12 Estimating General Population and Aquatic Exposure Using E-FAST

E-FAST, the **E**xposure, **F**ate **A**ssessment **S**creening **T**ool, is a screening level model that provides conservative estimates of chemical concentrations in surface water to which aquatic life may be exposed, and generates human inhalation, drinking water ingestion, and fish ingestion exposure estimates resulting from chemical releases to air, water, and land. E-FAST version 2.0 can be downloaded at no cost at http://www.epa.gov/oppt/exposure/pubs/efastdl.htm. Also available on the download page is the E-FAST Documentation Manual which has more detailed information on how to properly use the model and its four modules.

This chapter briefly describes each of the four modules, the input information needed (such as physical-chemical and environmental fate properties, and environmental release information), and the results obtained from each module. If measured data needed to run E-FAST are not available, these values can be estimated by other Sustainable Futures methods such as EPISuite™, ECOSAR, and ChemSTEER.

The E-FAST Opening Screen is shown to the right. E-FAST is designed to be easy to use. When you click on "Select a chemical ID and modify its physical-chemical and fate properties before continuing to any module" you will get a data entry screen (shown below) which allows you to enter data needed for each exposure route/module selected. The chemical data you enter will be available for
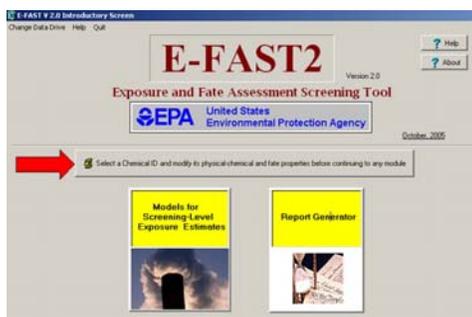
use by each module and is saved for later model runs.

E-FAST also provides on-screen guidance to help users with questions they may have while running the model. You can access the on-screen guidance by clicking on the "Help" button found on most data entry screens.

12.1 Aquatic Exposure

Industrial chemicals released to surface waters can affect the aquatic organisms living in the surface water. E-FAST provides an estimate of the Predicted Environmental Concentration (PEC) of an industrial chemical in the water column of the receiving water body. E-FAST also estimates Surface Water Concentration (SWC) resulting from the disposal of consumer products down-the-drain to surface waters.

12.2 Human Exposure

E-FAST estimates human exposures by ingestion and/or inhalation resulting from:
1. Releases of industrial chemicals to surface water via:
    a. Drinking contaminated water,
    b. Eating contaminated fish, or
    c. Drinking from a well contaminated by landfill leaching;
2. The use of consumer products, and
3. The disposal of consumer products.

The estimates of human exposure (in mg/kg-day) provided by E-FAST include:
- Potential Lifetime Average Daily Dose (LADDpot) for assessing human health *cancer* risk,
- Potential Average Daily Dose (ADDpot) for assessing *chronic* effects and estimated from the LADD value (described below), and
- Potential Acute Dose Rate (ADRpot) for assessing *acute* human health non-cancer risk.

Determining Average Daily Dose (ADD) from LADD
The Potential Average Daily Dose (ADDpot) is estimated from the Potential Lifetime Average Daily Dose (LADDpot) using the following equation:

LADD or ADD = (Exp x ED x EY)/(BW x AT x 365 days/yr)

Note that the Averaging Time (AT) is the only parameter that changes in the equation for LADD vs. ADD.
    LADD uses a 75 year cancer Averaging Time (equivalent to a human lifetime)
    ADD uses a 40 year non-cancer Averaging Time (equivalent to years spent in the workplace)
The ADD can be calculated from the LADD value by multiplying by 75/40 or 1.875.

12.3 Four Modules of E-FAST

This section gives a brief introduction to each of the four modules and describes the purpose of each module, information needed to run the module, and screen shots of the results provided by each module.

12.3.1 General Population and Ecological Exposure Module

The General Population and Ecological Exposure from Industrial Releases Module of E-FAST provides estimates of concentrations of industrial chemicals resulting from releases to surface water, air, and landfills. This module provides predicted surface water concentrations and human exposure doses. When combined with toxicity data these values can be used to determine if the chemical releases may pose risk to humans or the aquatic environment.

