APPENDIX 6
Development of Alternative Ingestion-Dermal Exposure Pathway Soil Remediation Standards

This appendix describes the procedures for the development of alternative soil remediation standards (ARS) for the ingestion-dermal exposure pathway. An ARS may be developed at any time, but it shall be implemented prior to completion of the selected remedial action. Note that development and use of an ARS, in itself, is not a justification for the extension of the required time frames.

The organization of this appendix is as follows:

- Statement of purpose;
- Section I, ARS options that require prior approval from the Department; and
- Section II, ARS options that do not require prior approval from the Department.

Statement of Purpose

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~~ ingestion-dermal exposure pathway for a site or an area of concern.

Commented [TS1]: SD caught correction needed.
THANK YOU!

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

Commented [TS2]: TT – this allows an ARS only for limited land use?
Why can't we vary density, porosity, etc.?
Has DEP given any thought to that?

KL – Suggested edits included here.

Alternative remediation standards for the ingestion-dermal exposure pathway may be developed to account for ~~are limited to~~:

1. Alternative ~~land uses~~scenarios for potential human exposure 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 for Potential Human Exposure

Commented [TS3]: KL – Suggested changes for global application.

An ARS may be based on the site-specific alternative ~~land use~~scenarios for human exposure that are current or reasonably expected in the future~~, 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~~

Commented [TS4]: KL – Suggested language changes consistent with those already suggested.

~~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~~scenarios for potential human exposure include, but are not limited to:

- Active recreational ~~land use~~exposure which could occur on ~~, such as~~ sports playing fields and playgrounds;
- Passive recreational ~~land use~~exposure which could occur on ~~, such as~~ land and trails used for walking, cycling, and hunting;
- Exposure which could occur during maintenance or utility work in Restricted access areas, such as right-of-way areas or in the ~~used for the inspection and~~ repair of utilities, or in the performance of landscaping activities; ~~and~~
- Exposure which could occur during construction or redevelopment activities;
- Exposure which could occur at hotels, hospitals and/or other institutions; and
- Infrequent access areas, such as ecological preservation and conservation areas.

(a) ~~Alternative Land Use Scenario~~In developing an ARS, the following must be documented:

1. ~~1.~~ The scenario for potential human exposure;
2. The exposure factors appropriate in calculating an alternative ingestion-dermal standard for that soil exposure scenario and their bases; and
3. The toxicity values for use in calculating the ingestion-dermal remediation standard for that exposure scenario (chronic, subchronic) and their bases.

~~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.~~

Commented [TS5]: KL – suggested edits/changes.

ND – In agreement with KL's suggested language changes here.
Why, in the current regs are the exposure scenarios only to recreational?

TS – Our experience has been in recreational scenarios.

AC Pedersen – We need specificity for what is needed for the DEP and the stakeholders. Comments are appreciated, but in a regulatory format, the DEP requires particular language.

KL – Calculations and concentrations may vary greatly. From a more conservative exposure, you want to challenge the LSRPs to be clear about the protection of people. Many exposures could be relevant. The DEP should be more specific/clear that if a scenario is picked for an ARS, the details and exposure factors and tox values applicable to those scenarios need to be discussed and approved. The frequency is not enough. There should be more included. We have an obligation to worry about the other scenarios that are not included here.

AC Pedersen - Your suggested changes are consistent with this proposed language?

KL - Yes.

... [1]

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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~~exposure assumptions used in developing the ARS 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].

Commented [TS6]: CM – If we develop an ARS under this section, then we have to have an institutional control, an engineering control and an RAP?

TS - No engineering control needed. Global change. Institutional control comes in when there are conditions that must remain consistent for the ARS.

CM - So an institutional control is required? Can this language be less definitive than as stated?

BF - Any # generated requires some use restriction, which would require an institutional control and and RAP to be applied in perpetuity.

CM - So it needs to be recertified every two years?

BF - Yes, an RAP is required. Financial assurance is only required when an engineering control is required.

AC Pedersen - LSRPs certify every two years as long as there is a permit.

TT - (Global discussion re: institutional controls) Here it is most straightforward, but if we change aspects of it, does DEP en ... [2]

Commented [TS7]: KL – Suggested text changes;

Changing land use to exposure scenarios (like above).

Commented [TS8]: KL suggests this global change.

Commented [TS9]: KL – this was superseded in 2003 (update) and a 2009 update to the original guidance?

TS – we'll check into this.

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

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.

Commented [TS10]: KL – same global concepts from Appendix 6 should be transposed on this Appendix, too.

Commented [TS11]: JH – Can the depth ranges be changed in II below?

TS – If warranted, there are multiple options to obtain an ARS.

Commented [TS12]: JH – Correction. THANK YOU!

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.

Commented [TS13]: This is remaining because it is a "shall" paragraph. "Shall not" paragraphs will not have this language.

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

The following provides additional options which can be changed/utilized in the development of ARSs for inhalation exposure for any exposure scenario including the default residential and non-residential exposure scenarios:

Commented [TS14]: Added by KL.

(a) ~~Depth Range~~Finite Depth of Contamination (or Thickness)

The vapor flux calculations can be modified to reflect a site-specific finite depth of vadose zone soil 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.

