PNNL-13395

Test Plan and Baseline Results for Wildlife Ecological Assessment Program (WEAP)

Addendum to

Demonstration of the Wildlife Ecological Assessment Program (WEAP)

September 2001

Contents

1.0 Background and Scope

To help utilize current and existing state-of-the-art multimedia tools and to gain an appreciation for current technological advances, the Pacific Northwest National Laboratory (PNNL) is supporting WES and ARAMS by modifying and updating the Framework for Risk Analysis in Multimedia Environmental Systems (FRAMES) for inclusion as a component in ARAMS. FRAMES is a Windows-based software platform that provides an interactive user interface and, more importantly, specifications to allow a variety of DOS and Windows-based environmental codes to be integrated within a single framework. As a new component in ARAMS and FRAMES, PNNL has developed the Wildlife Ecological Assessment Program (WEAP), which is a software package that summarizes ecological health impacts to wildlife from exposures to chemical contaminants.

WEAP is an updated beta version of the FRequency ANalysis of COncentration (FRANCO) model, which was developed by PNNL for the U.S. Environmental Protection Agency (EPA) for regulatory and compliance purposes. WEAP is a statistical package that 1) correlates the duration of exposure to contaminant levels to help determine the impacts of the exposure to organisms and 2) bridges the gap between simulated chemical transport and fate modeling and ecological-risk assessment data that are available from laboratory studies. The WEAP statistical analysis accommodates different organisms as they relate to different contaminants, resulting in a flexible and versatile tool.

2.0 Requirements

Requirements for the WEAP User Interface are described in a document entitled *Demonstration of the Wildlife Ecological Assessment Program*. These requirements are reworded into the following list of concise, fundamental requirements suitable for testing (Table 1). The last two columns show the relationship between these requirements and the test cases described in Section 2.

Table 1. Requirements for the WEAP System

		Test Cases	
Requirement Number	**Requirement**	**1**	**2**
1	WEAP shall be capable of connecting to a Surface Water Icon that produces a Water Concentration File (WCF), containing time-varying constituent concentrations.	X	
2	WEAP shall be capable of connecting to an Eco Exposure Icon that produces a Body Burden File (BBF).		X
3	WEAP shall be located under the Ecological Effects Icon.	X	X

		Test Cases	
Requirement Number	**Requirement**	**1**	**2**
4	WEAP shall connect to an Eco Benchmarks Icon that produces an Ecological Benchmark File(EBF).		
5	WEAP shall be capable of accessing and reading a WCF, which contains a time series of water concentrations (i.e., concentration versus time).	X	
6	WEAP shall be capable of accessing and reading an ecological BBF, which contains a time series of body burden or doses containing units of mg/kg (i.e., dose/body burden versus time).		X
7	WEAP shall be capable of accessing and reading an EBF, which contains ecological benchmark information, as described by an EBF Dictionary (EBF.DIC) file. A Dictionary file describes the parameters and the characteristics of the parameters (e.g., name, value, definition, units, etc.).	X	X
8	When consuming information from a WCF, WEAP shall produce a table, computing acute (e.g., #96 hr) and chronic exposures (e.g., >96 hr), for the percentage of time that a time series of concentrations, doses, or body burdens are a. below an acceptable limit (e.g., Chronic Limit, Criterion Continuous Concentration [CCC], No Observable Effects Level [NOEL], No Observable Adverse Effects Level [NOAEL], etc.) b. above an unacceptable limit (e.g., exposure duration curves associated with Lethal Concentration for 50% mortality [LC-50], Lethal Dose for 50% mortality [LD-50], Effective Dose at 50% [ED-50], etc.) c. in between acceptable and unacceptable limits. This table will result in a maximum of six values.	X	
9	When consuming information from a WCF, WEAP shall produce a table reporting the Probability of Exceedence, based on the Period of Record (i.e., assumed equal to the Exposure Duration) versus Concentration: the probability that concentration will be equal to or greater than a selected value.	X	

		Test Cases	
Requirement Number	**Requirement**	**1**	**2**
10	When consuming a BBF, WEAP shall produce a table reporting the Ecological Hazard Quotient (EHQ) versus time. The EHQ is defined as the ratio of the body burden to the benchmark dose.		X
11	When consuming a BBF, WEAP shall produce a table reporting the Probability of Exceedence, based on the Period of Record (i.e., assumed equal to the Exposure Duration) versus EHQ: probability that an EHQ will be equal to or greater than a selected value.		X
12	When consuming a BBF, WEAP shall produce a table reporting the Probability of Exceedence, based on the Period of Record (i.e., assumed equal to the Exposure Duration) versus Dose or Body Burden: the probability that dose/body burden will be equal to or greater than a selected value.		X
13	The WEAP model must operate within FRAMES under Windows-95 or higher.	X	X

3.0 Test Cases and Baseline Testing Results

The procedure for setting up and running test cases is described in detail in Appendix B. Review the basic techniques described in Appendix B before proceeding. Additional instructions will be listed for each test case as needed.

3.1 WEAP01

3.1.1 Description and Rationale

3.1.2 Instructions for Performing the Test and Expected Results

These instructions assume that the FUI is running and visible on the user's screen. If the workspace area already contains a site model, select the "New" or "Close" option from the "File" menu. You may be prompted to save the current file. Select "Yes" or "No." Once the workspace is clear, you may begin a new case. As noted above, detailed instructions for setting up and running test cases are contained in Appendix B.

For all the following, place icons on the workspace by double-clicking the desired icon in the icon palette. Move icons by dragging with a left-click(button-down) then release-button to drop. Connect icons by shift-left click(button-down) on one icon, drag to the next icon, and then the release-button. Connect icons in the order of the flow of contamination.

Place the following icons on the workspace and move them into desired position.

Database: Contaminant, Eco Benchmarks
Model: Surface Water, Eco Effects

Connect the icons as follows:

Contaminant	–> all other icons
Eco Benchmarks	–> Eco Effects
Surface Water	–> Eco Effects

This completes the skeleton framework of a conceptual site model of an environmental release scenario.

The actions required to complete each module and fulfill the analysis of the release scenario are described below. Each action is initiated by right-clicking on the module icon and then selecting the specified action (i.e., "General Info," "User Input," "Run Model," "View/Print Module Output") from the popup menu. Every required action will be described for every module. For modules with user interfaces, all user inputs will be described to satisfy the input requirements and prepare for the next action. The objective is to complete each module in turn, changing the signal light from red to green.

3.1.2.1 Contaminant Module

General Info: Select "FRAMES Default Chemical Database Selection." Click "OK."

User Input: When prompted for a file name for this scenario, enter "Weap01.gid" and click "Save." In the "FRAMES Constituent Database Editor" window, select "Fluoranthene" as the only constituent of interest and click "File | Exit – Save Changes" on the menu bar.

No further action is required, the signal light will turn green indicating the module is complete.

3.1.2.2 Surface Water Module

General Info: Select "FRAMES Known Surface Water Module." Click "OK."

User Input: Enter the following data. When complete, click "File | Save and Exit" on the menu bar. Note that if you revisit this module input screen, you will see that the

values may not be exactly what you entered. This is caused by the unit conversions and is not a problem of concern.

