APPENDIX 6

Development of Alternative Ingestion-Dermal Exposure Pathway Soil Remediation Standards

Commented [TS1]: NOT REVIEWED.

Pursuant to N.J.A.C. 7:26D-8.1, the person responsible for conducting the remediation may propose an alternative soil remediation standard (ARS) for the inhalation exposure pathway for a site or an area of concern.

Prior approval from the Department is required for an ARS developed in accordance with N.J.A.C. 7:26D-8.4 and the options in Section I below. Department approval is required prior to implementation of the ARS for the specific site or area of concern.

All of the ARS options listed in Section I below are applicable to carcinogenic and non-carcinogenic health end-points. The ARS options for lead in Section I below are applicable to residential, non-residential, and alternative land use scenarios.

An ARS for lead may be based on both alternative land use and site-specific default values for lead models, if appropriate. An ARS calculated pursuant to this chapter Appendix 6 is applicable only to the ingestion-dermal exposure pathway.

I. Alternative Remediation Standards Requiring Prior Approval by the Department

Alternative remediation standards for the ingestion-dermal exposure pathway are limited to:

1. Alternative land uses other than residential and non-residential scenarios; and

2. Site- specific modification of parameters in the Integrated Exposure Uptake Biokinetic model (IEUBK) and Adult Lead Model (ALM).

Alternative Land Use Scenarios

An ARS may be based on the site-specific alternative land use, which would involve an alternative exposure scenario that is neither a residential nor a non-residential land use scenario. Alternative standards may be based on site-specific land use scenarios that affect the amount of time that people are likely to spend at a site (e.g., exposure frequency).

Examples of alternative land uses include, but are not limited to:

- Active recreational land use, such as sports playing fields and playgrounds;
- Passive recreational land use, such as land and trails used for walking, cycling, and hunting;
- Restricted access areas, such as right-of-way areas used for the inspection and repair of utilities; and
- Infrequent access areas, such as ecological preservation and conservation areas.

(a) Alternative Land Use Scenario

1. Determine the future use of the site and the appropriate exposure frequency (EF) associated with the future land use in accordance with Department guidance located on the Department's website.

2. Use the EF in the Department's calculator located on the Department's website to calculate an alternative ingestion-dermal remediation standard.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's calculator showing the modified input parameters and the resultant alternative remediation standard;

ii. A description of how the input parameters were selected; and

iii. A description of how the standards will be used in the remediation of the site or area of concern, including appropriate institutional controls.

4. Development of an ARS based on alternative land use scenario shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on an alternative land use scenario to ensure that the continued use of the ARS remains valid.

Alternative Remediation Standards for Lead

(a) Alternative Land Use Scenarios for Lead

1. An ARS for an alternative land use at a lead site may be based on the assessment of non-continuous exposure for all ages identified in EPA's Assessing Intermittent or Variable Exposures at Lead Sites (USEPA, 2003)[3].

2. Prior to the development of an ARS under option (a), consultation with the Department shall be required in accordance with Department guidance located on the Department's website.

3. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific alternative land use described in (a)1 above to ensure that the continued use of the ARS remains valid.

(b) Site-specific Changes to Default Values for Lead Under a Residential Exposure Scenario

1. An ARS for lead for residential exposure may be based on input parameters identified by the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) (USEPA, 1994)[1].

2. Prior to the development of an ARS under option (b), consultation with the Department shall be required in accordance with Department guidance located on the Department's website.

3. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific changes to the default values for lead to ensure that the continued use of the ARS remains valid.

(c) Site-specific Changes to Default Values for Lead Under a Non-residential Exposure Scenario

1. An ARS for lead for non-residential may be based on the input parameters identified in the document Recommendations of the Technical Review Workgroup (TRW) for Lead for an Interim Approach to Assessing Risk Associated with Adult Exposures to Lead in Soil (USEPA, 1996)[2].

2. Prior to the development of an ARS under option (c), consultation with the Department shall be required in accordance with Department guidance located on the Department's website.

3. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific changes to the default values for lead to ensure that the continued use of the ARS remains valid.

