

**Appendix C**  
**Bioscreen Tables and Figures**

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BIOSCREEN Base Case

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Acenaphthene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

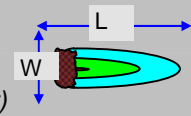
Retardation Factor*	R	113.4	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	4898	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	2.2E+0	(per yr)
		↑ or	
Solute Half-Life	t-half	0.32	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

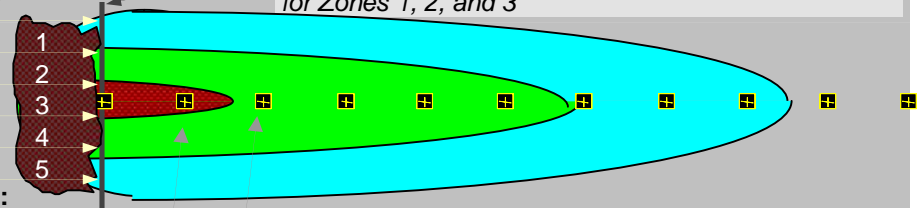
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.701
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	1st Order	
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)											
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

**RUN ARRAY**

**Help**

Recalculate This Sheet

View Output

View Output

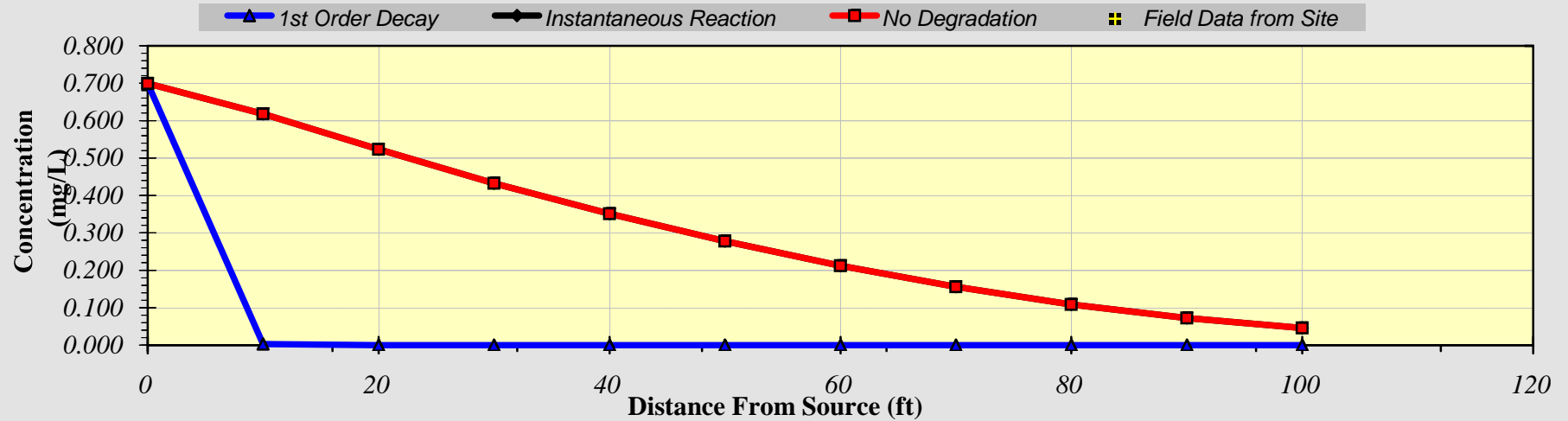
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

**DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)**

*Distance from Source (ft)*

<b>TYPE OF MODEL</b>	0	10	20	30	40	50	60	70	80	90	100
<b>No Degradation</b>	0.699	0.618	0.523	0.433	0.351	0.278	0.212	0.156	0.109	0.072	0.046
<b>1st Order Decay</b>	0.699	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Inst. Reaction</b>	0.699	0.618	0.523	0.433	0.351	0.278	0.212	0.156	0.109	0.072	0.046
<i>Field Data from Site</i>											