Commented [TS15]: KL – global change suggestion to "finite depth."

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.

Commented [TS16]: SP – want to make the language a bit clearer regarding whether there should be an institutional control. Please state what is required in each deed notice. (global request/consideration.)

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

1. ~~1.~~ The vapor flux calculations can be modified to reflect a site-specific 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.

Commented [TS17]: JH – Are you removing references to calculator and website globally?

TS – It depends on if it is needed for a lead-in for the paragraph. It will vary throughout based on necessity.

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)

Particulate emission calculations can be modified to reflect a site-specific cover.

Commented [TS18]: KL language suggestion addition.

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

~~"HERE IS HOW WE USE THE APPENDICES. . ." [PLACEHOLDER]~~This appendix describes the procedures for the development of alternative soil remediation standards (ARS) for the migration to ground water exposure pathway. An ARS may be developed at any time, but it shall be implemented prior to completion of the selected remedial action. Note that development and use of an ARS, in itself, is not a justification for the extension of the required time frames.

The organization of this appendix is as follows:

- Statement of purpose;
- Section I, ARS options that require prior approval from the Department; and
- Section II, ARS options that do not require prior approval from the Department.

Statement of Purpose

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:

i. The details of the DAF calculation which document the specific parameters used in deriving the ARS, including ~~A~~ 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;

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~~4. The Department shall not require the use of an institutional control, engineering controls (as needed), or remedial action permit~~s~~, 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 most current version of 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 shall also be submitted; and

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.~~

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~~.

7. An alternative software package equivalent to SEVIEW that has been authorized by the Department may be used as a substitute for SEVIEW in application of this chapter Appendix 8 at I(b).

(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. The contaminated ground water plume has been delineated in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E and appropriate Department guidance;

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

iii. 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 the model for each source, the SEVIEW project map, printouts from the most current version of 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; and

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~~CEA 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~~.

9. An alternative software package equivalent to SEVIEW that has been authorized by the Department may be used as a substitute for SEVIEW in application of this chapter Appendix 8 at I(c).

(d) ~~Site-specific data for~~ Volatile organic contamination, including methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA), associated with discharges of:

- ~~petroleum hydrocarbon mixtures~~Leaded, unleaded, and aviation gasoline;
- Light petroleum distillates, including paint thinners;
- Kerosene;
- Jet fuel; and
- No. 2 fuel oil and diesel ~~only when.~~:

1. This option applies only when

~~1. Contamination~~:

i. Contamination h~~h~~as been fully delineated to the soil migration to ground water remedia~~-~~tion standards and the ground water remediation standards;

ii. Soil contamination h~~h~~as been treated or removed to the extent practicable~~, (including re-moval of free and residual product)~~; and

iii. I~~i~~t has been determined that the highest concentrations of remaining soil contamination lie~~s~~ between the seasonal high and low water table ~~and ground water conditions are acceptable as per Department guidance~~.

~~2~~2.~~.~~ The procedure shall be as follows:

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

~~ii.~~ii. Demonstrate contaminant concentrations~~s~~ detected in ground water are:

(1) B~~-b~~elow the Department's Ground Water Remediation Standards (N.J.A.C. 7:26D) ~~or are relatively low~~; ~~and~~ or

(2) Relatively low with ~~decreasing~~ decreasing trends as ~~are d~~demonstrated using the Mann Whitney U Test or other appropriate statistical test as determined by the Department ~~in accordance with N.J.A.C. 7:26E-6.3(e);~~ and

(3) ~~–~~Decreasing contaminant trends shall not be related to water table fluctuations; and

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

(1) ~~Provide a description of how the samples were used to demonstrate compliance with the MGW pathway, including a~~Rll ~~r~~elated tables, figures, and laboratory results~~,~~; and

(2) Results of the Mann Whitney U Test or other appropriate statistical ~~to the Department with the applicable form found on the Department's website.~~
test.

~~3~~3. If the conditions in ii(1) above are met, then the numeric migration to ground water standards in this chapter shall not apply, as the migration to ground water exposure pathway will be deemed by the Department to have been satisfactorily addressed on a narrative basis. 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 when the ground water is clean.

4. If the conditions in ii(2) and ii(3) above are met, then a ground water remedial action permit shall be required for the remaining contamination until such time that the Ground Water Remediation Standards (N.J.A.C. 7:26D) are achieved. Upon achievement of the Ground Water Remediation Standards, the migration to ground water exposure pathway will be deemed by the Department to have been satisfactorily addressed on a narrative basis.
~~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. With prior approval by the Department, additional ARSs for the migration to ground water exposure pathway may also be developed using other scientific methods including relevant guidance from the USEPA or other States and other relevant, applicable, and appropriate methods and practices that ensure the protection of public health and safety and of the environment.

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.

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.

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:

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.

APPENDIX 9
Development of Alternative Vapor Intrusion Exposure Pathway Indoor Air Remediation Standards

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:

Commented [TS19]: SD – In the other appendices, there is opportunity to use other toxicity values (if new data available, etc.) Why is that not in this section, too?