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[1] U.S. Environmental Protection Agency (USEPA). 1994. Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children. Office of Solid Waste and Emergency response, Washington, DC. OSWER 9285.7-15-1.

[2] U.S. Environmental Protection Agency (USEPA). 1996b. Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, USEPA Technical Workgroup for Lead. December, 1996.

[3] U.S. Environmental Protection Agency (USEPA). 2003b. Assessing Intermittent or Variable Exposures at Lead Sites, Office of Solid Waste and Emergency Response, OSWER 9285.7-76.

II. Alternative Remediation Standards Not Requiring Prior Approval by the Department

(a) No ARS options exist that do not require prior approval by the Department.

APPENDIX 7

Development of Alternative Inhalation Exposure Pathway Soil Remediation Standards

Commented [TS2]: NOT REVIEWED.

Pursuant to N.J.A.C. 7:26D-8.1, the person responsible for conducting the remediation may propose an alternative soil remediation standard (ARS) for the inhalation exposure pathway for a site or an area of concern.

Prior approval from the Department is required for an ARS developed in accordance with N.J.A.C. 7:26D-8.4 and the options in Section I below. Department approval is required prior to implementation of the ARS for the specific site or area of concern.

Prior approval from the Department is not required for an ARS developed in accordance with N.J.A.C. 7:26D-8.5 and the options in Section II below. Department approval is not required prior to implementation of the ARS for the specific site or area of concern.

All of the ARS options listed below are applicable to carcinogenic and non-carcinogenic health endpoints. The ARS options in Section II below are applicable to residential, non-residential, and alternative land use scenarios.

An ARS for a given contaminant may be based on multiple site-specific options. An ARS calculated pursuant to this chapter Appendix 7 is applicable only to the inhalation exposure pathway.

I. Alternative Remediation Standards Requiring Prior Approval by the Department

Alternative Land Use Scenarios

An ARS may be based on the site-specific alternative land use, which would involve an alternative exposure scenario that is neither a residential nor a non-residential land use scenario. Alternative standards may be based on site-specific land use scenarios that affect the amount of time that people are likely to spend at a site (e.g., exposure frequency and exposure time).

Examples of alternative land uses include, but are not limited to:

- Active recreational land use, such as sports playing fields and playgrounds;
- Passive recreational land use, such as land and trails used for walking, cycling, and hunting;
- Restricted access areas, such as right-of-way areas used for the inspection and repair of utilities; and
- Infrequent access areas, such as ecological preservation and conservation areas.

(a) Alternative Land Use Scenario

1. Determine the future use of the site and the appropriate exposure frequency (EF) and exposure time (ET associated with the future land use in accordance with Department guidance located on the Department's website.

2. Use the EF and ET in the Department's calculator located on the Department's website to calculate an alternative inhalation remediation standard.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's calculator showing the modified input parameters and the resultant alternative remediation standard;

ii. A description of how the input parameters were selected; and

iii. A description of how the standards will be used in the remediation of the site or area of concern, including appropriate institutional controls.

4. Development of an ARS based on alternative land use scenario shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on an alternative land use scenario to ensure that the continued use of the ARS remains valid.

II. Alternative Remediation Standards Not Requiring Prior Approval by the Department

(a) Depth Range of Contamination

1. Determine the actual depth range of contamination by delineation sampling pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E-4 and Department guidance located on the Department's website.

2. Use the actual depth range of contamination in the Department's calculator located on the Department's website to calculate an alternative inhalation remediation standard.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's calculator showing the modified input parameters and the resultant alternative remediation standard;

ii. A description of how the input parameters were selected, including all related laboratory results; and

iii. A description of how the standards were used in the remediation of the site or area of concern, including appropriate institutional controls.

4. Development of an ARS based on depth range of contamination shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific depth range of contamination that begins below the ground surface to ensure that the continued use of the ARS remains valid.

(b) Soil Organic Carbon Content (f_{oc})

1. Determine the f_{oc} in accordance with the appropriate Department guidance located on the Department's website.

2. Input the appropriate f_{oc} value(s) in the Department's calculator located on the Department's website when calculating an alternative inhalation remediation standard.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's calculator showing the modified input parameters and the resultant alternative remediation standard;

ii. A description of how the input parameters were selected, including all related laboratory results; and

iii. A description of how the standards were used in the remediation of the site or area of concern.