**Calculate Animation**

**Time:**

100 Years

**Return to Input**

**Recalculate This Sheet**



# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Naphthalene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
or			
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
or			
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

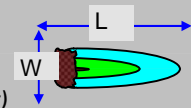
Retardation Factor*	R	28.3	(-)
or			
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	1191	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.6E+0	(per yr)
or			
Solute Half-Life	t-half	0.44	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

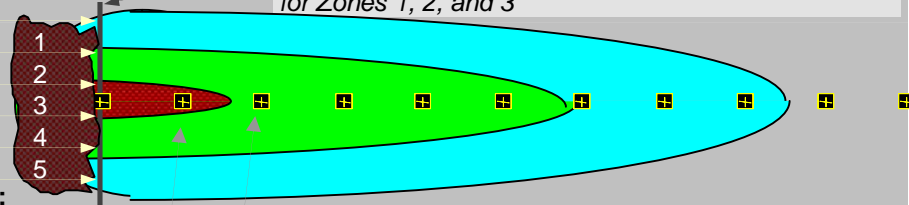
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.0619
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	1st Order	
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)														
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100			

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

View Output

**RUN ARRAY**

View Output

**Help** Recalculate This Sheet

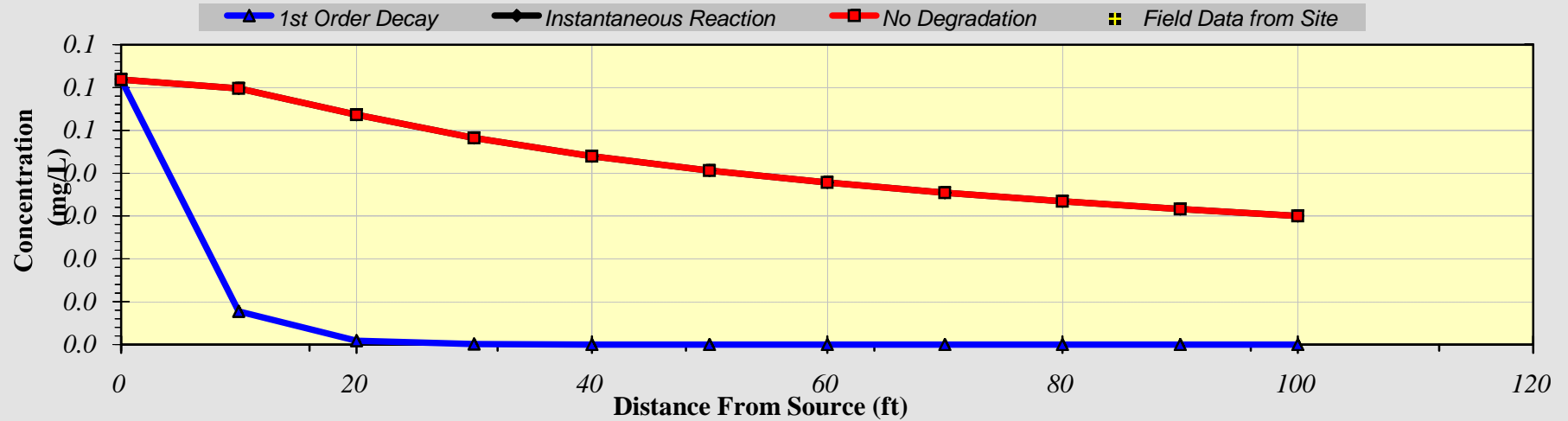
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

## DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.062	0.060	0.054	0.048	0.044	0.041	0.038	0.035	0.033	0.032	0.030
1st Order Decay	0.062	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.062	0.060	0.054	0.048	0.044	0.041	0.038	0.035	0.033	0.032	0.030
Field Data from Site											



**Replay Animation**

Next Timestep

Prev Timestep

Time:

100 Years

**Return to Input**

**Recalculate This Sheet**

BIOSCREEN Sensitivity Run  
High Degradation Half-life  
(slower degradation rate)

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Acenaphthene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