Time	Concentration
day	mg/L
0	0
10	100
12	5
30	90
40	60
45	85
50	30
60	75
70	10
80	15
90	5
95	95
100	20

Run Model: The model will execute and the signal light will turn green, indicating the model ran successfully.

3.1.2.3 Eco Benchmarks Module

General Info: Select "PNL ERED Database." Click "OK" to save and exit.

User Input: When prompted for a Login User Name and Password, enter your PNNL user name and password, click "OK." After loading data, a Data Editor will be displayed. The Data Editor input form has two panels. On the left-hand panel is a hierarchical list of input items. As each list item is clicked, the required data will be entered in the right-hand panel.

List Item Selected		User Input and/or Selections	
1	Chemical Aliases	Selected Chemicals of Concern	Aliased CAS ID for selected chemical
		206440	206-44-0

2	LifeForm Selection	Life-forms of Concern
		Asterias rubens (Common Name: Starfish) Brachionus calyciflorus (Common Name: Rotifer)

2.1	LifeForm Aliases	Selected Life-forms of Concern	Aliased Scientific name for selected lifeform
		Asterias rubens Brachionus calyciflorus	Asterias rubens Oncorhynchus mykiss

3	Viewing and Editing	Retrieve Data Click on the button to initiate data retrieval for chemical and lifeform selections.

When the data are retrieved, additional items will appear on the hierarchical list. Click on each one to confirm the values. The values can be changed if the Number of ED values is non-zero to affect the final outcome of the analysis.

List Item Selected		User Input and/or Selections	
		Criteria	Values
3.1	Short description for ED percentages	Number of ED descriptions: 1	LOED
3.2	Body part description	Number of body part descriptions: 1	Whole Body

3.3	Description of effect	Number of effect types descriptions: 1	Physiological
3.4	Comment on conditions of measurement...	Chemical common name: Fluoranthene Life-form Scientific name:Rotifer Short Description: LOED Bodies part description: Whole Body Description of effect: Physiological Number of Ed Values: 1	Induction Of Hepatic Mixed Function Oxidases
		Chemical common name: Fluoranthene Life-form scientific name:Starfish Short Description:LOED Body part description:Whole Body Description of effect: Physiology Number of Ed Values:0	<empty>
3.5	ED effect concentration values	Chemical common name: Fluoranthene Life-form scientific name:Rotifer Short Description:LOED Body part description:Whole Body Description of effect: Physiological Number of Ed Values:1 Units: mg/Kg	**30**
		Chemical common name: Fluoranthene Life-form scientific name:Starfish Short Description:LOED Body part description:Whole Body Description of effect: Physiology Number of Ed Values:0 Units: mg/kg	<empty>
3.6	ED effect duration	Chemical common name: Fluoranthene Life-form scientific name:Rotifer Short Description:LOED Body part description:Whole Body Description of effect: Physiological Number of Ed Values:1 Units: day	**180**

		Chemical common name: Fluoranthene Life-form scientific name:Starfish Short Description:ED50 Body part description:Whole Body Description of effect: Physiology Number of Ed Values:0 Units: day	<empty>

Click "File | Save and Exit" to close the user input. No further action is required, the signal light will turn green indicating the module is complete.

3.1.2.4 Eco Exposure Module

General Info: Select "Wildlife Ecological Assessment Program." Click "OK" to save and exit.

User Input: The WEAP input form will be displayed, the form has two panels. On the left-hand panel is a hierarchical list of input items. As each list item is clicked, the required input will be entered in the right-hand panel. If there are sub-items there will be a + indicating that the list can be expanded. Expand all items and step through each line-item individually to complete the input data. There will be a expandable line-item for each Lifeform of Concern specified in the previous Eco Benchmarks Module.

Expand Rotifer, click on Rotifer. Enter Time vs Location Distribution:

Time vs Location Distribution for Rotifer	
Time	Location
day	Pick Location
0	Location 1 (Riv 3)
50	Location 1 (Riv 3)
100	None

Click on Fluoranthene (under Rotifer). Enter the following:

Acute exposure duration - ACUTETIME	4 day

Chronic Limit - CCC	10 mg/l
Description of effect	<empty>
Duration	Concentration
day	mg/L
0	95
4	95
20	50
60	30
100	30

Expand Starfish, click on Starfish. Enter Time vs Location Distribution:

Time	Location
day	Pick Location
0	None
50	Location 1 (Riv 3)
100	None

Now click on Fluoranthene (under Starfish) to enter effects information:

Acute exposure duration - ACUTETIME	4 day
Chronic Limit - CCC	22 mg/l
Description of effect	<empty>
Duration	Concentration
day	mg/L
0	66
30	55
100	44

When the data are complete, click "File | Save and Exit" from the menu bar. The module signal will change to yellow to indicate input is complete and the model can be executed.

Run Model: The model will run and the signal will display green to indicate the model ran successfully and the module is complete.

. Programs to view the results for each module are accessed and invoked from the same popup menu for the actions above. Result viewers are only accessible if the module is complete (stoplight is green). For each module, all applicable viewers will be listed from which any viewer can be selected, one at a time. Execute the following action and compare the results to those included in Appendix C.

View/Print Module Output: Select "EXF Graphical View." The results are reported in Excel spreadsheets.

3.2 WEAP02

3.2.1 Description and Rationale

3.2.2 Instructions for Performing the Test and Expected Results

These instructions assume that the FUI is running and visible on the user's screen. If the workspace area already contains a site model, select the "New" or "Close" option from the "File" menu. You may be prompted to save the current file. Select "Yes" or "No." Once the workspace is clear, you may begin a new case. As noted above, detailed instructions for setting up and running test cases are contained in Appendix B.

For all the following, place icons on the workspace by double-clicking the desired icon in the icon palette. Move icons by dragging with a left-click(button-down) and then the release-button to drop. Connect icons by shift-left click(button-down) on one icon, drag to the next icon, and then the release-button. Connect the icons in the order of the flow of contamination.

Place the following icons on the workspace. Move them into desired position.

Database: Contaminant, Eco Benchmarks
Model: Source, Surface Water, Eco Exposure, Eco Effects

Connect the icons as described below:

Contaminant –> all other icons
Eco Benchmarks –> Eco Exposure, Eco Effects
Source –> Surface Water –> Eco Exposure –> Eco Effects

This completes the skeleton framework of a conceptual site model of an environmental release scenario.

The actions required to complete each module and fulfill the analysis of the release scenario are described below. Each action is initiated by right-clicking on the module icon and then selecting the specified action (i.e., "General Info," "User Input," "Run Model," "View/Print Module Output") from the popup menu. Every required action will be described for every module. For modules with user interfaces, all user inputs will be described to satisfy the input requirements and prepare for the next action. The objective is to complete each module in turn, changing the signal light from red to green.

3.2.2.1 Contaminant Module

General Info: Select "FRAMES Default Chemical Database Selection"

User Input: When prompted for a file name for this scenario, enter "Weap02.gid" and click "Save." In the "FRAMES Constituent Database Editor" window, select "Fluoranthene" as the only constituent of interest and click "File | Exit – Save Changes" on the menu bar.

No further action is required, the signal light will turn green indicating the module is complete.

