handling of the statistical requirements for groundwater attainment in the background standard.

~~If a person remediating a site~~ A remediator who believes that ~~it a site~~ meets the following conditions for reducing the number of groundwater sampling events found in Section 250.702(a)(2)(x) fo the regulations and has eight or more samples, ~~they person~~ may request that the Department accept fewer than the eight quarters of samples. ~~The conditions for reducing the number of sampling events are found in Section 250.707(a)(2)(x) of the regulations.~~ The request may be sent along with supporting information, to the Regional Environmental Cleanup and Brownfields Program Manager. If the Department is not satisfied that these conditions are met, the person remediator can continue to monitor for the remainder of the eight quarters.

The time frame for taking the background samples when remediation is not undertaken may start before the site characterization is completed. This will allow a user who has existing data to establish background without the need to monitor for an additional four or eight quarters as long as all the consecutive quarterly data total four or eight quarters, as applicable to that background condition.

If remediation action is undertaken, the attainment sampling is done after remediation is completed.

ii) Background from Naturally Occurring or Areawide Contamination.

Some areas of the Commonwealth have naturally occurring or widespread groundwater contamination. ~~F A remediator must obtain written agreement from the Department if they plan to demonstrate that their site is in an area of naturally occurring or widespread contamination~~ he Department needs to agree in writing that a site is in an area of widespread contamination. This decision will be based on evidence presented to the Department in writing by the remediator seeking the determination. The Department will make the final determination on the existence of areawide contamination. After the person has sent a written request with supporting data to the Department and provided documentation that areawide contamination exists, the Department will review the submitted data. When the Department agrees, through written

acknowledgment to the person-remediator that the property under investigation is within a location of areawide contamination, the following approach for establishing background is allowed.

(a) Groundwater

When the background groundwater condition is due to naturally occurring or area-wide contamination, a minimum of twelve samples should be ~~taken~~ collected offsite and twelve samples ~~taken-collected~~ onsite. The number of wells sampled onsite and offsite must be the same in each round of sampling. For example, if three wells are sampled offsite, three wells must be sampled onsite. In this example each of the wells must be sampled a minimum of four times ~~at a minimum~~. The samples must be independent of one another. The onsite and offsite samples must be ~~taken-collected~~ at the same time. The time frame for establishing this condition is not predetermined, as it is in the upgradient release. By increasing the number of wells onsite and offsite, the number of sampling events necessary to meet the minimum of twelve samples can be reduced (two wells will require six sampling events, six wells will require two sampling events). The offsite wells must be located upgradient of the site. The number of wells and the horizontal and vertical location of the wells onsite must be adequate to characterize any release of regulated substance at each site. All sampling data must be reported to the Department.

~~The Department needs to agree in writing that the site is in an area of widespread groundwater contamination. This decision will be based on evidence presented to the Department in writing by the person seeking the determination.~~

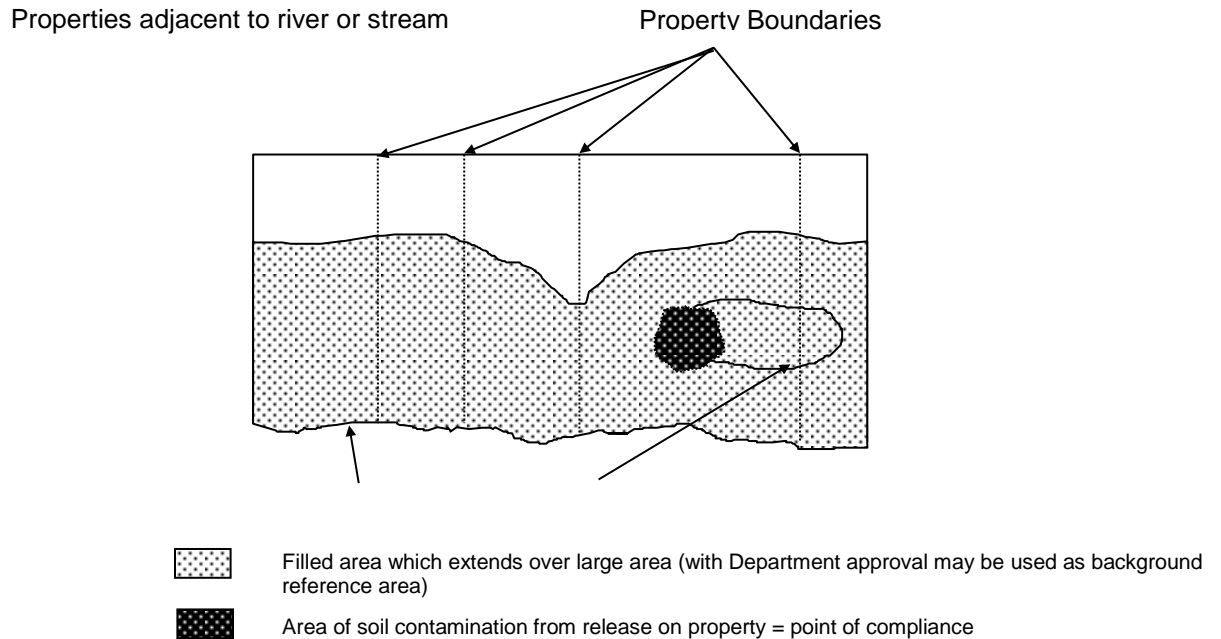
(b) Soil

Soils exhibiting the presence of naturally occurring regulated substances or soils where a large area was affected by a release of regulated substances off-property do not typically move from one location to another in comparison with the movement of groundwater. Natural movement of soil in Pennsylvania normally involves surface water transporting sediment, landslides or airborne transport of soil or contaminants.