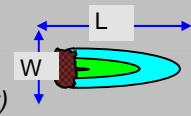
Retardation Factor*	R	113.4	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	4898	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	2.2E-1	(per yr)
		↑ or	
Solute Half-Life	t-half	3.18	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

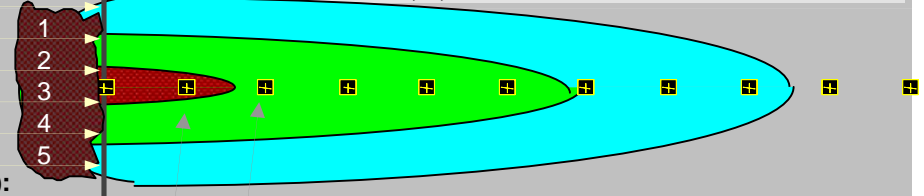
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.701
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	1st Order	
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)											
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

**RUN ARRAY**

**Help**

Recalculate This Sheet

View Output

View Output

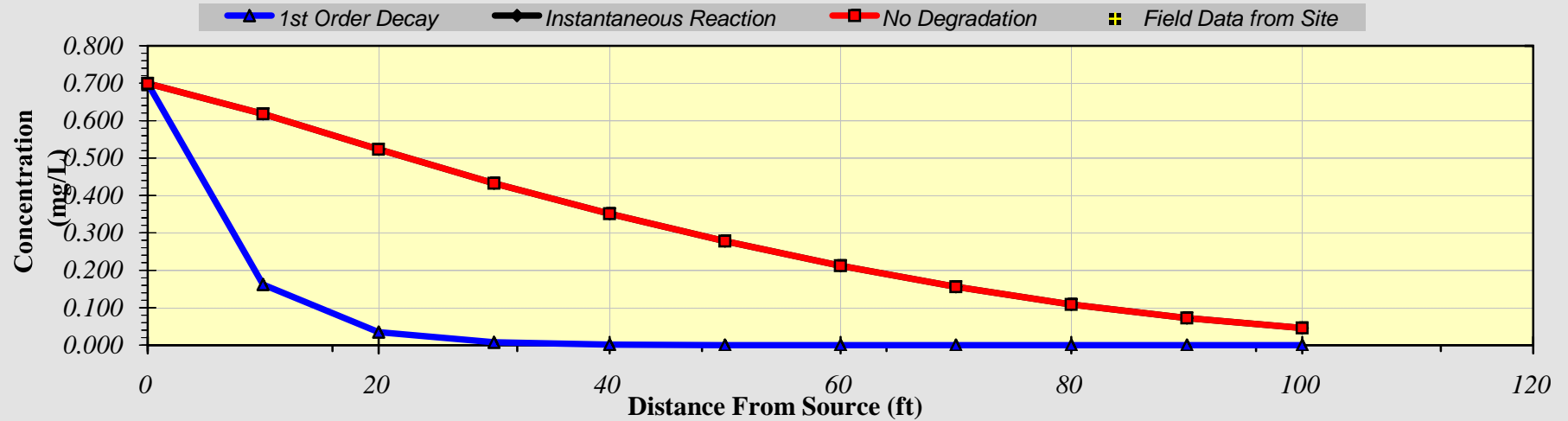
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.699	0.618	0.523	0.433	0.351	0.278	0.212	0.156	0.109	0.072	0.046
1st Order Decay	0.699	0.162	0.035	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.699	0.618	0.523	0.433	0.351	0.278	0.212	0.156	0.109	0.072	0.046
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Naphthalene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

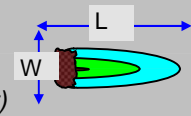
Retardation Factor*	R	28.3	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	1191	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.6E-1	(per yr)
		↑ or	
Solute Half-Life	t-half	4.40	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	200	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