3.2.2.2 Source Module

General Info: Select "RECOVERY 3.0 Source - Known Contaminant Concentration." Click "OK."

User Input: Enter the following data then click "Save and Exit."

Contaminant initial concentration	1.0e-6
Contaminant inflow concentration	.005
Constant contaminant external loading	50

Run Model: The model will execute and the signal light will turn green, indicating the model ran successfully.

3.2.2.3 Surface Water Module

General Info: Select "RECOVERY 3.0 Surface Water Module." Click "OK."

User Input: Enter the following data then click "OK."

Simulation Period	100.0
Number of Time Steps ... for Water Column	50
Number of Time Steps ... for Sediment Profile	50
Maximum Sediment Profile Depth ...	100
Enhanced Biodiffusion Coefficient	2.5e-5
Enhanced Biodiffusion Depth ...	0

After clicking "OK," there will be several DOS windows displayed to present additional information and obtain more data:

Press any key to acknowledge the first screen.
Press "Enter" to acknowledge the "RECOVERY" screen.

On the "Morphometry and Hydrology Water" screen, enter the following. Press "F9" to recalculate and then "F10" to continue.

Water Surface Area (m^2)	100000
Water Depth (m)	3
Flow Through (m^3/yr)	0
Residence Time (years)	.3

On the "Morphometry and Hydrology Contaminated Sediments Layer" screen, enter the following and then press "F10" to continue.

Contaminated Sediment Depth (m)	0.3
Depth of Mixed Layer (cm)	10
Mixed Layer Surface Area (m^2)	100000
Initial Concentrations - Mixed Layer	1000
Deep Contaminated Sediments	1. Fixed Concentration

Initial Concentrations - Deep Contaminated Sediments	1000

On the “System Properties” screen, enter the following, press “F9” to calculate, and then “F10” to continue.

Suspended Solids Concentration	30
Mixed Sediment Porosity	.9
Deep Sediment Porosity	.4
Mixed Sediment Particle Density	2650000
Deep Sediment Particle Density	2650000
Wind Speed	2
Weight fraction carbon... - water	.02
Weight fraction carbon... - mixed layer	.05
Weight fraction carbon... - sediments	.05
Resuspension Velocity	0
Burial Velocity	.001
Settling Velocity	0

On the ‘FLUORANTHENE Properties’ screen press ‘F10' to continue. The values for this run do not need to be changed.

On the next ‘FLUORANTHENE Properties’ the values for this run do not need to be changed so press ‘F9' to recalculate, then ‘F10' to continue.

On the final ‘RECOVERY’ screen, press ‘Enter’ to save, then press ‘Enter’ again to ‘Exit’. You will be prompted to ‘press any key to continue...’, do so and the module input will complete. The signal light will change to yellow.

Run Model: The model will execute and the signal light will turn green, indicating the model ran successfully.

3.2.2.4 Eco Benchmarks Module

General Info: Select 'PNL ERED Database'. Click 'OK' to save and exit.

User Input: When prompted for a Login User Name and Password enter your PNNL user name and password, click 'OK'. After loading data a Data Editor will be displayed. The Data Editor input form has 2 panels. On the left-hand panel is a hierarchical list of input item. As each list item is clicked, the required data will be entered in the right-hand panel.

List Item Selected		User Input and/or Selections	
1	Chemical Aliases	Selected Chemicals of Concern	Aliased CAS ID for selected chemical
		206440	206-44-0

2	LifeForm Selection	Life-forms of Concern
		Asterias rubens (Common Name: Starfish) Oncorhynchus mykiss (Common Name: Trout - Rainbow)

2.1	LifeForm Aliases	Selected Life-forms of Concern	Aliased Scientific name for selected lifeform
		Asterias rubens Oncorhynchus mykiss	Balanas crenatus Oncorhynchus mykiss

3	Viewing and Editing	Retrieve Data Click on the button to initiate data retrieval for chemical and lifeform selections.

When the data is retrieved, additional items will appear on the hierarchical list. Click on each one to confirm the values. The values can be changed if the Number of ED values is non-zero to affect the final outcome of the analysis.

List Item Selected		User Input and/or Selections	
		Criteria	Values
3.1	Short description for ED percentages	Number of ED descriptions: 1	LOED
3.2	Body part description	Number of body part descriptions: 1	Whole Body
3.3	Description of effect	Number of effect types descriptions: 1	Physiological
3.4	Comment on conditions of measurement...	Chemical common name: Fluoranthene (206440) Life-form Scientific name:Starfish Short Description:LOED Body part description:Whole Body Description of effect: Physiological Number of Ed Values: 0	<null>
		Chemical common name: Fluoranthene Life-form scientific name:Trout Short Description:LOED Body part description:Whole Body Description of effect: Physiology Number of Ed Values:0	Induction Of Hepatic Mixed Function Oxidases
3.5	ED effect concentration values	Chemical common name: Fluoranthene Life-form scientific name:Starfish Short Description:LOED Body part description:Whole Body Description of effect: Physiological Number of Ed Values:0 Units:	**<empty>**
		Chemical common name: Fluoranthene Life-form scientific name:Trout Short Description:LOED Body part description:Whole Body Description of effect: Physiology Number of Ed Values:1 Units: mg/kg	30

3.6	ED effect duration	Chemical common name: Fluoranthene Life-form scientific name:Starfish Short Description:ED50 Body part description:Whole Body Description of effect: Physiological Number of Ed Values:0 Units: day	**<empty>**
		Chemical common name: Fluoranthene Life-form scientific name:Trout Short Description:ED50 Body part description:Whole Body Description of effect: Physiology Number of Ed Values:1 Units: day	180

Click 'File | Save and Exit' to close the user input. No further action is required, the signal light will turn green indicating the module is complete.

3.2.2.5 Eco Exposure Module

General Info: Select 'Theoretical Bioacccumulation Potential (TBP)." Click "OK."

User Input: You will get a "Match organism" screen that reports "The organism you selected (<name>) does not appear in the BSAF database. Please choose a comparable organism."

Select "Hyalella azteca" for Asteria rubens. Click "Continue."
Select "Nephytys sp" for Oncorhynchus mykiss. Click "Continue."

The TBP screen will report the selected organisms. Click "Save Settings."

Run Model: The model will execute and the signal light will turn green, indicating the model ran successfully.

3.2.2.6 Eco Effects Module

General Info: Select "Wildlife Ecological Assessment Program." Click "OK."

User Input: Select the desired options for the analysis from the "Wildlife Ecological Assessment Program" as below by clicking (highlighting) a line of the left side

list, then clicking (highlighting) on the right side option. Click "File Save and Exit" from the menu bar when finished.