(c) Historic Fill

Some sites may be located in an area where there has been widespread use of fill (Figure H-4 Figure). This fill may contain regulated substances. If a spill or discharge of a regulated substance occurs on a site that received fill long ago (historic fill), the remediator can limit his remediation to the discharge that he has recently caused. In this case, the remediator would obtain relief from liability only for cleaning up what he has recently spilled. This includes contamination resulting from the onsite release ~~in-to~~ the soil and groundwater. Persons-Remediators who wish to limit their cleanup to the levels that were already present in the fill should provide information to the Department indicating that the fill was historical (placed prior to 1980), not placed at their direction, widespread, and involved more than the subject property.

**Figure II-4
Background Standard Areawide Fill**



An example of contamination [that may have occurred](#) through airborne transport [may have occurred comes from the time](#) when leaded gasoline was commonly used in automobiles. The surface and near surface soils of properties along highways [were have been](#) found to have elevated levels of lead. Samples taken from a number of properties near and along the highways would be required to compare the on and off site conditions.

e) Final Report Requirements for the Background Standard

For a site remediated under the background standard, the [person conducting the remediation-remediator](#) shall submit a final report to the Department which documents attainment of the selected standard. Section 250.204 of the regulations discusses final report requirements.

A complete final report is prepared in accordance with scientifically recognized principles, standards and procedures. The report will present a thorough understanding of the site conditions. It will provide a detailed discussion on the areas of concern and a conceptual site model based on the results of the site characterization. Support for interpretations and conclusions will be based on data collected during all of the investigations at the site. The level of detail in the investigation and methods selected needs to be sufficient to define the rate, extent and movement of the contaminants to assure continued attainment of the remediation standard. In accordance with Section 250.204(a) of the regulations, all interpretations of geologic and hydrogeologic data shall be prepared by a professional geologist licensed in Pennsylvania.

Two copies of the final report should be submitted for the Department's review. The final report must include the information below, and it is preferred to be organized according to the outline in [Table II-1](#). The following paragraphs describe the information to be included in the final report:

i) Summary

The Final Report Summary form is to be filled in and submitted to the Department electronically. The summary submitted with the final report should be a copy of that completed form.

ii) Site Description

Provide a description of the site in sufficient detail to give the reviewer an overall idea of the site and its location, and the types of operations that are currently and/or were formerly conducted on the site. As appropriate to the site, the description should include location, physical description of the property, ownership history, site use history, and regulatory action history (past cleanups).

iii) Site Characterization

The site characterization provides important information documenting the current conditions at the site, and shall be based on Section 250.204 of the regulations. The two principal objectives of an investigation under the background standard are to determine what constitutes background for each of the regulated substances associated with the release, and to characterize the nature, extent, direction, volume and composition of regulated substances that have been released. Considerations for establishing the background concentrations are found in the previous section. Section 250.204 of the regulations has reporting requirements for the background standard.

For sites where there are multiple distinct areas of contamination, the site characterization process should be applied to each area individually.

Along with a narrative, the results from the site characterization and all sampling and analysis work should be provided on map(s) illustrating, to the extent possible, the interrelationship of the following:

All physical site characteristics.

- All groundwater, soil, sediment and other sample locations, including sample depth and contaminant concentration.
- The surveyed locations for all assessment structures (monitoring wells, soil borings, test pits, etc.). All elevations should be reported in reference to mean sea level (msl), where practical.
- Appropriate number of stratigraphic cross sections that adequately depict site stratigraphy, well locations, well depths, groundwater flow directions, equipotential lines, flow lines, hydraulic conductivity intervals and values, sampling intervals and concentrations. All elevations should be reported in reference to msl, where practical.

- Variation in potentiometric surfaces(s), potentiometric surface map(s), hydraulic gradients, and groundwater flow directions.
- All identified sources of releases.
- The extent and concentrations of contaminant plumes in all media. The horizontal and vertical extent of contaminant plumes including the relative density and thickness of any separate phase liquids (SPL) present.
- Top of bedrock contour (if encountered).

A conceptual site model should be developed and refined as information is gathered during the site characterization. The conceptual site model provides a description of the site and extent of contamination. Some of the information and data used to develop the site model would include:

- The type, estimated volume, composition, and nature of the released materials, chemicals or chemical compounds (Include all calculations and assumptions.)
- Source(s) and extent of release(s).
- Background concentrations for constituents of concern.
- The horizontal and vertical extent of contamination.
- Affected aquifer(s) or water bearing formation(s)/member(s), hydrostratigraphic units.
- All existing and potential migration pathways.
- The estimated volume of contaminated soil and water (include all calculations and any assumptions.)

For soils, include information on samples and measurements used to characterize the horizontal and vertical extent of contamination, and direction and rate of contaminant movement based on factors in the soil and the contaminant which affect migration. Soil and boring descriptions should be included as an attachment.

For groundwater, include information on samples and measurements used to characterize the horizontal and vertical extent of contamination, and direction and velocity of contaminant movement based on factors of the groundwater and the contaminant(s) which affect migration. Geologic boring descriptions and as-built drawings of wells should be included as an attachment. Text, tables, graphics, figures, maps and cross sections, as appropriate, can be utilized to describe the nature, location, and composition of the regulated substances at the site. Providing the data in an appropriate format will expedite the review of the report.