4. Development of an ARS based on soil organic carbon content shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific soil organic carbon content to ensure that the continued use of the ARS remains valid.

(c) Fraction of Vegetative Cover (V)

1. Determine V on the site in accordance with the appropriate Department guidance located on the Department's website.

2. Use V in the Department's calculator located on the Department's website to calculate an alternative inhalation remediation standard.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's calculator showing the modified input parameters and the resultant alternative remediation standard;

ii. A description of how the input parameters were selected, including all measurements and calculations; and

iii. A description of how the standards were used in the remediation of the site or area of concern, including appropriate institutional controls.

4. Development of an ARS based on fraction of vegetative cover shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific fraction of vegetative cover to ensure that the continued use of the ARS remains valid.

APPENDIX 8

Development of Alternative Migration to Ground Water ~~Exposure~~ Pathway Soil Remediation Standards

Pursuant to N.J.A.C. 7:26D-8.1, the person responsible for conducting the remediation may propose an alternative soil remediation standard (ARS) for the migration to ground water exposure pathway for a site or an area of concern.

Prior approval from the Department is required for an ARS developed in accordance with N.J.A.C. 7:26D-8.4 and the options in Section I below. Department approval is required prior to implementation of the ARS for the specific site or area of concern.

Prior approval from the Department is not required for an ARS developed in accordance with N.J.A.C. 7:26D-8.5 and the options in Section II below. Department approval is not required prior to implementation of the ARS for the specific site or area of concern.

An ARS for a given contaminant may be based on multiple site-specific options. An ARS calculated pursuant to this chapter Appendix 8 is applicable only to the migration to ground water exposure pathway.

I. Alternative Remediation Standards Requiring Prior Approval by the Department

The person responsible for conducting the remediation is required to obtain the Department's prior approval for alternative MGW pathway remediation standards that are developed using:

(a) A site-specific Dilution-Attenuation Factor (DAF) as follows:

1. Measure the length of the area of concern parallel to the ground water flow, the aquifer hydraulic conductivity, the aquifer gradient and, if necessary, aquifer thickness in accordance with the appropriate Department guidance ~~located on the Department's website~~.

~~2. Input the appropriate values into the Department's calculators (DAF calculator or Soil-Water Partition Equation calculator) located on the Department's website.~~

3. ~~Provide the following to the Department with the applicable form found on the Department's website~~The following should be documents within the applicable remedial phase report:

i. The details of the DAF calculation which document the specific parameters used in deriving the ARS. ~~A printout of the Department's DAF calculator or the Department's Soil-Water Partition Equation calculator showing the modified parameters and the resultant alternative remediation standard;~~

Commented [TS3]: TT – Please discuss what was the basis for the Dept. selecting what processes require preapproval and which ones do not.

TS – Committee met; there are 4 modes of action; decision regarding preapproval was left to the heads of the pathway groups.

TT – The possibility for error is equal in every way for the processes.

TS – TT asking why DAF cannot be a non-prior approval. It's a different lift. We will look at it.

Commented [TS4]: LV & KL – This is not an exposure pathway.

KL – It is an indirect exposure scenario. Maybe take out the word "exposure?"

Commented [TS5]: KL – Does this mean a combination of different options?

TS – Yes.

Commented [TS6]: TT asking why DAF cannot be a non-prior approval.

KL – There's a very prescriptive discussion of what the process is for Dept. approval, with many specifics included here when a principle discussion may be better for LSRP and Dept. flexibility. (Throughout the appendices as a whole.)

ND – Would it be helpful to have illustrative language to specify what KL is suggesting?

KL - Proposed language changes within text of (a).

TS - We're trying to standardize the language throughout the appendices for efficiency of review.

ii. ~~Documentation of the determination of the site-specific parameters used to determine the DAF including a~~All related tables, figures and laboratory results used in the development of the site-specific or area-specific ARS.~~; and~~

~~iii. A description of how the standards will be used in the remediation of the site or area of concern.~~

~~4. Development of an ARS based on a DAF shall be done in accordance with Department guidance located on the Department's website.~~

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific DAF to ensure that the continued use of the ARS remains valid.