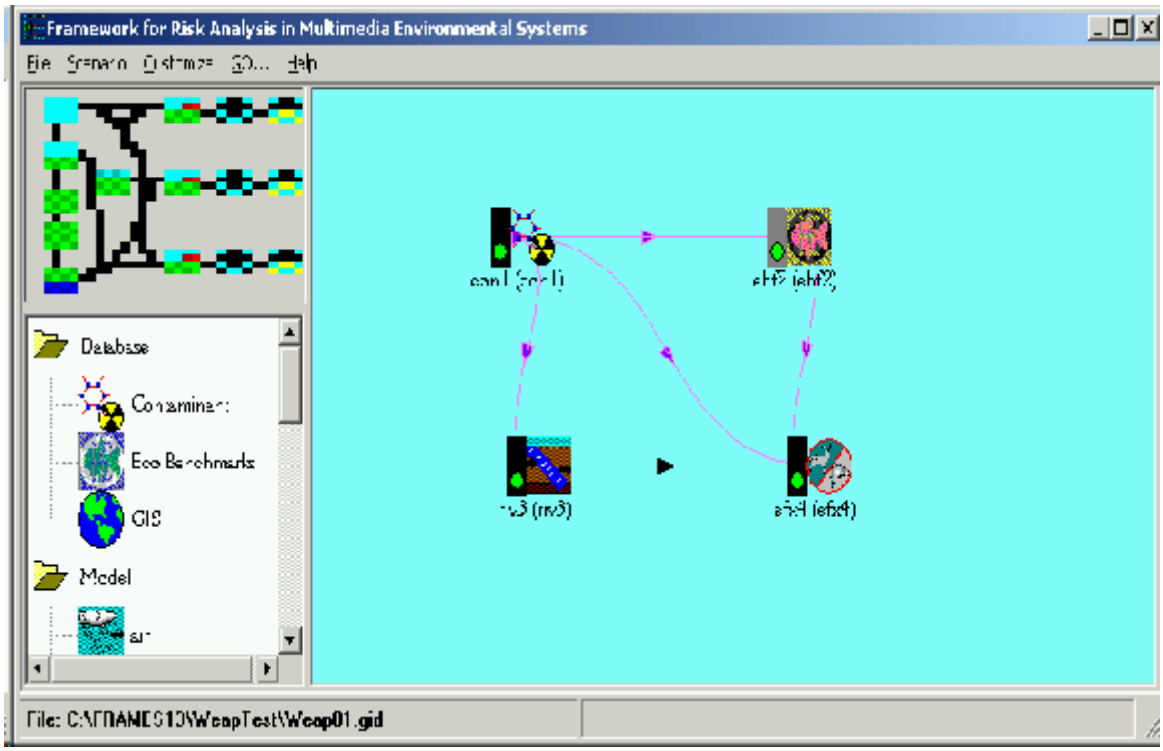
Ecological Dose Selections	Effective Dose
Effective Dose	LOED
Body part of concern	Whole Body
Type of Effect:	Physiological

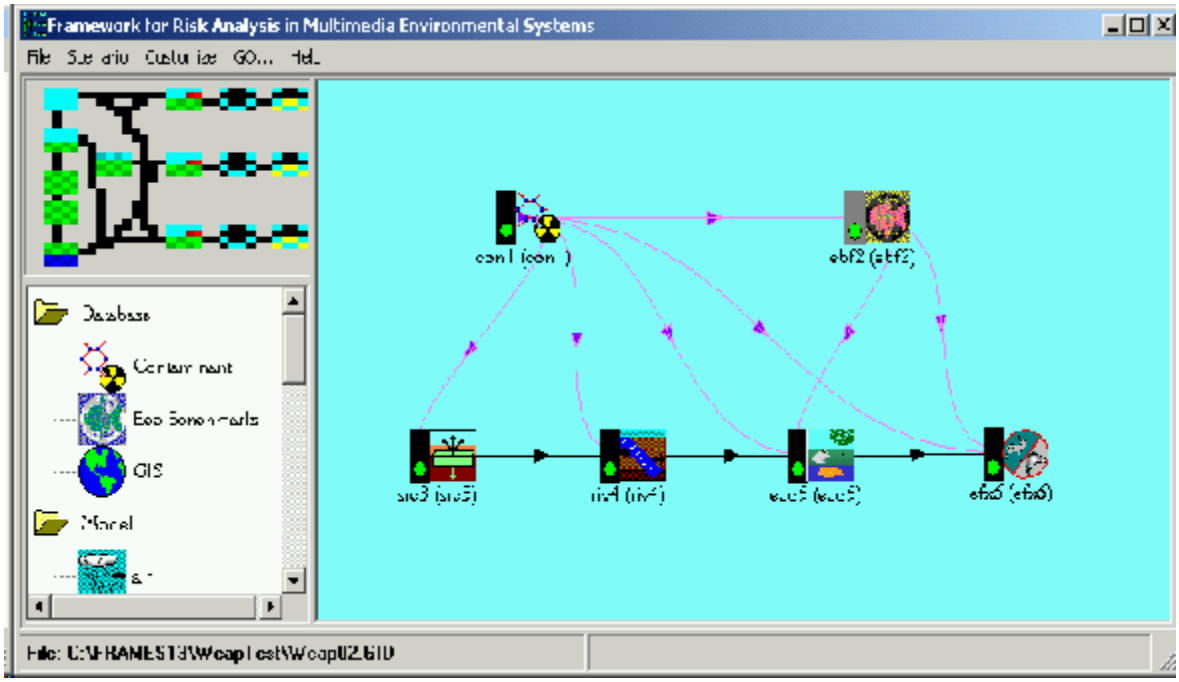
Run Model: The model will execute and the signal light will turn green, indicating the model ran successfully.

Programs to view the results for each module are accessed and invoked from the same popup menu for the actions above. Result viewers are only accessible if the module is complete (stoplight is green). For each module, all applicable viewers will be listed from which any viewer can be selected, one at a time. Execute the following action and compare the results to those included in Appendix D.

View/Print Module Output: Select "EXF Graphical View."

Appendix A


Framework for Risk Analysis in Multimedia Environmental Systems
File Scenario Customize GO... Help
Database
Contaminant
Eco Benchmarks
GIS
Model
File: C:\FRAMES1D\WeapTest\Weap01.gid


Framework for Risk Analysis in Multimedia Environmental Systems
Database
GIS
Model

Appendix B

General Instructions for Setting Up and Running Test Cases

This section describes how to set up and run cases using the FRAMES (Framework for Risk Analysis in Multimedia Environmental Systems) software system. These instructions assume that the FRAMES user interface is running and visible on the user's computer.

Each test case must include a minimum of three modules: a contaminant database, source term model, and a transport or exposure model. Additional modules can be added to process data further or to view output results files, but these additional modules aren't necessarily required for test case execution. A brief description of the icons associated with each module is listed in Appendix A.

To start a new case, select New from the File menu. Enter a file name and select Open. Enter a site name at the prompt and select Ok.

Double-click on the Contaminant icon on the toolbar. The icon should appear in the workspace section of the screen along with a signal light that will be completely black. The black signal light indicates that a contaminant database and contaminants have not been selected. Once the database and contaminants are selected, the light will turn green indicating that the module has been given the necessary data and executed. Right click the Contaminants icon and choose "General Info" from the popup menu. A window titled "Object General Information" will appear. The section titled "Select from Applicable Models" contains a list of databases that can be used in the FRAMES system. Click on "FRAMES Default Chemical Database Selection." A description will appear in the "Model Description" section to the right. Click "Ok" at the bottom of the screen. Next, right click the Contaminants icon and click "User Input" from the popup menu. A new window titled "FRAMES Constituent Database Editor" will appear. The contaminants of interest must be chosen using this screen. The list of contaminants can be sorted and filtered into several categories. The default category is "All Contaminants." Other categories may be chosen from the list box near the top of the window. The contaminants selected for all test cases were chosen from the "All Contaminants" list.