Table II-1

Suggested Outline for a Final Report under the Background Standard

I. Final Report Summary

The final report summary should be a copy of the electronic form submitted to the Department.

II. Site Description

Provide a description of the site in sufficient detail to give an overall view of the site (Section II.B.1.e.ii)

III. Site Characterization

Document current conditions at the site (Section 250.204 of the regulations and Section II.B.1.e.iii)

IV. Background Standard

How the background standard was established (Section II.B.1.e.iv)

V. Remediation

Description of the remedial methodologies used to attain the selected standard (Section II.B.1.e.v)

VI. Attainment

A. Soil background standard

B. Groundwater background standard

Both sections A and B should describe the statistical methods used to establish background and to demonstrate attainment of the standard (Section II.B.1.e.vi)

VII. Fate and Transport Analysis

Description of fate and transport analyses used and results and conclusions. (Section II.B.1.e.vii)

VIII. Postremediation Care Plan

This section is included only if necessary. It describes the engineering and institutional controls necessary to maintain the standard. (Section II.B.1.e.viii)

IX. References

(Section II.B.1.e.ix)

X. Attachments

(Section II.B.1.e.x)

XI. Signatures

(Section II.B.1.e.xi)

iv) Background Standard

- How ~~was~~ the background concentration was established.
- Type of background condition: upgradient release, or area-wide contamination.
- Identify on a map the location of background soil samples and background groundwater wells.
- Document that point of compliance attainment for groundwater is throughout the plume.
- Attainment for each medium is to be determined by the same method as the method used to establish background levels.
- Summary of sampling methodology and analytical results relating to determination of background.

v) Remediation

Provide a description of the remedial methodologies used to attain the selected standard. Examples of the types of information typically included in this section include:

- Identification of areas remediated based on results of site characterization.
- Descriptions of treatment, removal, or decontamination procedures performed in remediation. Description of removal, what was removed, and amount removed. Results of any treatability, bench scale, or pilot scale studies, or other data collected to support the remedial action(s).
- Description of the methodology and analytical results used to direct the remediation and determine the cessation of remediation. This description should document how the remediator determined that remediation was performed to address all areas that exceed the standard.
- Description of treatment technologies.
- Documentation of handling of remediation wastes in accordance with applicable regulations.
- Specific characteristics of the site that affected the implementation or effectiveness of the remedial action including such characteristics as topography, geology, depth of bedrock, potentiometric surfaces, and the existence of utilities.
- All other site information relevant to the conceptual design, construction, or operation of the remedial action.

In addition to the above, this section should also include the calculation of the mass of contaminants addressed during the remediation of soil and/or groundwater, using the methodology in Section III.C.

vi) Attainment

Appropriate statistical methods, discussed in Section III.B, will confirm the attainment of cleanup under the background standard. Not all the statistical tests discussed in the manual are appropriate for the background standard attainment tests. Section 250.707(a) of the regulations describes statistical tests for the background standard. The following information shall be documented in a final report when a statistical method is applied except the highest measurement comparison test described in Section 250.707(a)(1)(i) of the regulations:

- Description of the statistical method, and the underlying assumptions of the method.
- A clear statement of the applicable decision rule in the form of a statistical hypothesis for each spatial unit and temporal boundary including the applicable statistical parameter of interest and the specific cleanup standard.
- Documentation showing that the sample data set meets the underlying assumptions of the method and explaining why the method is appropriate to apply to the data.
- Specification of false positive and false negative rates.
- Documentation of input and output data for the statistical test, presented in table and figures, or both, as appropriate; and identify, by medium, contamination levels remaining onsite.
- An interpretation and conclusion of the statistical test.

In demonstrating attainment of the background standard, concentrations of regulated substances are not required to be less than the limit related to the Practical Quantitation Limit (PQL) for that substance as provided for in Section 250.701(c) and as listed in Section III.F of this manual.

(a) Soil background standards

The determination of attainment of soil background standards will be based on a comparison of the distributions of the background concentrations of a regulated substance with the concentrations in an impacted area. Act 2 regulations allow a person to use highest measurement comparison, combination of Wilcoxon Rank Sum test and Quantile test, or other appropriate methods to demonstrate attainment of background standards. No matter which method is used, Act 2 regulations require that the minimum number of soil samples to be collected is ten from the background reference area and ten from each cleanup unit. This requirement of ten samples is to ensure that any selected statistical test has sufficient power to detect contamination. ~~The regulations do not specify the false negative rate because it is more appropriate to determine the false negative rate on a site-by-site basis. For the background standard, the false negative rate is the probability of mistakenly concluding that the site is clean when it is contaminated. It is the probability of making a Type-II error.~~

(b) Groundwater background standards

There are two general categories of background conditions for groundwater. The first is naturally occurring background or area-wide contamination, neither of which is expected to exhibit seasonal patterns or trends. The second is background associated with a release of regulated substances at a location upgradient from the site that may be subject to such patterns and trends.

For naturally occurring background or area-wide contamination, it is recommended that a minimum of twelve samples be collected from any combination of upgradient monitoring wells, provided that all data collected are used in determination of background concentrations. This same number of samples must then be collected from monitoring wells impacted by a release on the site during the same sampling event. In both cases, this sampling may be accelerated such that all samples ~~are~~ collected as quickly as possible so long as the frequency does not result in serial correlation in the data. The resulting values may be compared using nonparametric or parametric methods to compare the two populations, such as using the combination of the Mann-Wilcoxon Rank Sum test and the Quantile test. When comparing with the background results, the sampling results in the plume onsite should not exceed the sum of the arithmetic average and three times standard deviation calculated for the background reference area [Section 250.707(a)(3)(vii)].