(b) Seasonal Soil Compartment Model (SESOIL) modeling as follows:

1. Delineate contamination and determine the depth to ground water in accordance with the appropriate Department guidance located on the Department's website.

2. If desired, determine soil texture in accordance with the appropriate Department guidance located on the Department's website.

3. If desired, determine soil organic carbon content according to Section II below.

4. Input the appropriate parameters into the SESOIL model in accordance with the appropriate Department guidance located on the Department's website.

5. Provide the following to the Department with the applicable form found on the Department's website:

i. For each alternative standard determined using the SESOIL model, a SESOIL model table showing the measured contaminant concentrations as a function of depth and the modeled SESOIL concentrations, printouts from the SEVIEW model software of the SESOIL CLIMATE report, the SESOIL HYDROLOGIC CYCLE report, the SESOIL PROFILE AND LOAD REPORT, and the SESOIL POLLUTANT CYCLE report. The project file (*.prj file) from the SEVIEW project or equivalent shall also be submitted;

ii. A description of how the SESOIL input parameters were determined, including all related tables, figures and laboratory results; and

~~iii. A description of how the standards will be used in the remediation of the site or area of concern.~~

Commented [TS7]: See comment TS8.

Commented [TS8]: SD – This language does not belong here.

TS – We will consider elimination of this language.

Commented [TS9]: TT – This is the most workable version out there, but it should not be limited to a particular vendor.

TS – Can you offer another vendor example?

TT – Maybe add "or equivalent."

Commented [TS10]: KL – Proposes a global change that this language is not necessary.

6. Development of an ARS based on SESOIL modeling shall be done in accordance with Department guidance located on the Department's website.

7. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific SESOIL modeling to ensure that the continued use of the ARS remains valid.

(c) Seasonal Soil Compartment Model/Analytical Transient 1-,2-,3-Dimensional (SESOIL/AT123D) modeling as follows:

1. The SESOIL/AT123D model shall only be used when:

i. A Classification Exception Area (CEA) exists for contaminated ground water on the site;

ii. An impermeable cap does not and will not exist above the vadose zone contamination. Any permeable cap used shall allow unrestricted ground water recharge; and

iii. The contaminated ground water plume has been delineated in accordance with appropriate Department guidance located on the Department's website.

2. Delineate the vadose zone contamination and determine the depth to ground water accordance with the appropriate Department guidance located on the Department's website.

3. Determine the soil organic carbon for both the vadose zone and the aquifer according to Section II below.

4. Determine the soil texture for the vadose zone in accordance with the appropriate Department guidance located on the Department's website.

5. If desired, determine the aquifer texture in accordance with the appropriate Department guidance located on the Department's website.

6. Input the appropriate parameters into the SESOIL/AT123D model in accordance with the appropriate Department guidance located on the Department's website.

7. Provide the following to the Department with the applicable form found on the Department's website:

i. For each alternative standard determined using the combined SESOIL/AT123D model, a SESOIL model table showing the measured vadose zone contaminant concentrations as a function of depth and the modeled SESOIL concentrations, a map of the delineated ground water plume (with concentration isopleths) showing AT123D ground water sources and the concentrations and dimensions used in

Commented [TS11]: LV – What is the crosswalk between capping guidance and this model?

TS - The decision was already made in the capping guidance document.

Commented [TS12]: RF – Is this a "chicken or the egg" issue? Is complete delineation required here? The outer reach of the ground water impact is not necessary for the model.

TS – We'll take this under advisement.

Commented [TS13]: TT – If you put an impermeable cap, there is no leaching and no modeling of it. Does this imply that one cannot say that a capped site takes care of the problem? Are you inadvertently eliminating the remedial option?

TS – How would you prove that there is no problem?