To select a contaminant, type name of the contaminant in the "Search for:" box. Click "Find Next." The first contaminant containing the contaminant name will be highlighted in the list to the right. For example, if you type in "benzene" then "1,2 Dichlorobenzene" will be highlighted because it contains the string "benzene." Since "1,2 Dichlorobenzene" is not the contaminant of interest for this example, click on "Find Next" and the next contaminant containing "benzene" will be highlighted. Continue to click "Find Next" until plain "Benzene" is highlighted. Click on "Add >>>" to insert "Benzene" into the list of contaminants that will be used. Additional contaminants can be added by following the same process. A contaminant may be removed from the list by highlighting the contaminant in the list to the right and clicking "<<< Remove." When the list is complete, click "OK."

The contaminant selection screen will disappear and the signal light attached to the Contaminants icon will turn green, indicating that contaminant selection is complete.

The next step is to set up a Source Term module. To do this, double-click on the Source icon in the toolbar. A Source Term icon will appear at the top-left corner of the workspace. Drag the Source Term icon to the location in the workspace that you desire. The source term icon will appear with a black signal light. The black signal light indicates that a Source Term model has not been chosen. Once the source term model has been selected, the signal light will turn red indicating that a model has been selected. When the required data has been entered, the light will turn yellow indicating that the model has been completed and is ready to be executed. Before work can begin on setting up the source term, a connection must be made from the Contaminants icon to the Source Term icon. To do this, hold down the shift button on the keyboard, click and hold the mouse button over the Contaminants icon, drag the cursor until it is over the Source Term icon, release the mouse button, and finally release the shift button. A line with an arrow pointing from the Contaminants icon to the Source Term icon should appear.

Once the connection has been made, right click on the Source Term icon and click "General Info" from the menu that appears. A window titled "Object General Information" should appear. In the box titled "Label" type in a source model name. Then select a source term model from the list in the "Select from Applicable Models" box on the left. Note that the lower left text box lists the *non*-applicable models for the current module type and also that a brief model description appears in the text box to the right. Highlight the desired source term model and click "Ok" at the bottom of the screen. The "Object General Information" screen will disappear. Notice that the signal light has changed to red, indicating that a source term model has been chosen.

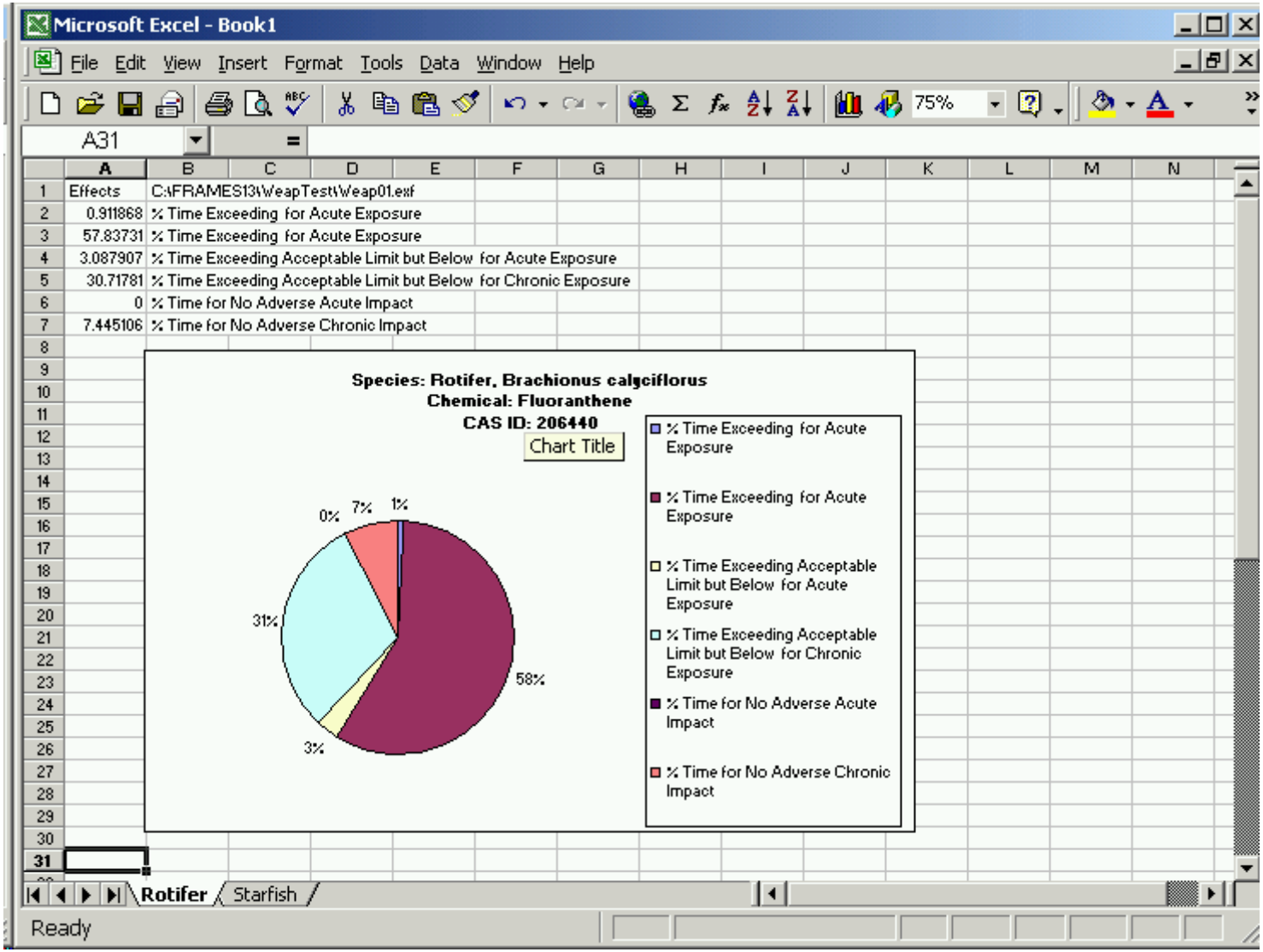
After the modules have been connected, input data can be entered in the source term module. Right click on the Source Term icon and select "User Input." The user interface for the model should appear. At this time, enter all of the required data. When all of the required input data has been entered, use the "File" pull-down menu to select "Save and Exit." If any of the required data was not entered, an error message box will appear and the signal light will remain red. If this happens, right click on the source term icon, and select "User Input." The user interface for the source term module will reappear. All fields containing invalid values will be highlighted in red. Type in an acceptable value in each of these fields and save and exit again. Upon exiting, the signal light will turn yellow, indicating that the Source Term module can be executed. Right click on the Source Term icon and select "Run Model." The model will run and the signal light will turn green, indicating that the model run succeeded.