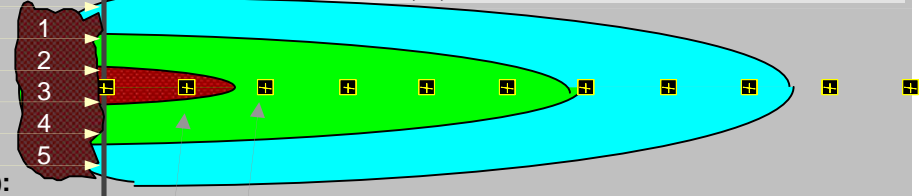
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.0619
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	1st Order	
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)														
Dist. from Source (ft)	0	20	40	60	80	100	120	140	160	180	200			

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

**RUN ARRAY**

**Help**

Recalculate This Sheet

View Output

View Output

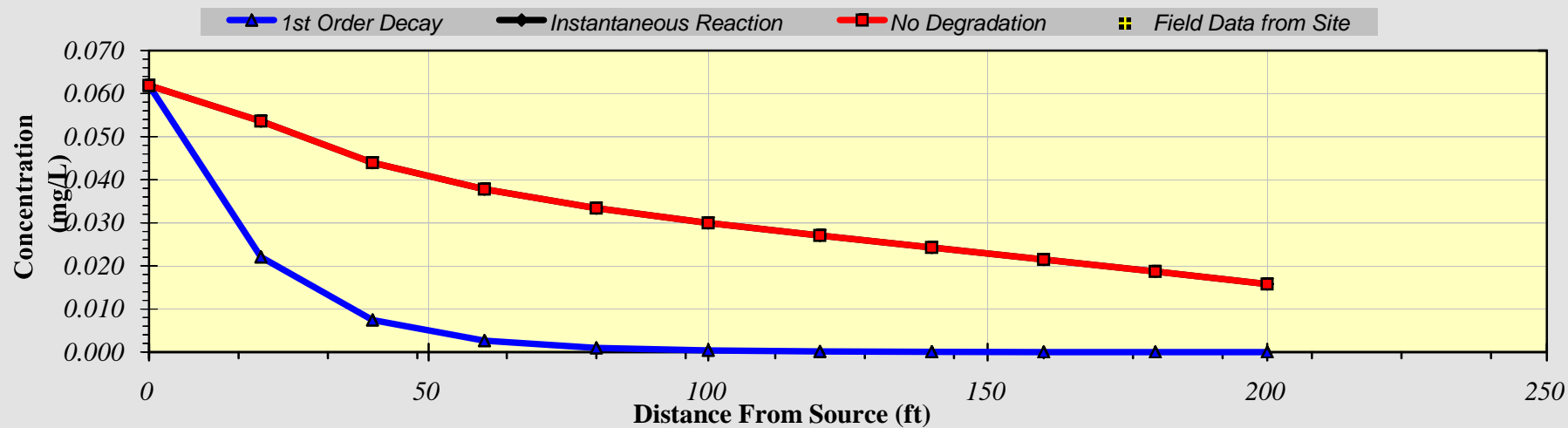
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	20	40	60	80	100	120	140	160	180	200
No Degradation	0.062	0.054	0.044	0.038	0.033	0.030	0.027	0.024	0.022	0.019	0.016
1st Order Decay	0.062	0.022	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.062	0.054	0.044	0.038	0.033	0.030	0.027	0.024	0.022	0.019	0.016
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet

BIOSCREEN Sensitivity Run  
Low Organic Carbon Partition Coefficient  
(faster migration)



# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Acenaphthene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
<b>or</b>		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
<b>or</b>		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

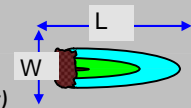
Retardation Factor*	R	90.3	(-)
<b>or</b>		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	3890	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	2.2E+0	(per yr)
<b>or</b>		↑ or	
Solute Half-Life	t-half	0.32	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

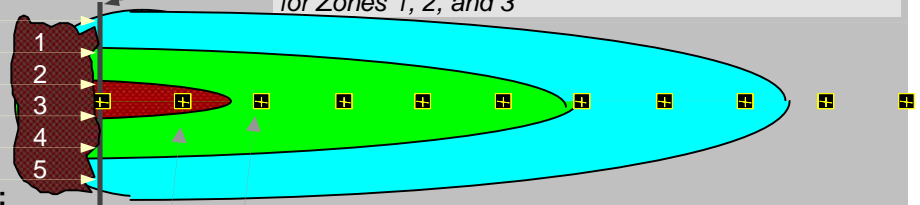
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.701
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	↑	1st Order
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)																				
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100									