TT – ex: There is the model, no cap, and is not below impact to ground water, so there is no issue according to the model.

the model for each source, the SEVIEW project map, printouts from the SEVIEW model software of the SESOIL CLIMATE report, the SESOIL HYDROLOGIC CYCLE report, the SESOIL PROFILE AND LOAD REPORT, the SESOIL POLLUTANT CYCLE report, an AT123D Point of Compliance Report at the downgradient edge of the Area of Concern at the centerline of the plume at the surface of the water table, and an AT123D Point of Compliance Report at the maximum extent of the plume at the centerline of the plume at the surface of the water table. For each Point of Compliance Report, the numerical concentration of the contaminant at the last time step (end of the Classification Exception Area time period) shall be shown in an EXCEL window pasted on to the report. The project file (*.prj file) from the SEVIEW project shall also be submitted;

ii. A description of how the SESOIL/AT123D input parameters were determined, including all related tables, figures and laboratory results; and

iii. A description of how the standards will be used in the remediation of the site or area of concern.

8. Development of an ARS based on SESOIL/AT123D modeling shall be done in accordance with Department guidance located on the Department's website.

9. Except for the existing Classification Exception Area and the remedial action permit, the Department shall not require the use of any additional institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific SESOIL/AT123D modeling to ensure that the continued use of the ARS remains valid.

(d) Site-specific data for petroleum hydrocarbon mixtures only when:

1. Contamination has been fully delineated to the soil migration to ground water remediation standards and has been treated or removed to the extent practicable, (including removal of free and residual product) and it has been determined that the highest concentrations of remaining contamination lies between the seasonal high and low water table and ground water conditions are acceptable as per Department guidance.

2. The procedure shall be as follows:

i. Collect and analyze soil and ground water samples in accordance with the appropriate Department guidance located on the Department's website;

ii. Demonstrate contaminants detected in ground water are below the Department's Ground Water Remediation Standards (N.J.A.C. 7:26D) or are relatively low and decreasing trends are demonstrated using the Mann Whitney U Test or other appropriate statistical method in accordance with N.J.A.C. 7:26E-6.3(e). Decreasing contaminant trends shall not be related to water table fluctuations; and

Commented [TS14]: ND – Compliments the Dept. on this part (d).

Commented [TS15]: TT – Definition in Tech Rule falling behind in the application here? Perhaps this is a good change to think about what we're trying to do with free and residual product and where the general thought is going on this topic.

TS – This is a guidance issue.

Commented [TS16]: TT – Add suggested language.

iii. Provide a description of how the samples were used to demonstrate compliance with the MGW pathway, including all related tables, figures, and laboratory results, to the Department with the applicable form found on the Department's website.

3. If compliance with the migration to ground water exposure pathway is determined by the conditions in (d)1 and (d)2 above, then the numeric standards in this rule shall not apply, but the pathway will be deemed to have been satisfactorily addressed on a narrative basis.

4. Development of an ARS based on data for petroleum hydrocarbon mixtures shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific data for petroleum hydrocarbon mixtures to ensure that the continued use of the ARS remains valid.

(e) Other Methodologies

1. ARSs for the migration to ground water pathway may also be developed using other published scientific methods including, based on USEPA published guidance, other states, or other relevant, applicable and appropriate methods and practice that ensure the protection of public health and safety and the environement.

II. Alternative Remediation Standards Not Requiring Prior Approval by the Department

The person responsible for conducting the remediation is not required to obtain the Department's prior approval for alternative MGW pathway remediation standards that are developed using:

(a) The soil water partition equations can be modified to reflect ~~A~~ a site-specific soil organic carbon content (f_{oc}) following the collection and analysis of ~~in the Soil Water Partition Equation, found in this chapter Appendix 4 as follows:~~

~~1. Collect and analyze~~ the samples for determining f_{oc} in accordance with the appropriate Department guidance ~~located on the Department's website~~.

2. Input the appropriate f_{oc} value(s) in the Department's f_{oc} calculator located on the Department's website to determine the site-specific f_{oc} value.

3. Input the site-specific f_{oc} value into the Soil-Water Partition Equation calculator located on the Department's website in order to determine the alternative remediation standard.

Commented [TS17]: ND – Proposes this addition. This would allow for the addition of the Mass Limit Model and others.

RL – We talked about some narrative (non-#) standards. Maybe put them in this area (language based on performance). The documents that they currently have do not have this piece.