The results can be viewed in FRAMES by using one of the viewers. To use a viewer, right-click on the module icon and select the desired viewer from the sub-menu of the context menu item View/Print Module Output. Close the window when you are finished with it. You can activate viewers for all other modules by repeating this process and selecting a viewer type appropriate to the particular file being displayed. Alternatively, the output files can be viewed using DOS, M.S. Excel, Notepad, or

other similar programs. It is important to note that viewers will only run when the module that they are attached to has a green light because the viewers require complete files to display

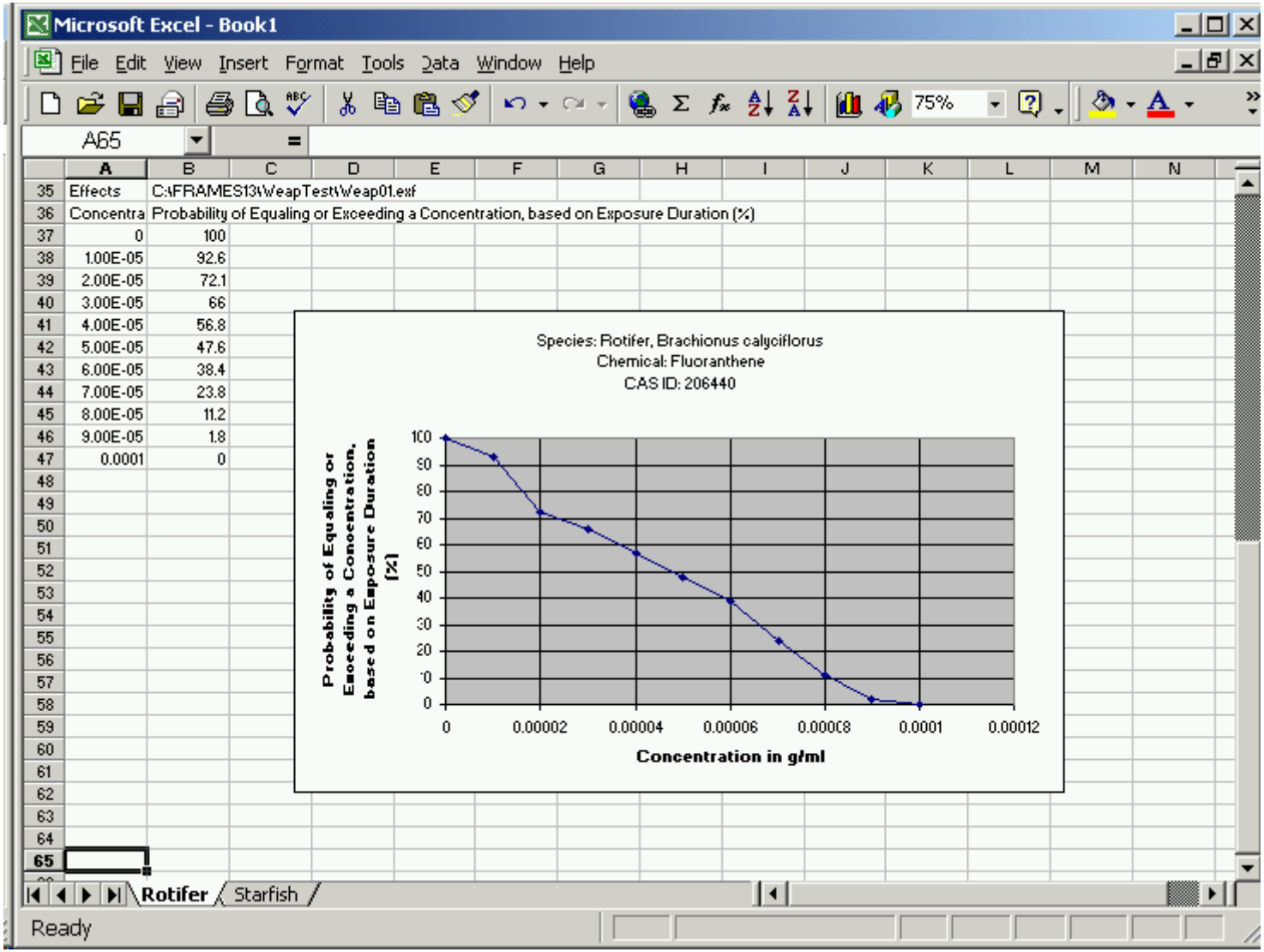
The above process describes the methods used to add modules, choose contaminants, choose models, connect modules, enter input data, run models, and view results. These same techniques will be used to set up specific modeling scenarios in this test plan.

Appendix C
WEAP01 - EXF Graphical View (1)