TS – Tox changes are generic changes. They'd be included in the interim and updated standards.

Commented [TS20]: LG – Are we not incorporating the fact that there may be different sized buildings (like a residential home, etc.)?

TS – That's not necessarily appropriate in this Appendix.

KL – It's not modeling here.

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.

Commented [TS21]: KL – What to do in a situation in which there is a recognized hazard and the RP/LSRP notes that it will default to occupational indoor air standards. Can that be incorporated here? When certain conditions apply, additional evaluation is warranted in those circumstances. Paint a context to say that, when there is a recognized hazard, the occupational indoor air standards may apply. This could require an institutional control. Maybe somehow capture this in the regulation to account for such situations.

KL - Generally, look at it in the circumstances of vapor intrusion cases. Maybe consider the occupational indoor air standards as the metric here.

TS – We will try to formulate a position on this.

CB [*earlier mistakenly referenced as KB*]– (Similar question with more direct example.)

AC Pedersen – If a chemical manufacture facility has staff not subject to OSHA, that's not what you're addressing with your question , CB?

CB – The workers are all aware of all of the risks.

AC Pedersen – LSRPs are looking at all lines of evidence to be able to track the release to a discharge versus the existing (baseline) levels? Should the operation change, the risk must still be addressed.

ANY NEW ISSUES TO DISCUSS?

RF – What about hex-chrome numbers?

TS – We're waiting on IRIS for additional changes, if any. Maybe an interim standard would come next.

MK – Would there be the same stakeholder input (as here) for chrome as we get more information?

TS – No, This is a different effort – it's formal rulemaking process here.

NEXT MODE = Guidance efforts involving external stakeholders.

TS – This meeting marks the end of the external stakeholder meetings for the rule proposal (no objection from audience) and the new emphasis will be on guidance development for the majority of this group. The details are being worked out. We're looking to move quickly with focus groups (DEP staff + external stakeholders). We're just starting on that process. George Nicholas will be providing additional information as the effort progresses.

STANDARDS

TS – The intention is that the RSLs are coming. We are going to be cutting off (for calculation purposes) the numbers. We'll be rolling in reporting limits, etc. to produce data tables once the numbers are ready – probably will be out in July 2015 to the external stakeholders. We are not anticipating many changes; probably will have few minor changes.

TS – We're working for a January 2016 rule proposal, maintaining the current schedule. 2016 will be time for formal comments, with adoption expected by January 2017.

Page 2: [1] Commented **Teruo Sugihara** **6/10/2015 2:08:00 PM**

KL – suggested edits/changes.

ND – In agreement with KL's suggested language changes here.
Why, in the current regs are the exposure scenarios only to recreational?

TS – Our experience has been in recreational scenarios.

AC Pedersen – We need specificity for what is needed for the DEP and the stakeholders. Comments are appreciated, but in a regulatory format, the DEP requires particular language.

KL – Calculations and concentrations may vary greatly. From a more conservative exposure, you want to challenge the LSRPs to be clear about the protection of people. Many exposures could be relevant. The DEP should be more specific/clear that if a scenario is picked for an ARS, the details and exposure factors and tox values applicable to those scenarios need to be discussed and approved. The frequency is not enough. There should be more included. We have an obligation to worry about the other scenarios that are not included here.

AC Pedersen - Your suggested changes are consistent with this proposed language?

KL - Yes.

BF - Good points, but it goes back to what we are defining as an ARS. This ARS is a number different that those chronic scenarios already considrered.
Guidance documents already ensure that some of the concerns are already addressed. These are more health and safety issues.

KL - Site exceeds Res standards, but not Non-res standards. Are the expected actions (taken via the rule application) enough to protect persons at the site? Other future/potential exposures are out there. LSRPs should think about multiple ARSs for a site - not just one per site. It doesn't have to be spelled out here - maybe in guidance (the details).

RF - We're responsible for the health and safety of persons. It's far-reaching. The same applies to worker exposures on contaminated sites, on bridges for transports, etc. Those scenarios should be considered in developing ARSs. It doesn't have to be necessarily tied to the land use. There are other areas to be considered.

TS - We will consider these issues and take them under advisement.

Page 3: [2] Commented **Teruo Sugihara** **6/10/2015 2:14:00 PM**

CM – If we develop an ARS under this section, then we have to have an institutional control, an engineering control and an RAP?

TS - No engineering control needed. Global change. Institutional control comes in when there are conditions that must remain consistent for the ARS.

CM - So an institutional control is required? Can this language be less definitive than as stated?

BF - Any # generated requires some use restriction, which would require an institutional control and and RAP to be applied in perpetuity.

CM - So it needs to be recertified every two years?

BF - Yes, an RAP is required. Financial assurance is only required when an engineering control is required.

AC Pedersen - LSRPs certify every two years as long as there is a permit.

TT - (Global discussion re: institutional controls) Here it is most straightforward, but if we change aspects of it, does DEP envision that there are different Deed Notice templates for these, or are they to be proposed to the DEP? What's the vision.

TS - There's a standard Deed Notice with paragraphs that need to be maintained, but that template would be used consistentlly for these.