For background associated with a release of regulated substances at a location upgradient from a property, the background groundwater concentrations will be determined at the hydrogeologically upgradient property line of the property, or a point hydrogeologically upgradient from the upgradient property line that is unaffected by the release.

For background associated with an upgradient release of regulated substances, Section 250.707(a)(2) of the regulations allows the use of the nonparametric tolerance limit procedure. The nonparametric tolerance limit procedure requires at least eight samples from each well over eight quarters to have sufficient power to detect contamination. Once the nonparametric upper tolerance limit is established for upgradient data, data from downgradient compliance wells can be compared to the limit. A resampling strategy can be used when an analyte exceeds the nonparametric upper tolerance limit. The well is retested for the analyte of concern and the value is compared to the nonparametric upper prediction limit. These two-phase testing strategies can be very effective tools for controlling the facility-wide false positive rate while maintaining a high power of detecting contamination. See [Sections 5.2.2 and 5.2.3 Chapter 19](#) of the EPA [Unified Guidance Addendum](#) (USEPA, ~~1992a~~ [March 2009](#)) which describes the procedures to use ~~along with recommended coverage and confidence levels~~.

vii) Fate and Transport Analysis

The Fate and Transport Section (Section III.A) of this manual provides a discussion on fate and transport analysis. The amount of detail in the fate and transport analysis will vary from a simple narrative description to a very

extensive detailed model with quantitative modeling as appropriate to the circumstances of the site. Whenever a model is used the Department must be provided with the assumptions, data, and information on the model necessary for Department staff to evaluate and run the model. Any parameters used in the analysis or models should use data from the site obtained during the site characterization.

The following are examples of situations where a fate and transport model/analysis is used to justify a special condition when attaining the background standard:

- When shortening the number of groundwater samples for establishing an upgradient release in the background determination, Section 250.707(a)(2)(x) of the regulations, it is required that fate and transport be fully evaluated.
- When contamination remains in the unsaturated soil, fate and transport must demonstrate that the contamination in the soils will not impact the groundwater and raise the level of regulated substances above the groundwater standard. This would be both when the soils and groundwater attain the background standard and when using a combination of standards; for example, background standard in the groundwater and Statewide health [standard](#) in the soils.
- When the contamination on the site is the result of chemical transformations (*e.g.*, parent to daughter), fate and transport must demonstrate that the concentrations of regulated substances onsite were the result of releases not on the site.

While the previous examples will require detailed evaluation, when the source and any regulated substance that could have migrated from the source are removed before contamination reached the groundwater, the fate and transport analysis could be very short and non-quantitative.

When the background standard is attained in all media, the fate and transport analysis ~~would~~will confirm that no cross-media contamination will cause contamination in one medium to raise the contamination in another medium above the standard.

If the standard will be exceeded in the future, a post-remediation care plan is required.

viii) Postremediation Care Plan (if applicable)

If engineering or institutional controls are needed to maintain the standard, a postremediation care plan must be documented in the final report in accordance with Section 250.204(g) of the regulations. The plan should include reporting of any instances of nonattainment; reporting of any measure to correct non-attainment conditions; periodic reporting of monitoring; sampling and analysis as required by the Department; maintenance of records at the property where the remediation is being conducted for monitoring, sampling and analysis; and a schedule for operation and maintenance of the controls and submission of any

proposed changes. The Department may ask for documentation of financial ability to implement the remedy and to maintain the postremediation care controls. When the standard can be maintained without the controls operating and documentation is provided, the Department will approve termination of the postremediation care program.

ix) References

Any references mentioned in the final report.

x) Attachments

Attachments should include (but not limited to):

Laboratory sheets and historical sampling data results

All raw data and summary of data

Quality Assurance and Quality Control Plan

Physical/chemical properties or toxicological/exposure factors of chemical compounds of concern. Include, as appropriate, water solubility, vapor pressure, Henry's Law constant, compound density, octanol/water partition coefficient (K_{ow}), organic carbon partition coefficient (K_{oc}), and soil/water partitioning coefficient (K_d) as needed for determining performance of remedial equipment and/or fate and transport modeling for site-specific risk assessment.

Calculations and formulas

Methods of data analysis

Health and Safety Plan

Sampling and Analysis Plan

All water level/liquid level measurements, including SPL measurements

Maps and cross sections used which present information on site characterization and attainment

As-built well construction details, boring logs, cross sections, stratigraphic logs, including soil/rock characteristics and field instrument readings, and as-built drawings

Proofs required such as municipal and newspaper notices, proof of publication and Department acknowledgment of natural or areawide contamination

Before and after remediation photographs

xi) Signatures

If any portions of the submitted report were prepared or reviewed by or under the responsible charge of a registered professional geologist or engineer, the professional geologist or engineer in charge must sign the report. The name, address, and signature of all those who participated in the remediation who are seeking relief from liability