Information needed to run this module (right) includes:

- NPDES permit number or SIC Code* (once entered the data associated with that number or code is extracted from the searchable databases within module)
- Release activity (i.e. manufacturing, processing)
- Number of sites being assessed
- Release amounts and frequency for each media, estimated from ChemSTEER or measured
  - Surface water
  - Landfill
  - Ambient air - fugitive or via incineration
- Human exposure factors
  - Defaults available from EPA's Exposure Factors Handbook
- Bioconcentration Factor (BCF) From EPI
- Chronic Concentration of Concern (COC)
  - Derived from ECOSAR (lowest ChV/10)
  - User can input up to 3 Chronic COCs in E-FAST 2
- Removal amounts
  - By wastewater treatment (EPI)
  - By drinking water treatment
  - By incineration
- Groundwater migration potential
  - From Koc classification (EPI)

*The Standard Industrial Classification was replaced by the North American Industry Classification System (NAICS) in 1997, but E-FAST still uses SIC-based data. Both SIC and NAICS classify sites by their primary type of activity.

Surface Water Release Scenarios
- Release at a *specific* location
  - Based on National Pollutant Discharge Elimination System (NPDES) Permit Number
  - Uses a known facility location (referenced by NPDES) on a specific river, stream, lake, bay, or estuary
- Release to surface waters at an *unspecified* location
  - Based on 41 Standard Industrial Classification (SIC) Codes
  - Uses industry-specific stream flow statistics (for flow rate, dilution factors, etc)
- Searchable databases of NPDES numbers and SIC codes are included in the module

Surface Water Release Results

The Surface Water Release Results screen is shown below. Aquatic exposure results provided include:

- Predicted environmental concentration (PEC)
    - Provides aquatic concentrations for several stream low-flow assumptions
    - Uses a Probabilistic Dilution Model (PDM)
    - Assumes stream flows have lognormal distributions
- Number of days per year the PEC exceeds the COC

Human exposure results provided include:

- Cancer LADD, chronic ADD and ADR dose concentrations due to:
    - Ingestion from releases to surface waters
    - Ingestion from the presence of a chemical in fish

Sample Results for COC Exceedence

Sample Results for Drinking Water Exposure

Air Release Scenario

The Air Release Scenario provides estimates of:

- Fugitive release
    - Inhalation exposure when a substance is released to the air from such places as pipe connections, tanks and loading/unloading operations
- Incinerator stack release
    - Inhalation exposure downwind of a stack releasing to the atmosphere after incineration
- Human exposure results
    - Uses a Gaussian plume model
        - LADD and ADR dose concentrations due to:
    - Inhalation from releases due to fugitive and/or incinerator emissions
    - Results look similar to the previous outputs for drinking water exposure

Landfill Release Scenario

The scenario provides estimates resulting from chemicals deposited in landfills. Chemicals may leach through the soil to the groundwater. Human exposure may then occur by drinking from contaminated wells. Estimates include:

- Human exposure results
    - LADD dose concentration due to ingestion of groundwater contaminated by landfill leachate
    - Results look similar to the previous outputs for drinking water exposure

12.3.2 Down the Drain Module

Consumers often dispose of household products by pouring them down the drain. The chemicals may pass through wastewater treatment (WWT) to surface waters. The Down the Drain Module (right) provides:

- Aquatic environmental exposure
  - PEC
- Human exposure
  - Drinking water ingestion
  - Fish ingestion

Information needed to run the module includes:

- Production volume
- Exposure Duration (years of use)
  - Default is 57 years
- Chronic Concentration of Concern (COC)
  - Derived from ECOSAR (lowest ChV/10)
  - User can input up to 3 Chronic COCs in E-FAST 2
- BCF From EPISuite™
- Removal amounts by WWT From EPISuite™

Down the Drain Results

Results provided by the Down the Drain module include:

- Aquatic exposure
 - PEC and number of days per year the PEC exceeds the COC
- Human exposure
  - LADD, ADD and ADR dose concentrations due to:
    - Ingestion from releases to surface waters
    - Ingestion from the presence of a chemical in fish
- The relevant output screens are nearly identical to those in the General Population and Ecological Exposure module

12.3.3 Consumer Exposure Pathway Module

The Consumer Exposure Pathway module (shown to the left) predicts human exposure resulting from the use of consumer products. Predictions provided include:

- Inhalation and Dermal (Skin) Exposure Predictions
  - LADD, ADD and ADR dose concentrations
  - Pre-set scenarios defined by EPA
  - Option of user defined scenarios

Information needed to run this module includes:
- Use scenario
  - Pre-set scenario
    - Includes general purpose cleaner, laundry detergent, latex paint, etc.
  - User defined scenario
- Location of use
  - Defaults for the pre-set scenarios
- Molecular weight
- Weight fraction in the formulation
- Vapor pressure from EPISuite™
- Inhalation inputs (defaults or user entered)
  - Frequency of use per year
  - Duration and Amount of use per event
  - Number of years used
  - Human exposure factors
- Dermal inputs (defaults or user entered)
  - Frequency of use per year
  - Number of years used
  - Human exposure factors