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

View Output

**RUN ARRAY**

View Output

**Help**

Recalculate This Sheet

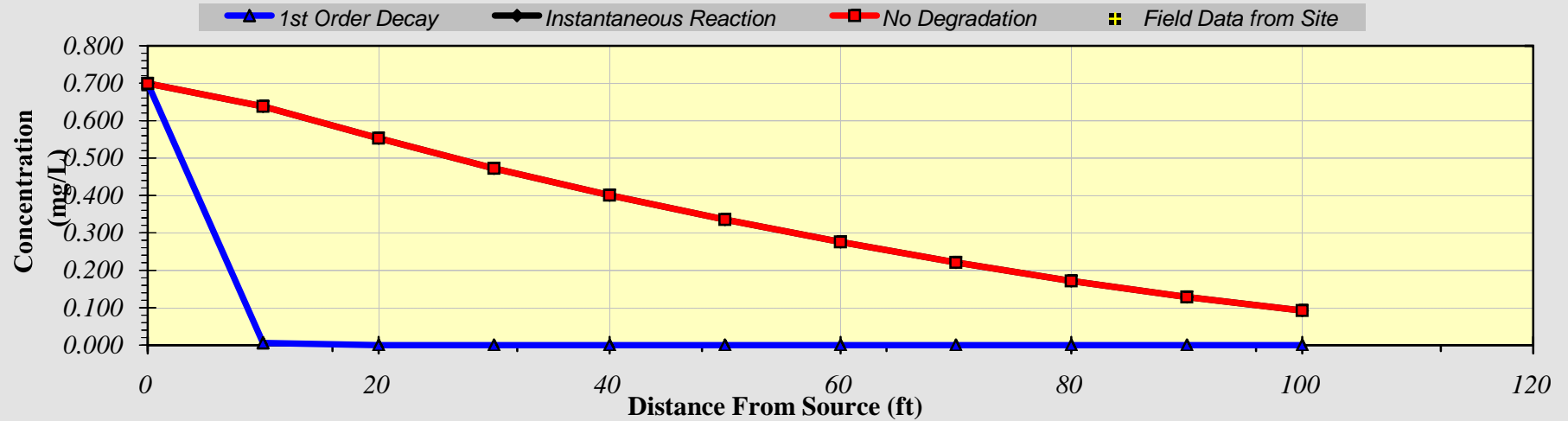
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.699	0.638	0.553	0.472	0.401	0.336	0.276	0.221	0.171	0.128	0.093
1st Order Decay	0.699	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.699	0.638	0.553	0.472	0.401	0.336	0.276	0.221	0.171	0.128	0.093
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Naphthalene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

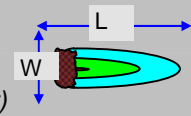
Retardation Factor*	R	21.0	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	870	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.6E+0	(per yr)
		↑ or	
Solute Half-Life	t-half	0.44	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

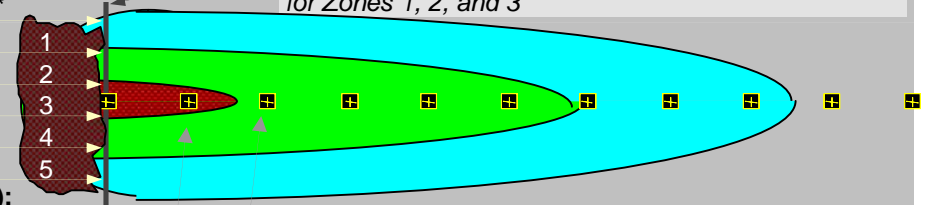
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.0619
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	1st Order	
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)											
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