4. Special Industrial Areas

a) Introduction

The special industrial area provision established in Section 305 of Act 2 creates incentives to reuse industrial properties. Cleanups at these special industrial areas have reduced remediation requirements which are intended to allow these sites to be put back into productive use in the community. Act 2 established this provision to encourage the redevelopment of properties used for industrial activities. The remediator, reuser, and the property must meet eligibility requirements to be considered as a special industrial area under Act 2. Under the special industrial area provision, ~~perform~~ necessary remediation will be performed, and ~~meet~~ required notification and reporting requirements will be met. Any remediation undertaken for a special industrial area property shall comply with one or more of the three cleanup standards.

b) Eligibility Determination

Specific eligibility requirements in Section 250.502 of the regulations provide for qualification of a property for reuse as a special industrial area and for the qualification of a remediator to use this special provision of Act 2. The property must have been used for industrial activity. The extent of industrial activity is defined very broadly and is detailed in Section 103 of Act 2. If the property qualifies as having been used for industrial activity, the following additional qualifications must be met:

- The property must be one where there is no financially viable responsible person, or it is located within a designated enterprise zone.
- The remediator must not have caused or contributed to releases at the property. A person who is interested in purchasing a property and undertaking a reuse of that property should contact the Department before the reuser purchases the property.
- The term responsible person includes the owner of the property, regardless ~~as to of~~ whether he has or has not caused or contributed to the contamination. Therefore, prospective purchasers of property which could be eligible as a special industrial area should sign a special industrial area agreement with the Department prior to the purchasing of the property. The standard template for this type of agreement is located on the Department's web site. ~~at:~~
http://www.dep.state.pa.us/dep/deputate/airwaste/wm/landrecy/Vol_Cleanup.htm#anchor8609. Signing a special industrial area agreement does not bind the prospective purchaser if he does not purchase the property.
- Actions in themselves that do not cause or contribute to contamination taken under Act 2 Section 307 relating to emergency and interim responses will not prejudice eligibility determinations under the special industrial area designation.

- It is the responsibility of the reuser to demonstrate to the Department that the reuser has not had an environmental impact on the property, just as it is the responsibility of the remediator to document that the property meets the other eligibility criteria for a special industrial area. In order to accomplish this, certain information must be presented to the Department regarding the above eligibility requirements.
 - Documentation that the property has been used for industrial activities by including information on the ownership and operational history of the property as part of the work plan for the baseline remedial investigation.
 - Verification that no financially viable responsible party exists to address the contamination on the property. Financial information for existing responsible parties must be included in the ownership and operational history. Financially viable is generally defined as having sufficient financial resources to be able to perform part or all of the cleanup required at a particular property.

To qualify as a property within an Enterprise Zone or Keystone Opportunity Zone, the municipality where the property is located must be designated by the Pennsylvania Department of Community and Economic Development ([DCED](#)) as an Enterprise Zone, ~~or~~ Keystone Opportunity Zone, or Keystone Innovation Zone. In order to determine whether a particular property is within an Enterprise Zone, ~~or~~ Keystone Opportunity Zone, or Keystone Innovation Zone, contact DCED or the appropriate ~~zone~~ local contact person. ~~DCED is currently undergoing a process of reevaluating the status of Enterprise Zones across the state and all Enterprise Zones have established exit dates.~~ If a remediator wants to determine the eligibility of a site for the special industrial area provisions, when a financially viable responsible party is present, the remediator will need to verify the existence of the Enterprise Zone, Keystone Opportunity Zone, or Keystone Innovation Zone designation for the area where the site is located.

A letter from either the DCED or ~~enterprise-appropriate~~ zone contact person should be provided with the work plan to verify the status of the property. Persons remediating a site in an enterprise zone where a viable responsible party may still exist are only responsible for remediation of contamination identified in the baseline environmental report and specified in the Consent Order and Agreement with the Department as required for remediation prior to the new use of the property. Additional remediation may be pursued by the Department with the responsible person. Responsible persons under HSCA must resolve their liability to the Department pursuant to HSCA. See Section V.E of this manual.

c) Process Checklist for Special Industrial Areas

- Evaluate the property potential for redevelopment.
- Determine if the property was used previously for industrial activity or if it is located within an enterprise zone. Act 2 Section 305(a) and Section 250.502 of the regulations.

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- Determine if there is a financially viable responsible party. If the property is located within an enterprise zone, financial viability is not a requirement for special industrial area use (Act 2 Section 305(a) and Section 250.502 of the regulations).
- The remediator must demonstrate to the Department that he did not cause or contribute to contamination on the property (Act 2 Section 305(a) and Section 250.502 of the regulations).
- Review the historical information and present use of regulated substances at the property.
- Prepare a work plan for a baseline remedial investigation (Act 2 Section 305(b) and Section 250.503(b) of the regulations).
- The work plan must be approved by the Department prior to performing the investigation (Act 2 Section 305(b) and Section 250.503(b) of the regulations).
- Begin baseline remedial investigation (use Section II.B.4.e of this manual, Act 2 Section 305(b) and Section 250.503(c) of the regulations).
- Submit Notice of Intent to Remediate (NIR) for the special industrial area to the Department. Also notice the municipality, publish a notice of submission of the NIR in a local newspaper, and provide proof of [publication-required notices](#) to the Department.
- Prepare public involvement plan (if requested by municipality).
- Prepare baseline environmental report based on baseline remedial investigation (Act 2 Section 305(b) and Section 250.503(d) of the regulations).
- Department review of baseline environmental report.
- Meet with the Department and concur on Consent Order and Agreement (CO&A). [The prospective purchaser should enter into the CO&A prior to purchasing the property](#) [Act 2 Sections 305(e) and 502(a)].
- Remediate the property to the special industrial area requirements specified in the baseline environmental report and agreed to in the CO&A [Act 2 Section 502(b)].
- Calculate the mass of contaminants remediated using the procedure in Section III.C of this manual.
- Complete the Final Report Summary [and submit electronically as per the instructions on the Land Recycling Program web-page](#).
- Protection from liability occurs upon the signing of the [Consent Order and Agreement CO&A](#) with the Department, subject to the remediator's compliance with the [Consent Order and Agreement CO&A](#) demonstrating attainment of the special industrial area requirements in accordance with Chapters 3 and 5 of Act 2.