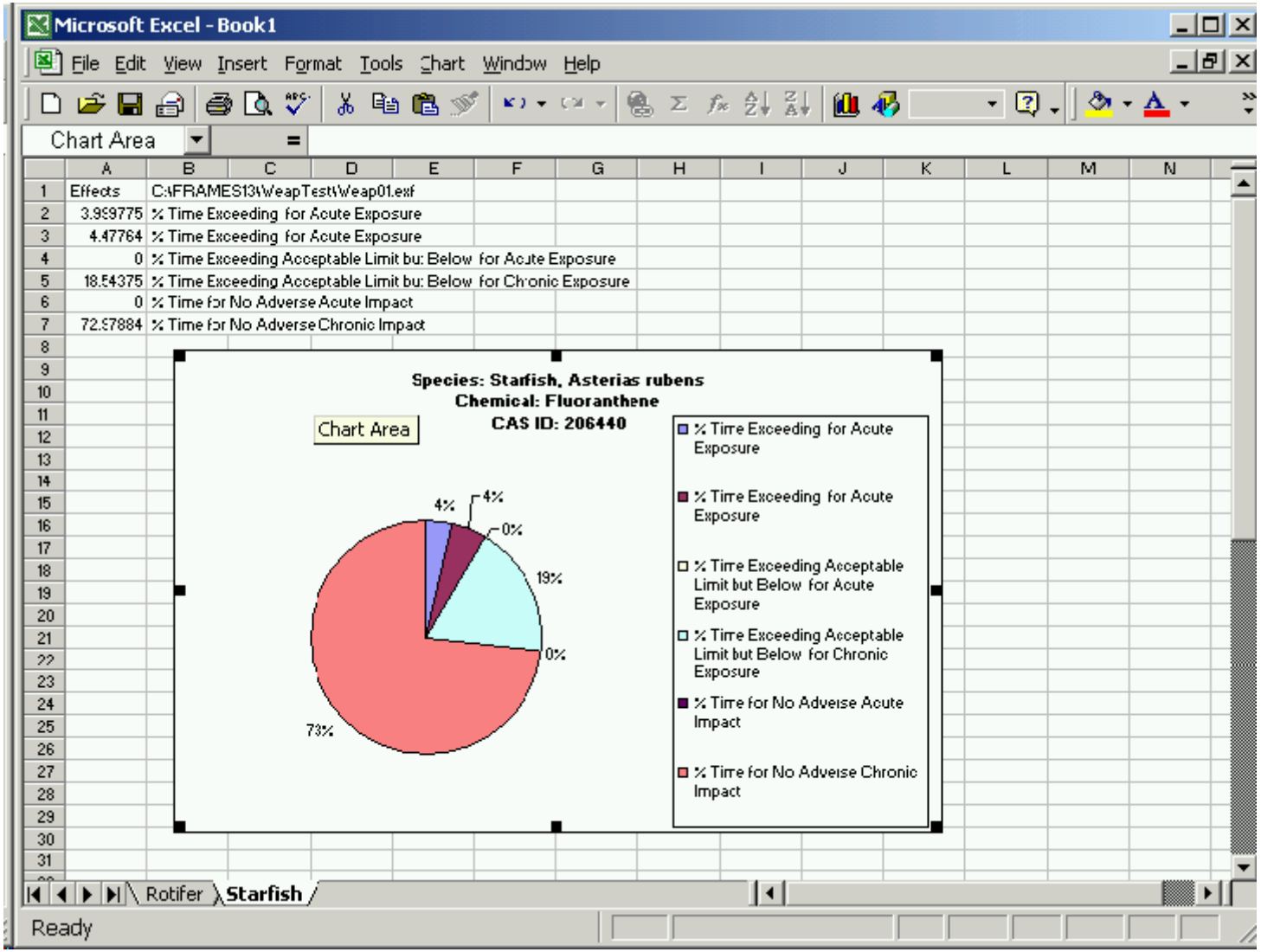


	A	B
1	Effects	C:\FRAMES13\WeapTest\Weap01.exf
2	0.911868	% Time Exceeding for Acute Exposure
3	57.83731	% Time Exceeding for Acute Exposure
4	3.087907	% Time Exceeding Acceptable Limit but Below for Acute Exposure
5	30.71781	% Time Exceeding Acceptable Limit but Below for Chronic Exposure
6	0	% Time for No Adverse Acute Impact
7	7.445106	% Time for No Adverse Chronic Impact

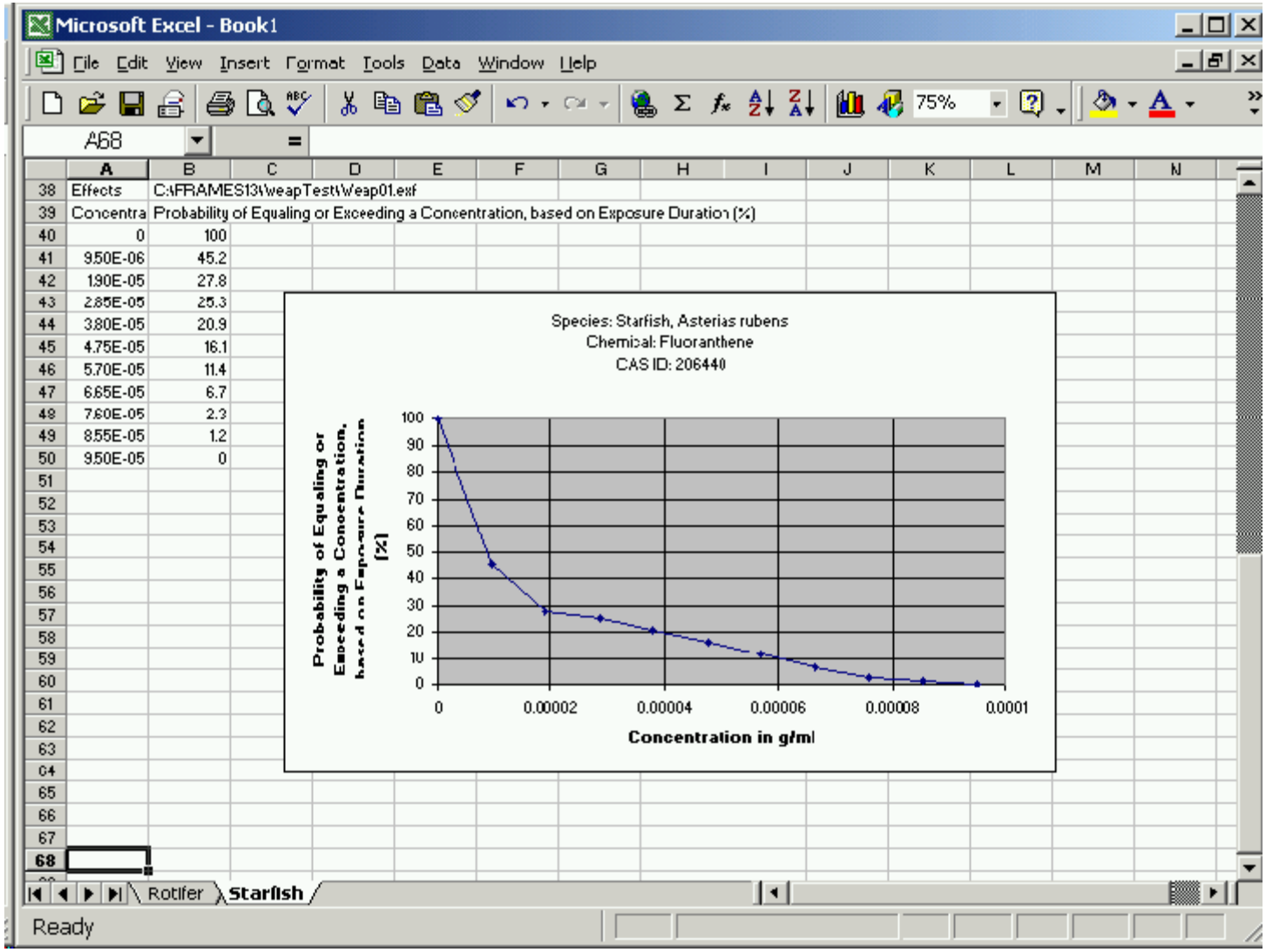
Appendix C
WEAP01 - EXF Graphical View (2)



Appendix C
WEAP01 - EXF Graphical View (3)