TS – The committee is split re: narrative and non-narrative. This type of thing is the equivalent of the narrative due to its site-specific nature. That is why it is located here (at (d)).

Commented [TS18]: KL – proposed changes.
Also include (global) documentation required to be submitted to support. (See rule text Sub 8 previous changes suggested.)

TT – There are other parameters that should be added to the equation – not just the foc. Perhaps open up the list of variables to the other variables (such as bulk density and porosity) that go into the equation, as long as the appropriate protocols and sequences are followed for the model.

4. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's f_{oc} and soil-water partition calculators showing the input parameters and the resultant alternative remediation standard;

ii. A description of how the soil organic carbon content was selected, including all related tables, figures and laboratory results; and

iii. A description of how the standards were used in the remediation of the site or area of concern.

5. Development of an ARS based on soil organic carbon content (f_{oc}) in the Soil Water Partition Equation shall be done in accordance with Department guidance located on the Department's website.

6. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific soil organic carbon content (f_{oc}) in the Soil Water Partition Equation to ensure that the continued use of the ARS remains valid.

(b) The Synthetic Precipitation Leaching Procedure (SPLP) ARS options contained in technical guidance issued by the Department, except when ~~using~~ combining with a site-specific DAF as provided in Section I(a) above. The procedure shall be as follows:

1. Collect samples and implement the SPLP procedure in accordance with the appropriate Department guidance located on the Department's website.

2. Input the appropriate values into the Department's SPLP calculator located on the Department's website.

3. Provide the following to the Department with the applicable form found on the Department's website with the applicable remedial phase report:

i. A printout of the Department's SPLP calculator and the resultant alternative remediation standard;

ii. A description of how the samples were selected, including all related laboratory results; and

iii. A description of how the standards were used in the remediation of the site or area of concern.

4. Development of an ARS based on SPLP shall be done in accordance with Department guidance located on the Department's website.

Commented [TS19]: RF – If can use other site-specific parameters, then why can we not use the DAF without prior approval.

Commented [TS20]: ND – Suggested text addition.

Commented [TS21]: KL – Why would this be important?

ST – To clarify, if you have a site-specific DAF, you go back to the prior approval part. (A site-specific DAF and SPLP requires prior approval.)

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific SPLP to ensure that the continued use of the ARS remains valid.

(c) Site-specific data for immobile chemicals only when:

1. The contaminant exhibits a very low mobility in soil as defined by a high soil organic carbon-water partition coefficient (Koc) or a high soil-water partition coefficient (Kd) and factors that increase a contaminant's mobility are not present and a clean zone of two feet or greater exists between the contamination and the water table, as described in appropriate Department guidance.

2. The procedure shall be as follows:

i. Collect and analyze soil samples in accordance with the appropriate Department guidance located on the Department's website; and

ii. Provide a description of how the samples were used to demonstrate compliance with the MGW pathway, including all related tables, figures and laboratory results, to the Department with the applicable form found on the Department's website with the applicable remedial phase report.

3. If compliance with the migration to ground water exposure pathway is determined by the site specific conditions in (c)~~1~~ above only, then the numeric standards in this rule shall not apply, but the pathway will be deemed to have been satisfactorily addressed on a narrative basis.

4. Development of an ARS based on immobile chemicals shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific immobile chemicals to ensure that the continued use of the ARS remains valid.

(d) Site-specific data for metals and semi-volatile contaminants only when:

1. The highest concentrations of remaining contamination are located at the water table and no ground water impact above the Ground Water Remediation Standard is observed as demonstrated by ground water sampling, as described in appropriate Department guidance.

2. The procedure shall be as follows:

Commented [TS22]: KL – Curious about the basis of the 2-foot assumption in 1. below.

BF – An extra foot was added for a safety factor.

KL – Maybe use the 100-year model (timing instead of feet)?

BF – Duly noted comment.

Commented [TS23]: KL – Would PCBs be considered a semi-volatile?

BF – Yes.

i. Collect and analyze soil and ground water samples in accordance with the appropriate Department guidance located on the Department's website; and

ii. Provide a description of how the samples were used to demonstrate compliance with the MGW pathway, including all related tables, figures and laboratory results, to the Department with the applicable form from the Department's website with the applicable remedial phase report.