d) Aspects of Special Industrial Areas

i) Immediate, Direct or Imminent Threats to Human Health and the Environment

One of the significant aspects of Act 2 is the cleanup liability protection provided for special industrial areas. The cleanup liability for the person undertaking remediation and reuse of a special industrial area is dependent upon the person performing remediation of immediate, direct or imminent threats to public health or the environment which would prevent the property from being occupied for the remediator's intended purpose.

The immediate, direct or imminent threats are to be determined by the baseline remedial investigation and defined in the baseline environmental report. The baseline environmental report will become the basis for the [Consent Order and Agreement CO&A](#) between the Department and the remediator. The exposures, and potential exposures, presented by a special industrial area site must be identified in the baseline remedial investigation. Defining immediate, direct, or imminent threats is relevant to the remediator's intended use of the property. Therefore, it is necessary for the remediator to specify the intended use of the property. The identification of these threats needs to be addressed at the time of the baseline remedial investigation work plan and in performance of the investigation. Only concerns identified in the baseline environmental report and included in the agreement can be considered in any relief from liability afforded to the remediator by Act 2. For this reason, it is paramount that the remediator performs a comprehensive investigation of a special industrial area.

Immediate and imminent threats are pending threats likely to happen without delay or momentarily in time. Direct threats, though sometimes similar in immediacy, also include chronic exposure. As a minimum, immediate, direct or imminent threats will entail:

- Contained wastes which present immediate, direct or imminent threats. Examples are regulated substances in drums, barrels, tanks, or other bulk storage containers; and contained wastes, such as wastes in drums, above or below ground tanks, and small containers.
- All wastes which are not containerized and which present a direct threat to workers or other persons on the property. These may include, but are not limited to, open containers, pits, waste piles and others that allow wastes to be exposed and accessible on the site.
- In addition to situations listed above, actual exposure for onsite human populations to any regulated substances.
- Actual contamination of drinking water by regulated substances. Also, contaminated groundwater, if groundwater use will expose persons on the property to contaminants.
- Contaminated soil presenting a direct contact threat to workers or other persons on the property. Direct contact may occur in a zone of soil at and

below the surface. The depth of consideration of surface soil shall be the first two feet from the ground surface, unless reuse of the property presents exposure threats at depths greater than two feet.

- ~~Environmental remediation undertaken at a special industrial area shall comply with one of the standards established by Act 2 [Act 2 Section 305(a)].~~
- Regulated substances presenting a threat of fire or explosion.
- Surface water and sediments contaminated with regulated substances, if persons are or may become exposed to these contaminants.
- Regulated substances contained as product may remain on the property if maintained according to appropriate regulations. The remediator is responsible for releases occurring as a result of the remediator's actions.

ii) Consideration of Chronic Exposure in Evaluation of the Reuse of a Special Industrial Area

Section 250.503(c)(5) of the regulations pertains to property to be reused and includes the terminology and states "Evaluation of exposure conditions within the portion of the property to be reused to identify existing contamination that poses an immediate, direct or imminent threat to public health or the environment which is inconsistent with the intended reuse of that portion of the property." Initially, the determination of property use for nonresidential or residential purposes will focus on determination of direct contact exposure. In the use of the definition of "immediate, direct or imminent," the word "direct" includes chronic exposure. In the scope of chronic exposure, workers or other persons using a property with existing contamination are to be protected from chronic exposure levels of contaminants, as well as to acute exposure levels. Direct contact includes contamination which persons may come in contact with when working, living at, or visiting a site. Direct contact may occur by several routes. Some examples are ingestion of soil, contact with soil, or inhalation of soil particles or vapor from the soil. Additional direct contact pathways may be caused by leaching from the soil to groundwater, vapor intrusion into buildings, inhalation of contaminated process water, surface water run off to water bodies, and exposure of wildlife and ecosystems. Soil available for direct contact must meet the human health and environmental protection standards established by Act 2.

iii) Contaminant Migration Off-Property

There are no obligations or liability for off-property contamination placed upon an innocent person using the special industrial area provision. For cases where the off-property pollution is significant, there may be other available options for addressing these risks. If there is an existing viable responsible party (property located within an enterprise zone), the viable responsible party would continue to be responsible for off-property contamination. For sites where there is no viable responsible party, the cleanup may either be remediated by a purchaser of the property (voluntary cleanup), or addressed under other state or federal

programs. In either case, the innocent purchaser would not be responsible for off-property contamination, as long as he or she did not cause or contribute to that contamination. Although assessment at the time of the baseline remedial investigation is not required off-property, the remediator should determine whether contamination is moving off the property.

