

# **PROTOCOL FOR ADDRESSING EXTRACTABLE PETROLEUM HYDROCARBON (EPH) CONTAMINATION**

## **Chairpersons**

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## **Committee Members**

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# STARTING POINT

- Brownfield Act legislatively mandates that all standards be health-based (N.J.S.A. 58:10B-12)
- EPA banned use of freon - EPA Method 418.1 used freon-based extraction
- Available petroleum hydrocarbon composition information limited
- Relevant toxicity information also limited in availability
- Goal that the protocol incorporate all pertinent regulatory concerns

# RESULT

- EPH protocol (version 3.0; 01/14/2010) as well as associated calculator are located at, respectively:
  - ◆ [http://www.nj.gov/dep/srp/guidance/srra/eph\\_protocol.pdf](http://www.nj.gov/dep/srp/guidance/srra/eph_protocol.pdf)
  - ◆ [http://www.nj.gov/dep/srp/guidance/srra/EPHCalculator\\_v1.0.xls](http://www.nj.gov/dep/srp/guidance/srra/EPHCalculator_v1.0.xls)
- EPH method is: "*Analysis of extractable petroleum hydrocarbons in aqueous and soil/sediment/sludge matrices. NJDEP EPH 10/08 Revision 2*" and is located at:
  - ◆ [http://www.nj.gov/dep/srp/guidance/srra/eph\\_method\\_october2009.pdf](http://www.nj.gov/dep/srp/guidance/srra/eph_method_october2009.pdf)

# EPH PROTOCOL SUMMARY

Type	Category 1		Category 2	
Exposure scenario	Residential	Non-residential	Residential	Non-residential
EPH value	5,100 mg/kg	54,000 mg/kg	Calculated	Calculated
Contingency	2-MN+Naph <sup>^</sup>	2-MN+Naph <sup>^</sup>	Per TRSR	Per TRSR
Product	8,000 mg/kg	8,000 mg/kg	17,000 mg/kg	17,000 mg/kg
Sheen	Policy	Policy	Policy	Policy
Ecological*	1,700 mg/kg	1,700 mg/kg	1,700 mg/kg	1,700 mg/kg

<sup>^</sup> 2-MN+Naph = 2-methylnaphthalene and naphthalene

\* Ecological evaluation not required at most homeowner sites or where there is no significant ecological receptor

**COMPOSITION-SPECIFIC EXTRACTABLE PETROLEUM HYDROCARBON (EPH) SOIL REMEDIATION CRITERION (SRC) CALCULATOR**  
(Version 1.0, November 6, 2009)

**DATA ENTRY CELLS**  
 ENTER ALL CONCENTRATIONS AS MILLIGRAMS/KILOGRAM (mg/kg)  
 FOR NON DETECT VALUES, ENTER "0" or "ND" (without the quotation marks)  
 REMEMBER TO ENTER ACTUAL SAMPLE IDENTIFICATION IN PLACE OF "SAMPLE 1", ETC.  
 REMEMBER TO INDICATE WHETHER THE SAMPLE IS "RESIDENTIAL" (R) OR "NON-RESIDENTIAL" (N) [OR USE DROP-DOWN LIST]  
 REMEMBER TO INDICATE WHETHER THE SAMPLE IS "#2 FUEL OIL/DIESEL" (#2 F) OR "OTHER" (O) [OR USE DROP-DOWN LIST]  
 ALL DATA MUST BE ENTERED FOR EACH SAMPLE FOR THE EPH CRITERION TO BE CALCULATED  
 CLICK ON THE "CALCULATE EPH SRC" BUTTON TO CALCULATE THE SAMPLE-SPECIFIC EPH SOIL REMEDIATION CRITERION  
 IF YOU CHANGE ANY INPUT DATA, YOU MUST CLICK ON "CALCULATE EPH SRC" AGAIN TO RECALCULATE THE SOIL REMEDIATION CRITERION