**RUN ARRAY**

**Help**

Recalculate This Sheet

View Output

View Output

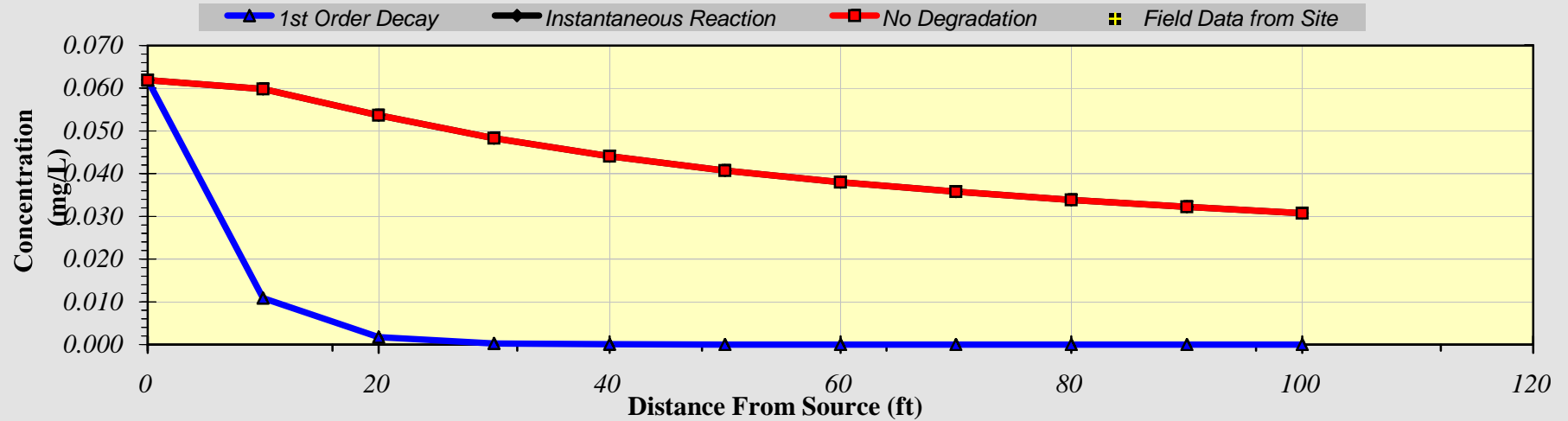
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.062	0.060	0.054	0.048	0.044	0.041	0.038	0.036	0.034	0.032	0.031
1st Order Decay	0.062	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.062	0.060	0.054	0.048	0.044	0.041	0.038	0.036	0.034	0.032	0.031
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet

BIOSCREEN Sensitivity Run  
Elevated Concentration  
(more potent source area)

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Acenaphthene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

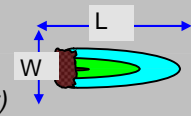
Retardation Factor*	R	113.4	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	4898	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	2.2E+0	(per yr)
		↑ or	
Solute Half-Life	t-half	0.32	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

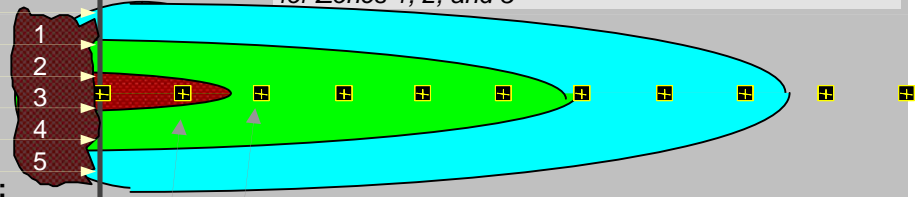
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	7.01
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	↑	1st Order
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)											
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