Sample Results for Inhalation Exposure
The image to the right shows sample results for inhalation exposure provided by ChemSTEER. Results provided include:

- Potential Lifetime Average Daily Dose (LADDpot) for assessing human health *cancer* risk,
- Potential Average Daily Dose (ADDpot) for assessing *chronic* effects (estimated from the LADD value), and
- Potential Acute Dose Rate (ADRpot) for assessing *acute* human health non-cancer risk.

12.3.4 Probabilistic Dilution Model (PDM) Module

The Probabilistic Dilution Model (PDM) module (left) predicts downstream chemical concentrations resulting from discharge of an industrial chemical. PDM calculates the probability that Concentration of Concern will be exceeded, and the number of days per year the exceedence condition will likely occur. PDM analyses can be performed on stream reaches with measured flow data (i.e., from U.S. Geological Survey gaging stations) or stream reaches with only estimated flow values.

PDM uses a mass balance approach to calculate stream concentrations. It also uses probability distributions as inputs to calculate the resulting probability distribution of the concentration in the stream. PDM has two options available for performing analyses, depending on the extent of data available. The first option addresses site-specific cases and requires NPDES number and Facility name. The second option, SIC-Code-based evaluation, models releases for an unspecified facility in an industrial category.

12.4 Running E-FAST on the Sample Chemical Isodecyl acrylate

Open E-FAST and click on "Select a chemical ID and modify its physical-chemical and fate properties before continuing to any module". When you get the data entry screen (shown below) you to enter the Chemical ID (iso example) then select the Modules you will run. The information needed to run each of the modules is listed previously in this chapter under each specific module.

Click on Surface Water and the data entry screen needed for that module pops up. Enter Chemical Name (iso ex 1); Unselect "No BCF Available" and enter Bioconcentration Factor (44); Wastewater Treatment Removal (90%).

Next click on Ambient Air Module, and enter Stack Air Emissions Removal rate of 90%. After you enter the data needed for each module desired, click on Select this Chemical ID and you will go back to the beginning screen in E-FAST.
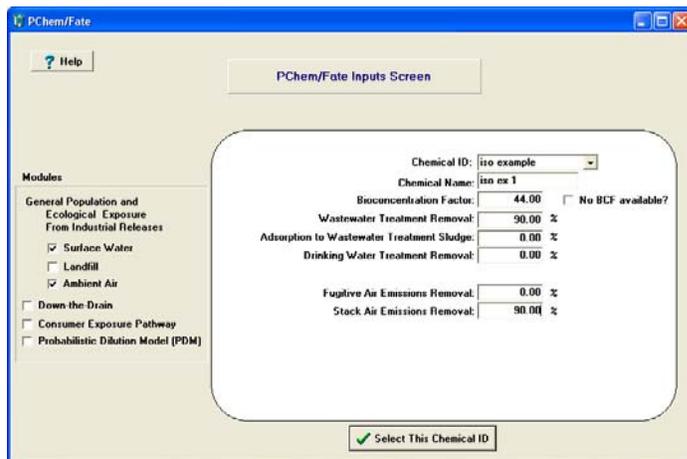
On that screen click on "Models for Screening-Level Exposure Estimates" (shown below) to begin running the desired modules.
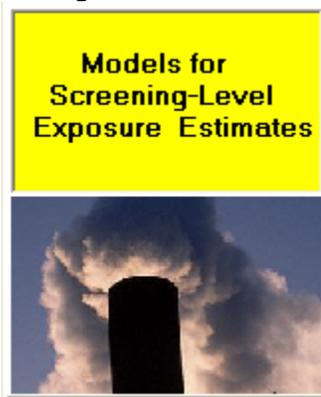
The page showing the four modules pops up (notice that the chemical ID you had already entered is displayed"). On this page you can select the document format you wish to use for saving the E-FAST report. WordPerfect is the default and if you want the report in MS Word you should select that format on this page. Now click on "General Population and Ecological Exposure from Industrial Releases"

You are taken to the Release Info Page (shown below) where you enter General Release Information for **Release #1**. Click on the types of expected releases (Surface Water and Ambient Air) and those data entry screens pop up. Click on the Surface Water tab to enter amount of release in kg/site/day predicted by ChemSTEER (11.20 kg/site/day for 1 day per year), enter SIC Code analysis (select SIC Adhesives and Sealants Manufacture), and enter the chronic Concentration of Concern from ECOSAR.