EC <sup>^</sup> RANGE / SAMPLE ID	A	B	C	D	SAMPLE 5
Enter Residential or Non-Residential	Residential	Residential	Non-Residential	Non-Residential	
Enter "#2 Fuel Oil/Diesel" or "Other"	#2 Fuel Oil/Diesel	Other	#2 Fuel Oil/Diesel	Other	
ALIPHATICS EC9-EC12	300.0	300.0	300.0	300.0	
EC12-EC16	400.0	400.0	400.0	400.0	
EC16-EC21	500.0	500.0	500.0	500.0	
EC21-EC40	600.0	600.0	600.0	600.0	
AROMATICS EC10-EC12	700.0	700.0	700.0	700.0	
EC12-EC16	800.0	800.0	800.0	800.0	
EC16-EC21	900.0	900.0	900.0	900.0	
EC21-EC36	1,000.0	1,000.0	1,000.0	1,000.0	
<b>Total Concentration (mg/kg)</b>	<b>5,200.0</b>	<b>5,200.0</b>	<b>5,200.0</b>	<b>5,200.0</b>	
<b>Calculated EPH SRC<sup>#</sup> (mg/kg)</b>	<b>5,100</b>	<b>2,900</b>	<b>54,000</b>	<b>31,000</b>	
<b>Allowable<sup>%</sup> EPH SRC (mg/kg)</b>	<b>5,100<sup>^</sup></b>	<b>2,900</b>	<b>8,000<sup>^</sup></b>	<b>17,000<sup>^</sup></b>	
<b>ABOVE/BELOW ALLOWABLE EPH SRC (i.e., PASS or FAIL)</b>	<b>ABOVE (FAIL)</b>	<b>ABOVE (FAIL)</b>	<b>BELOW (PASS)</b>	<b>BELOW (PASS)</b>	

<sup>^</sup> = Equivalent Carbon  
<sup>#</sup> = Soil Remediation Criterion  
<sup>%</sup> = Accounts for residual product  
 5,100<sup>^</sup> = Default value for residential #2 Fuel Oil/Diesel  
 8,000<sup>^</sup> = Default maximum value for #2 Fuel Oil/Diesel  
 17,000<sup>^</sup> = Default maximum value for all other petroleum hydrocarbon mixtures

**Calculate EPH SRC**

**Print Results**

**Reset Data**

**Instructions**

Run Date = 11/13/2009

# WHERE WE ARE NOW

- EPH analytical method has been certified by OQA as of November 10, 2009
- 20 laboratories have applied for certification (initially 12)
- Phase in schedule of guidance is at:
  - ◆ [http://www.nj.gov/dep/srp/guidance/srra/eph\\_phasein.pdf](http://www.nj.gov/dep/srp/guidance/srra/eph_phasein.pdf)

# PHASE IN – Category 1

## (Number 2 Fuel Oil And Diesel Fuel Oil)

Time Frame	Analytical Method for PHC	TPHC/EPH Criterion	Contingency Analyses	Contingency Sample Remediation Standards
September 30, 2007 Through September 16, 2008	USEPA SW846 Method 8015B or NJDEP OQA-QAM-025	10,000 mg/kg	Analyze highest 25% of soil samples that exceed 1,000 mg/kg TPHC for VO+10	Soil Cleanup Criteria (SCC)
September 17, 2008 Through March 17, 2009	USEPA SW846 Method 8015B or NJDEP OQA-QAM-025 rev. 7	10,000 mg/kg Or 5,100 mg/kg	Analyze highest 25% of soil samples that exceed 1,000 mg/kg TPHC for either VO+10 or BN+15	Either SCC Or Soil Remediation Standards (SRS)
March 18, 2009 Through May 9, 2010	USEPA SW846 Method 8015B/C* or NJDEP OQA-QAM-025 rev. 7*	5,100 mg/kg	Analyze highest 25% of soil samples that exceed 1,000 mg/kg EPH for 2-methylnaphthalene and naphthalene	SRS
On or after May 10, 2010	"Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices" (aka NJDEP EPH 10/08 Revision 2)	5,100 mg/kg (residential) Or 54,000 mg/kg (non-residential)	Analyze highest 25% of soil samples that exceed 1,000 mg/kg EPH for 2-methylnaphthalene and naphthalene	SRS

\* The person responsible for conducting the remediation may choose to use the "Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices" (aka NJDEP EPH 10/08 Revision 2) prior to May 10, 2010, provided that a New Jersey certified laboratory performs the analyses.