If contamination which requires remediation is found at a future date, and the nature, concentration, and location were not identified in the baseline environmental report, the remediator may be liable to perform cleanup of the contamination to one of the three standards.

iv) Contamination Identified Subsequent to Remediation and Agreement Conditions

Under Section 502(b) the remediator is only relieved from liability for contamination which was identified in the baseline environmental report. For this reason it is to the remediator's benefit to conduct a comprehensive investigation.

v) Storage Tank Closure and Corrective Action at Special Industrial Areas

Remediators are only responsible for addressing the immediate, direct or imminent threats posed at special industrial areas. In all cases this includes removal of waste in containers. Materials remaining in tanks must be removed and handled in accordance with applicable laws and regulations. Product may remain in the tanks if it is rendered inert and poses no risk. The actual tanks are required to be removed or rendered safe. The remediator should follow the Storage Tank Program regulations and guidance to achieve a safe closure of tanks. Smaller containers will likely be required to be removed. Releases from tanks that occur after the remediator becomes the owner or operator are the responsibility of the remediator.

vi) Consent Orders and Agreements

Remediation of all threats relevant to a special industrial area reuse which were detailed in the baseline environmental report will be detailed in a Consent Order and Agreement ([CO&A](#)). Contamination not identified in the baseline environmental report will become the responsibility of the remediator.

A change in use of the property, from that defined in the Agreement, may necessitate a change in the Agreement or modification of the proposed property reuse. A land use change for a special industrial area may trigger a reopener under Section 505(4) of Act 2. The [Consent Order and O&A Agreement](#) with the Department will require the remediator [or reuser](#) to provide the Department with written notice of any change in the use of the property and to remediate any contamination which would prevent the use of the property for its new purpose.

vii) Remediation

Remediation in special industrial areas must meet the following requirements:

- Cleanup may utilize treatment, containment, removal, or control methods, or any combination of the above.
- Cleanup must address all containerized waste at the property in accordance with applicable regulations.
- Soil available for direct contact must meet one of the three remediation standards.
- Cleanup of any wastes or cleanup of any medium contaminated with regulated substances which pose an immediate, direct or imminent threat to human health or the environment based on the intended use of the property must be to one of the three remediation standards.

If groundwater is to be used at the property, the groundwater must either be remediated in-ground or at the point of use so that it is safe for its intended use and occupation of the property.

viii) ~~Deed notice~~ Environmental Covenant

~~A deed acknowledgment~~ An environmental covenant, as required by the Solid Waste Management Act or the Hazardous Sites Cleanup Act, will be required at all special industrial area remediations. Future activity and use limitations due to disposal of hazardous wastes or regulated substances may be required as part of the remedy and may be identified as part of the ~~deed acknowledgment~~ environmental covenant.

e) Work Plan for Baseline Remedial Investigation and Baseline Environmental Report

i) Work Plan for Baseline Remedial Investigation

A baseline remedial investigation is required for evaluation of a property that will be part of a special industrial area agreement. The objective of the baseline remedial investigation is to establish a reference point documenting contamination that existed prior to the redevelopment. A work plan for the baseline remedial investigation is required to be prepared by the remediator and approved by the Department prior to initiation of the investigation. The findings and conclusions of the baseline remedial investigation shall be documented in a report known as a baseline environmental report.

The work plan for the baseline remedial investigation shall be designed considering the unique considerations of special industrial areas and tailored for the specific property. The work plan shall address how the remediator will perform the baseline remedial investigation and shall address the items below and any additional items determined to be appropriate by the person proposing remediation, or requested by the Department. The work plan for the remedial investigation shall include the steps to be taken to document the following:

- A description of the property and detailed ownership history.

- Identification of the historical regulated substance use, handling and disposal activities on the property, and any known or suspected releases associated with these activities. This is obtained by conducting an environmental site characterization, a review of historical records, and interviews with persons who may have knowledge of the property.
- Characterization of the regulated substances on the property. Identification of existing contamination that poses an immediate, direct or imminent threat to public health or the environment which would prevent the property from being occupied for the intended use.
- Identification of potential migration pathways off the property, or onto the property, and any potential receptors from any release on the property. Where migration pathways and receptors have been identified, the remediator shall perform environmental sampling of the groundwater at the downgradient property boundary to determine if regulated substances from releases on the property have migrated off the property.
- In addition to the above, environmental sampling, if indicated by the investigation, in all potential media of concern to confirm whether releases have occurred.

ii) **Baseline Environmental Report**

The baseline environmental report shall provide the results of the baseline remedial investigation and describe the historical use, location of areas of contamination, the intended reuse, sampling results, contaminant migration occurrence or potential, and the proposed remediation measures to ensure that the special industrial area requirements are met. Portions of the baseline environmental report containing information about geologic or hydrogeologic investigations shall be prepared and certified by a Registered Professional Geologist licensed in Pennsylvania. The baseline environmental report shall be submitted ~~in triplicate~~ without binding. The following is a recommended scope of a baseline environmental report:

Summary: Provide a summary paragraph(s) that will give the reviewer an overview of the property. This will serve to highlight the important issues and conclusion that will be presented in the report.

Description of property: Provide a description of the property in sufficient detail to give the reader an overall idea of the property and its location. Describe the following:

- Buildings and other site features such as lagoons, tanks, treatment plants, and other structures on the property. Include a site map (scale of 1 inch = 200 feet).
- The location of all onsite wells, septic systems, floor drains, sumps and associated piping, storage areas, and chemicals or chemical compounds used, stored, treated or disposed.