Then click on the Ambient Air release tab and enter the fugitive releases (9.70E-04 over 9 days per year) predicted by ChemSTEER. Click on Calculate Air Concentration and the module will calculate the Fugitive releases using use EPA's SCREEN3 Model to predict the downwind exposure concentrations. Click on "Submit to SCREEN#3 Model" and then "Return to E-FAST2" to get back to the screen below.

After you have entered the information for Release #1, click on "Next Release Activity" to go to **Release #2**.

Click on release activities completed to go to the exposure factors page. The defaults are not changed unless your scenario requires they be changed, for example if the population of concern is children instead of adult males.

Release Info Page	**Exposure Factors**	

Exposure Factors   ? Help

Chemical ID:	iso example	
Body weight:	71.80	kg
Exposure duration (cancer):	30.00	years
Averaging time (cancer):	75.00	years
Drinking water ingestion (chronic):	1.40	L/day
Drinking water ingestion (acute):	6.00	L/day
Fish ingestion (chronic):	6.00	g/day
Fish ingestion (acute):	129.00	g/day
Inhalation rate*:	0.55	m3/hr

* 24 hour/day exposure period is assumed

▦ Calculate, save results, and display results pages

Click on "Calculate, save results, and display results pages"

Environmental Releases | SIC Code | Inhalation | PDM SIC Code

Chem ID/Rel #
iso example,1
iso example,2

Environmental Release Results   ? Help

Remarks

Release Activity: [ ]   Number of Sites: [1]

Release Values

	Surface Water	Landfill	Stack	Fugitive
Total Releases:	11.20	N/A	0.00	8.73E-03
(before treatment)	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)
Release days/yr:	1.00	0.00/0.00	0.00	9.00
(before treatment)		Non-Sludge/Sludge		
Per site release	11.20	N/A	0.00	9.70E-04
	(kg/site/day)	(kg/site/day)	(kg/site/day)	(kg/site/day)

Print Page

Click on SIC Code tab, then click on the subtab named "General SIC Code Information" to get the surface water estimates. EPA New Chemicals uses the 10th percentile 7Q10 value.

Environmental Releases	SIC Code	Inhalation	PDM SIC Code

Sic Code Based Human and Aquatic Exposures to Surface Water Releases [? Help] [Print Page]

Chem ID/Rel #
iso example,1

Release Activity: [   ]   Exposed Population: [Adult]
SIC Code Description: [Adhesives and Sealants Manufacture]
SIC Codes: [2891]
WWT Removal: [90] %   Pre-treatment Release: [11.2] kg/site/day
Release Days: [1]   Post-treatment Release: [1.12] kg/site/day
Bioconcentration Factor: [44] L/kg   Drinking Water Treatment: [0.00] %

General SIC Code Information	Drinking Water Information	Fish Ingestion Information

Aquatic Exposure Estimates - Surface Water

Flow descriptor	Harmonic Mean	30Q5	7Q10	1Q10
50 %ile				
Flow (MLD)	226.89	125.13	79.03	65.02
Concentration (ug/L)	4.94	8.95	14.17	17.23
10 %ile				
Flow (MLD)	66.08	13.33	7.78	6.51
Concentration (ug/L)	16.95	84.02	143.96	172.04

SIC Code Comments: [   ]

On that same SIC Code tab click on the sub tab named Drinking Water Information

General SIC Code Information	Drinking Water Information	Fish Ingestion Information

Drinking Water Exposure Estimates

Exposure Types	50%ile Res.	10%ile Res.	ED (yrs)	AT (yrs)	BW (kg)	IRdw (L/day)
		Cancer				
LADDpot (mg/kg/day)	1.05E-07	3.62E-07	30.00	75.00	71.80	1.40
LADCpot (mg/L)	5.41E-06	1.86E-05	30.00	75.00	NA	NA
		Acute				
ADRpot (mg/kg/day)	7.48E-04	7.02E-03	NA	1 day	71.80	6.00

Then click on the Fish Ingestion subtab

| General SIC Code Information | Drinking Water Information | Fish Ingestion Information |

Fish Ingestion Exposure Estimates

Exposure Types	50%ile Res.	10%ile Res.	ED (yrs)	AT (yrs)	BW (kg)	IRfish (g/day)
		Cancer				
LADDpot (mg/kg/day)	1.99E-08	6.83E-08	30.00	75.00	71.80	6.00
LADCpot (mg/kg)	2.38E-04	8.17E-04	30.00	75.00	NA	NA
		Acute				
ADRpot (mg/kg/day)	3.90E-04	1.34E-03	NA	1 day	71.80	129.00