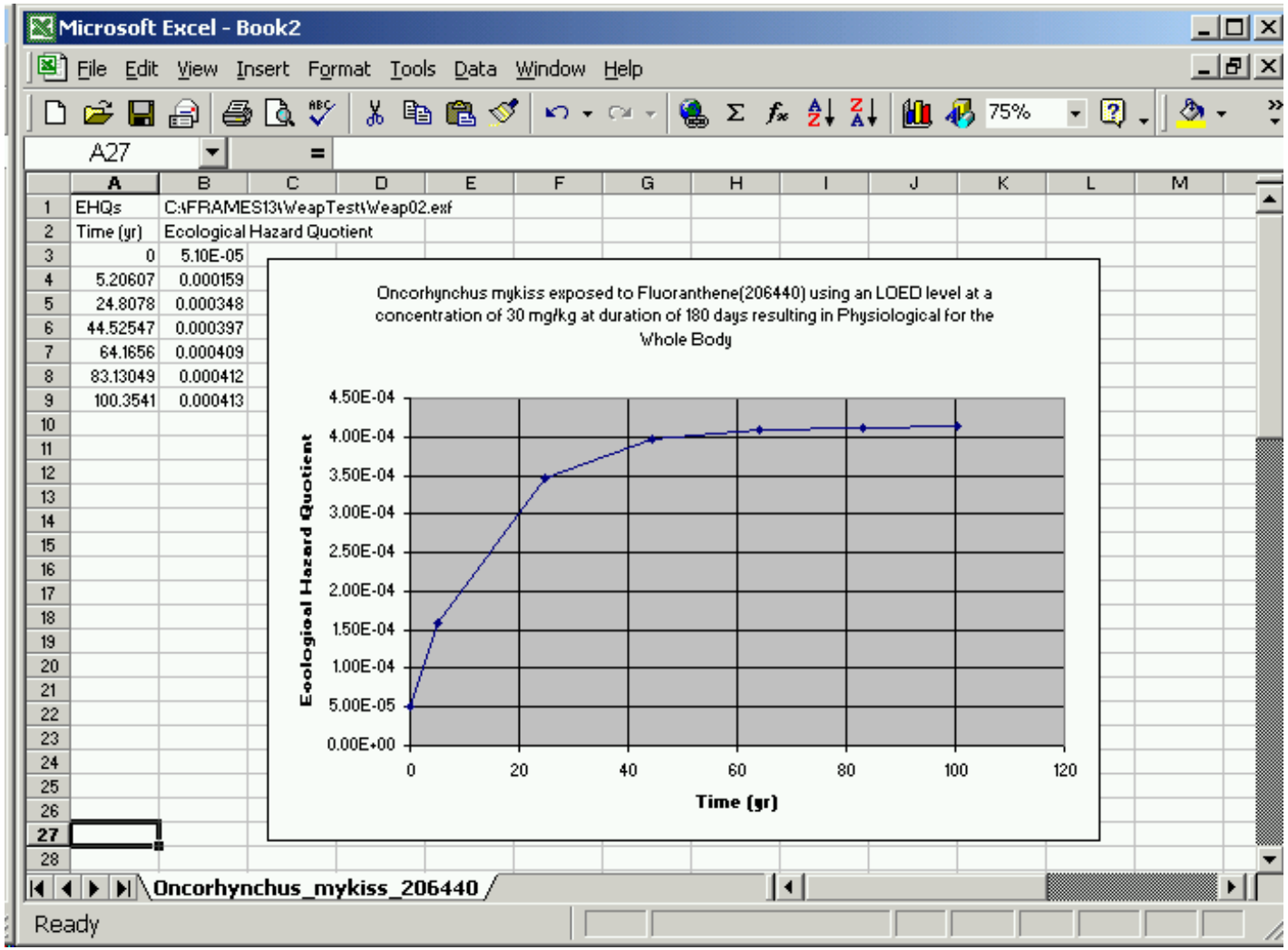


Appendix C
WEAP01 - EXF Graphical View (4)

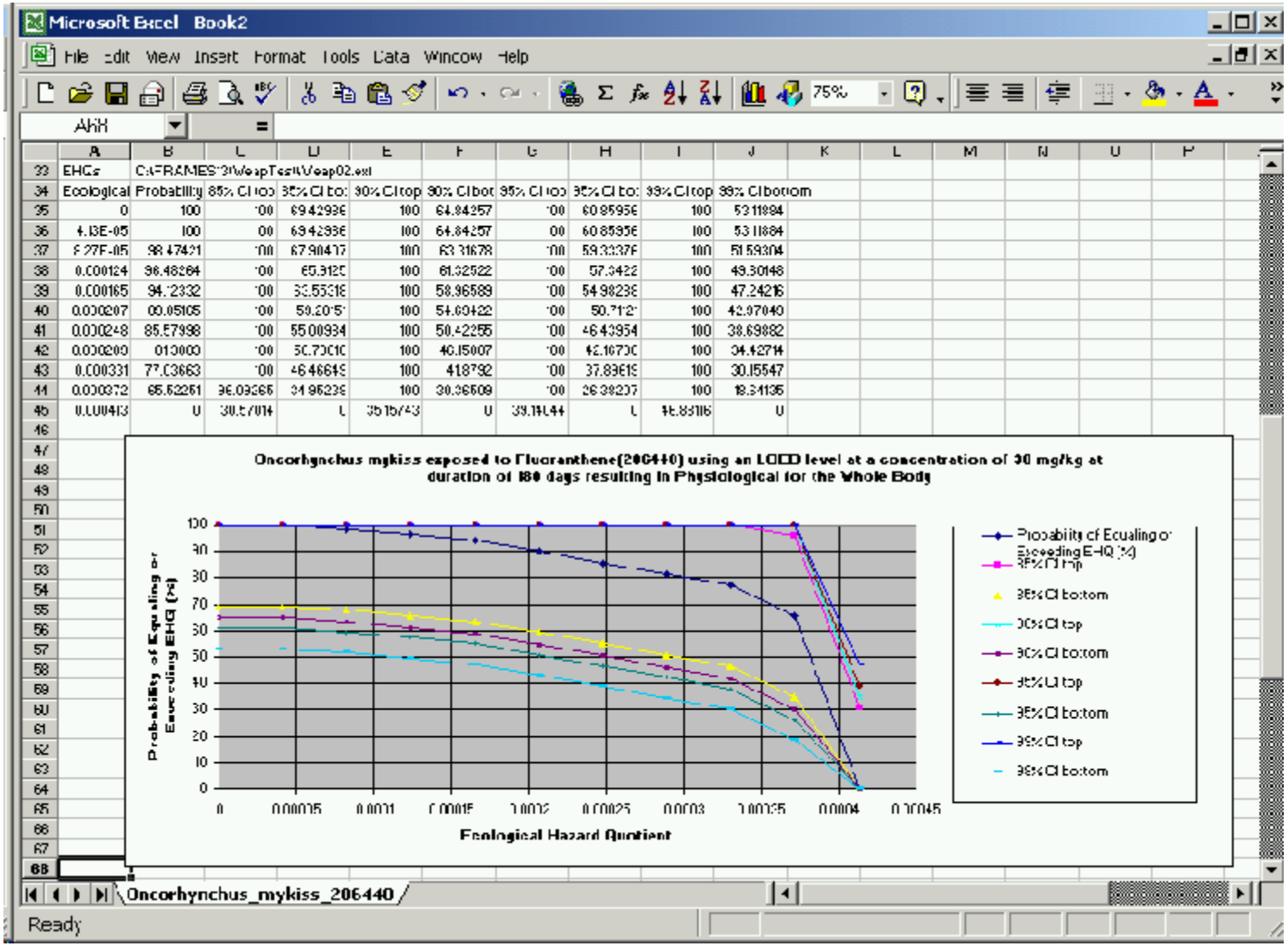


	A	B
38	Effects	C:\FRAMES13\WeapTest\Weap01.exf
39	Concentra	Probability of Equaling or Exceeding a Concentration, based on Exposure Duration (%)
40	0	100
41	9.50E-06	45.2
42	1.90E-05	27.8
43	2.85E-05	25.3
44	3.80E-05	20.9
45	4.75E-05	16.1
46	5.70E-05	11.4
47	6.65E-05	6.7
48	7.60E-05	2.3
49	8.55E-05	1.2
50	9.50E-05	0

Appendix D
WEAP02 - EXF Graphical View (1)



Appendix D
WEAP02 - EXF Graphical View (2)



Appendix D
WEAP 02 - EXF Graphical View (3)