View Output

**RUN ARRAY**

View Output

**Help**

Recalculate This Sheet

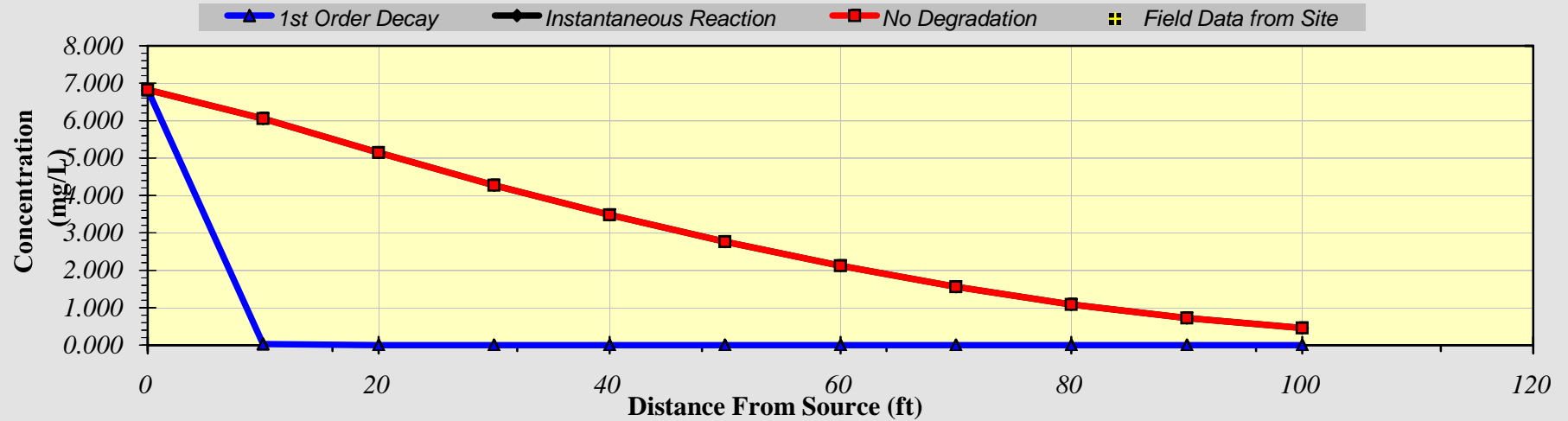
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	6.825	6.056	5.149	4.275	3.484	2.767	2.123	1.557	1.090	0.725	0.456
1st Order Decay	6.825	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	6.825	6.056	5.149	4.275	3.484	2.767	2.123	1.557	1.090	0.725	0.456
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet

# BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

Northwest Pipe

Naphthalene

Run Name

## Data Input Instructions:

115

↑ or

0.02

1. Enter value directly....or
  2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable\* → Data used directly in model.
- 20 → Value calculated by model. (Don't enter any data).

### 1. HYDROGEOLOGY

Seepage Velocity*	Vs	67.3	(ft/yr)
		↑ or	
Hydraulic Conductivity	K	1.0E-02	(cm/sec)
Hydraulic Gradient	i	0.0013	(ft/ft)
Porosity	n	0.2	(-)

### 2. DISPERSION

Longitudinal Dispersivity*	alpha x	11.0	(ft)
Transverse Dispersivity*	alpha y	1.1	(ft)
Vertical Dispersivity*	alpha z	0.0	(ft)
		↑ or	
Estimated Plume Length	Lp	200	(ft)

### 3. ADSORPTION

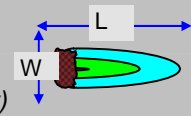
Retardation Factor*	R	28.3	(-)
		↑ or	
Soil Bulk Density	rho	1.7	(kg/l)
Partition Coefficient	Koc	1191	(L/kg)
Fraction Organic Carbon	foc	2.7E-3	(-)

### 4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.6E+0	(per yr)
		↑ or	
Solute Half-Life	t-half	0.44	(year)
<b>or Instantaneous Reaction Model</b>			
Delta Oxygen*	DO		(mg/L)
Delta Nitrate*	NO3		(mg/L)
Observed Ferrous Iron*	Fe2+		(mg/L)
Delta Sulfate*	SO4		(mg/L)
Observed Methane*	CH4		(mg/L)

### 5. GENERAL

Modeled Area Length*	100	(ft)
Modeled Area Width*	100	(ft)
Simulation Time*	100	(yr)



### 6. SOURCE DATA

Source Thickness in Sat.Zone\* 10 (ft)