- A description of present conditions at the property including any evidence of a release, contaminated media, tanks, and identification of areas of uncontained and/or separate phase liquids.
- The location and name of any public or private water supply on or near the property.
- The location, name and elevation of surface water bodies (springs, streams, lakes, ponds, wetlands) within 2,500 feet of the property.
- The location of utility lines at and near the area of investigation including any municipal or private water supply lines or natural gas lines, sanitary or sewer lines, and any other subsurface utilities.
- The location of active and inactive oil and gas wells, injection wells, surface and underground coal and non-coal mines, mine pool discharge points, landfills, and surface disposal areas within 2,500 feet of the property.
- Identify sensitive features within 2,500 feet of the property, such as threatened or endangered species habitat, recreational river corridors, State and federal forests and parks, historic and archaeological sites, national wildlife refuges, State natural areas, prime farm land, wetlands, special protection watersheds designated under Chapter 93 and other features.

Ownership History: Provide a detailed property ownership history since the release of regulated substances onsite. Include company or individual name and address (if available), ownership period, and the general operational use of the property during each ownership period.

Site Use History: Provide detail on past and current uses of property and adjoining properties; including treatment, storage, and disposal of regulated substances. Indicate the type, estimated volume, composition, and nature of the released materials, chemicals or chemical compounds. Indicate the sources of regulated substances; description of spills, leaks, releases on the property; and migration or migration potential to adjacent properties; and remedial action to date. Include a brief description of agency actions such as violation notices, administrative orders, and environmental permits.

Site Characterization: The site characterization provides important information documenting the current conditions at the property. Information developed during the site characterization is primarily intended to describe the nature, extent, and potential for movement of all contaminants present on the property, or that may have migrated from the property. For sites where there are multiple distinct areas of contamination, the site characterization process should be applied to each area individually. The remediator must use scientifically recognized principles, standards and procedures.

Geology/Hydrogeology: Description should be based on existing literature and data (SCS soil surveys, geologic maps, Water Resource Reports, reports on nearby properties and sampling) including:

- Descriptions of the soils, fill materials, geologic, hydrologic and hydrogeologic conditions at and surrounding the property. These descriptions should be detailed enough to provide an understanding of the site with respect to local geologic conditions and to determine if property groundwater is in an aquifer as defined by Act 2.
- A local stratigraphic column including lithology, physical characteristics and the approximate thickness of each stratum, include location and depth of aquifer(s) (if known).
- The geologic structure within the property boundaries and its relation to the regional geologic structure (if known).
- The location(s) of sinkholes, fracture traces, outcrops, and lineaments (if known).
- Screening of soils, sediments and water (as appropriate). Submit all results, include Quality Assurance/Quality Control (QA/QC) documentation. Identify field screening methods and sampling procedures. Cone Penetration Technologies (CPT) and other drive/push technologies (DPT) may be used for sampling of solids, soil gases, and groundwater. CPT and DPT results should be useful to more accurately site permanent monitoring wells in areas of concern. ~~Soil gas surveys should be conducted in accordance with ASTM Standard D-5314 or other Department approved method. Vapor intrusion assessments should be conducted in accordance with Section IV of this manual.~~ All sample locations should be depicted on a site map. Incorporate results from past sampling, if applicable.

Soil investigations shall be performed to establish baseline quality of surface, shallow, and subsurface soils at the site. Investigations will involve actual, as well as potential, sources of contamination, underground storage tanks, stained soils, and building drains, sumps, and storm/sewer systems. Investigations of underground storage tanks will identify any potential impacts from possible leakage of the tanks. Sampling will be performed. Property boundary soil sampling may also be performed to assess soil quality conditions and compared to the appropriate residential or nonresidential standards based on the proposed use of the property. Groundwater investigations shall be performed to establish baseline quality of the shallow and aquifer groundwater conditions. Investigations will involve wells (both monitoring and supply, and including appropriate off-property wells), sample analysis and water quality, and groundwater level measurement.

Identified Contamination: Characterize the source and nature, concentration, and location and extent of the regulated substances. Text, tables, graphics, figures, maps and cross sections, may be used to describe the nature, location, and composition of the contaminants on the property. Determine the extent, if any, of regulated substances that have migrated beyond the property boundary. Indicate all existing and potential migration pathways. Indicate the direction and rate of contaminant movement within each medium of concern.

Proposed Remediation Measures: The baseline environmental report shall include the proposed plan for remediation of the property and will serve as the basis for the Consent Order and Agreement. Therefore, the remedial action must be fully defined and described. The remediation of all threats relevant to the special industrial area reuse will be reiterated in the Consent Order and Agreement. Identification of contamination is very important in establishing what the remediator will be obligated to cleanup, and the extent of the cleanup liability protection afforded by Act 2.

Public Notice: Provide information concerning all public notifications performed. Supply copies of the notifications and proof of ~~publication required~~ notices of the NIR in a newspaper of general circulation serving the area where the property is located. Indicate if a municipality requested a public involvement, and if so, include the public involvement plan and all comments received, and responses to those comments.

Public Benefits: The baseline environmental report should include a description of the existing or potential public benefits of the use or reuse of the property for employment opportunities, housing, open space, recreation or other uses. An estimate of the potential employment anticipated by the reuse of the property is also requested.

Signatures: ~~All those who participated in the remediation who are seeking relief from liability. If any portions of the submitted report were prepared or reviewed by or under the responsible charge of a registered professional geologist or engineer, the professional geologist or engineer in charge must sign the report.~~

Attachments: (optional)