3. If compliance with the migration to ground water exposure pathway is determined by the site specific conditions in (d) only, then the numeric standards in this rule shall not apply, but the pathway will be deemed to have been satisfactorily addressed on a narrative basis.

4. Development of an ARS based on data for metals and semi-volatile contaminants shall be done in accordance with Department guidance located on the Department's website.

5. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on site-specific data for metals and semi-volatile contaminants to ensure that the continued use of the ARS remains valid.

Commented [TS24]: TT – This conflicts or does not follow with the rest of the section because if we have the data that shows no impact, we've developed and ARS based on guidance.

BF – We'll take a look at it. This may not need to be there.

APPENDIX 9

Development of Alternative Vapor Intrusion Exposure Pathway Indoor Air Remediation Standards

Commented [TS25]: NOT REVIEWED.

Pursuant to N.J.A.C. 7:26D-8.1, the person responsible for conducting the remediation may propose an alternative indoor air remediation standard (ARS) for the vapor intrusion exposure pathway for a site or an area of concern.

Prior approval from the Department is required for an ARS developed in accordance with N.J.A.C. 7:26D-8.4 and the options in Section I below. Department approval is required prior to implementation of the ARS at the site or area of concern.

All of the ARS options listed below are applicable to carcinogenic and non-carcinogenic health end-points. The ARS options outlined in Section I below may be utilized for non-residential buildings, but are not applicable to residential buildings.

An ARS for a given contaminant may be based on both the site-specific alternative exposure frequency and the site-specific alternative exposure time, if appropriate. An ARS calculated pursuant to this chapter Appendix 9 is applicable only to the vapor intrusion exposure pathway.

I. Alternative Remediation Standards Requiring Prior Approval by the Department

An ARS for the vapor intrusion exposure pathway is limited to site-specific use of a non-residential building at a site or area of concern resulting in site-specific exposure changes. Examples where or when exposure changes may occur include, but are not limited to:

- A small generating station;
- An isolated storage facility;
- A restricted access area of a non-residential building, such as a basement; or
- Workday hours are adjusted (differing from 8 hours).

(a) An ARS calculated pursuant to this chapter Appendix 9 is limited to site-specific modification of the following exposure parameters:

1. An alternative exposure frequency (EF) parameter representative of site-specific use that is incorporated in the applicable indoor air Equation 1 and 2 in this chapter Appendix 5; or

2. An alternative exposure time (ET) parameter representative of site-specific use that is incorporated in the applicable indoor air Equation 1 and 2 in this chapter Appendix 5.

(b) The person responsible for conducting the remediation developing an ARS pursuant to Section I (a) above shall provide the following supporting information to the Department with the applicable form found on the Department's website:

1. A printout of the ARS calculations showing the modified exposure parameters and resulting ARS using the Department's calculator located on the Department's website;

2. Support documentation justifying:

i. The basis for the site-specific parameters used to determine the ARS;

ii. The adequacy of the proposed monitoring; and

iii. The adequacy of the institutional and engineering controls;

3. An overview of the history and contamination at the site or area of concern pertinent to the vapor intrusion exposure pathway including:

i. A description of vapor intrusion investigations related to the ARS;

ii. The extent of soil and ground water contamination at the site affecting the vapor intrusion exposure pathway, including a summary table presenting the analytical results in accordance with N.J.A.C. 7:26E-1.6;

iii. A description of the subject building(s) and a scaled map of the site and surrounding area, identifying the subject building(s) and associated analytical results; and

iv. Identification of the uses in the subject building(s) and the locations where receptors are present within the building(s); and

4. Additional information used to support the ARS.

(c) Development of an ARS based on exposure frequency or exposure time shall be done in accordance with Department guidance located on the Department's website.

(d) The Department shall require the use of an institutional control, engineering controls (as needed), and remedial action permits, pursuant to N.J.A.C. 7:26C-7 for an ARS based on a site-specific exposure frequency or exposure time to ensure that the continued use of the ARS remains valid.

II. Alternative Remediation Standards Not Requiring Prior Approval by the Department

(a) No ARS options exist that do not require prior approval by the Department.