March 30, 2010

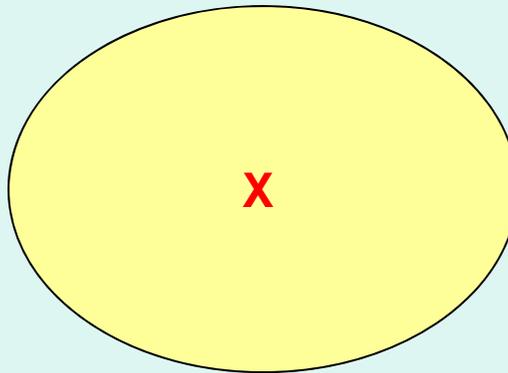
# PHASE IN – Category 2

("Other" = All Non-volatile, Non-Number 2 Fuel Oil / Non-Diesel Fuel Oil)

Time Frame	Analytical Method for PHC	TPHC/EPH Criterion	Contingency Analyses	Contingency Sample Remediation Standards
September 30, 2007 Through September 16, 2008	NJDEP OQA-QAM-025	10,000 mg/kg	Pursuant to Technical Requirements for Site Remediation (TRSR), Table 2-1	Soil Cleanup Criteria (SCC)
September 17, 2008 Through March 17, 2009	NJDEP OQA-QAM-025 rev. 7	10,000 mg/kg	Pursuant to TRSR, Table 2-1	Either SCC Or Soil Remediation Standards (SRS)
March 18, 2009 Through May 9, 2010	NJDEP OQA-QAM-025 rev. 7*	10,000 mg/kg*	Pursuant to TRSR, Table 2-1	SRS
On or after May 10, 2010	"Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices" (aka NJDEP EPH 10/08 Revision 2)	Sample-specific criterion using EPH Calculator	Pursuant to TRSR, Table 2-1	SRS

\* The person responsible for conducting the remediation may choose to use the "Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices" (aka NJDEP EPH 10/08 Revision 2) prior to May 10, 2010, provided that a New Jersey certified laboratory performs the analyses. Note that if this method is used to analyze the soil samples for mixtures other than No. 2 fuel oil/diesel fuel oil, then the EPH Calculator must be used to determine the sample-specific EPH soil remediation criterion.

**COMPLIANCE**  
**Site Investigation**  
**Category 2 Contaminant**

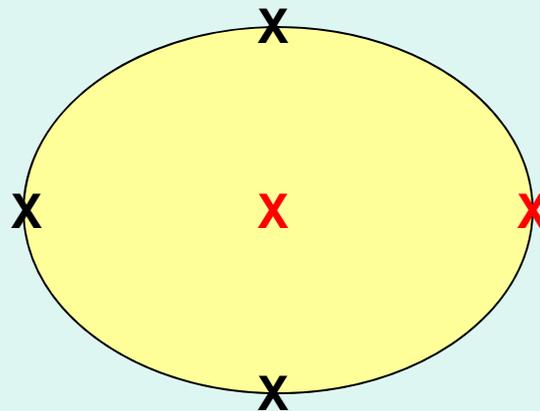


**X = Sample EPH concentration > allowable EPH SRC ("Fail")**

# COMPLIANCE

## Initial Delineation

### Category 2 Contaminant



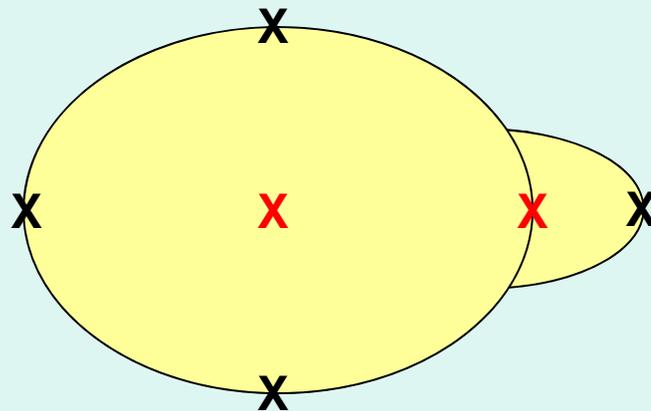
**X** = Sample EPH concentration > allowable EPH SRC ("Fail")

**X** = Sample EPH concentration  $\leq$  allowable EPH SRC ("Pass")

# COMPLIANCE

## Final Delineation

### Category 2 Contaminant



**X** = Sample EPH concentration > allowable EPH SRC ("Fail")

**X** = Sample EPH concentration  $\leq$  allowable EPH SRC ("Pass")

# COMPLIANCE

## Decision Matrix

1. Compare concentrations that remain to relevant contingency trigger
  - ◆ Trigger value exceeded, conduct required analyses, determine appropriate remedial actions
  - ◆ Trigger value not exceeded, go to 2
2. If applicable, implement sheen policy, then go to 3
3. If applicable, compare concentrations that remain to ecological screening level. Perform ecological remedial action if required.

# QUESTIONS

- Contact Teruo Sugihara
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- Contact David Haymes
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