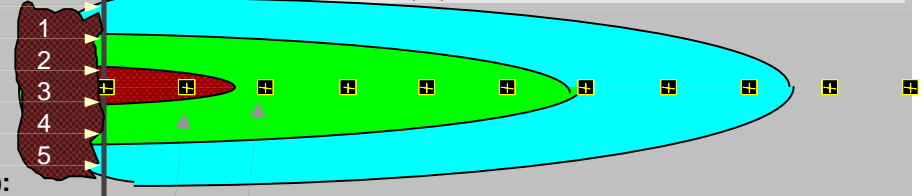
Source Zones:

Width* (ft)	Conc. (mg/L)*
20	
30	
20	0.619
30	0
20	0

#### Source Halflife (see Help):

>1000	>1000	(yr)
Inst. React.	↑	1st Order
Soluble Mass	2000	(Kg)
In Source NAPL, Soil		

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells  
If No Data Leave Blank or Enter "0"

### 7. FIELD DATA FOR COMPARISON

Concentration (mg/L)											
Dist. from Source (ft)	0	10	20	30	40	50	60	70	80	90	100

### 8. CHOOSE TYPE OF OUTPUT TO SEE:

**RUN CENTERLINE**

**RUN ARRAY**

**Help**

Recalculate This Sheet

View Output

View Output

Paste Example Dataset

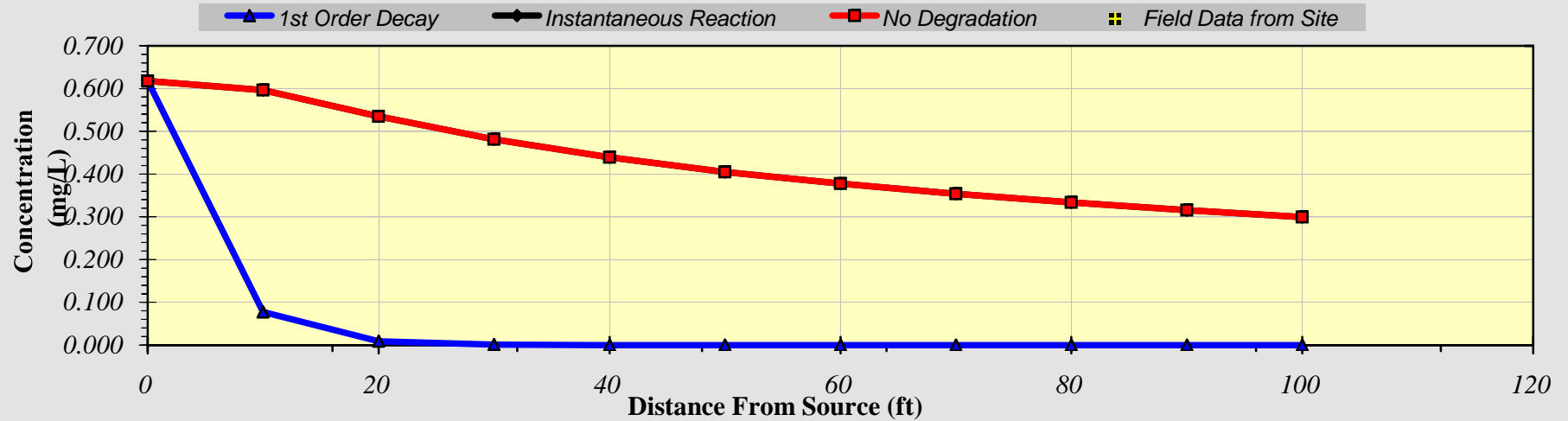
Restore Formulas for Vs, Dispersivities, R, lambda, other



### DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

*Distance from Source (ft)*

TYPE OF MODEL	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.618	0.597	0.535	0.481	0.439	0.405	0.377	0.354	0.334	0.316	0.300
1st Order Decay	0.618	0.078	0.009	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.618	0.597	0.535	0.481	0.439	0.405	0.377	0.354	0.334	0.316	0.300
Field Data from Site											



Calculate Animation

Time:

100 Years

Return to Input

Recalculate This Sheet