Next go to the Inhalation tab and the Fugitive Inhalation Exposure Estimates subtab

| Environmental Releases | SIC Code | Inhalation | PDM SIC Code |

Inhalation Exposure Estimates (Combined Fugitive and Stack)

? Help

Release Activity:
Exposed Population: Adult
Number of Sites: 1

Per Site Fugitive Release: 9.70E-04 kg/site/day
Release Days (Fugitive): 9.00
Per Site Stack Release: NA kg/site/day
Release Days (Stack): NA

Chem ID/Rel #
iso example,1
iso example,2

Print Page

| Inhalation Exposure Estimates | Release Information | Meterological/Terrain and Downwash Information | Screen3 Model Results |

| Fugitive Inhalation Exposure Estimates | Stack Inhalation Exposure Estimates |

Fugitive Inhalation Exposure Estimates

Exposure Types	Results	ED (yrs)	AT (yrs)	BW (kg)	IR (m3/hr)
		Cancer			
LADDpot (mg/kg/day)	1.92E-08	30.00	75.00	71.80	0.55
LADCpot (mg/m3)	1.04E-07	30.00	75.00	NA	NA
		Acute			
ADRpot (mg/kg/day)	2.43E-05	NA	1 day	71.80	0.55

Inhalation Comments:

With the same Fugitive Inhalation Exposure Estimates subtab selected, click on "iso example, 2" under Chemical ID/Rel # to go to the estimates for Release#2

| Environmental Releases | SIC Code | Inhalation | PDM SIC Code |

Inhalation Exposure Estimates (Combined Fugitive and Stack)

? Help

Release Activity:		Per Site Fugitive Release:	3.30E-03 kg/site/day
Exposed Population:	Adult	Release Days (Fugitive):	1.00
Number of Sites:	1	Per Site Stack Release:	NA kg/site/day
		Release Days (Stack):	NA

Chem ID/Rel #
iso example,1
iso example,2

Print Page

| Inhalation Exposure Estimates | Release Information | Meterological/Terrain and Downwash Information | Screen3 Model Results |

| Fugitive Inhalation Exposure Estimates | Stack Inhalation Exposure Estimates |

Fugitive Inhalation Exposure Estimates

Exposure Types	Results	ED (yrs)	AT (yrs)	BW (kg)	IR (m3/hr)
Cancer					
LADDpot (mg/kg/day)	7.27E-09	30.00	75.00	71.80	0.55
LADCpot (mg/m3)	3.95E-08	30.00	75.00	NA	NA
Acute					
ADRpot (mg/kg/day)	8.29E-05	NA	1 day	71.80	0.55

Inhalation Comments:

Click on PDM SIC Code tab to get the number of days the COC is exceeded

| Environmental Releases | SIC Code | Inhalation | PDM SIC Code |

PDM SIC Code Results   ? Help

Release Activity:		
SIC Code Description:	Adhesives and Sealants Manufacture	
SIC Codes:	2891	
WWT Removal:	90.00 %	Pretreatment Release:	11.20 kg/site/day
Release Days:	1 days/year	Post-treatment Release:	1.12 kg/site/day
Concentration of Concern:	1.00 ug/L	

Chem ID/Rel #
iso example,1

○ High-end scenario
○ Average case scenario

PDM SIC Code Estimates   Print Page

Run #1

COC (ug/L):	1.00
#Days exceeded:	1
% Year exceeded:	0

To get the report that E-FAST has been generating while you entered data go to the Results folder within EFAST2 on your PC (shown in the image at the right).
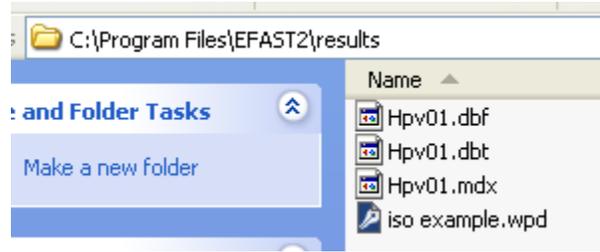
Notice that the default format for E-FAST reports is WordPerfect but you can change to Microsoft® Word v.97 and higher as your format on the E-FAST screen shown on page 12-9 of this chapter. Click on "Select Document Report Format shown below.

12.4.1 E-FAST Results Pages

E-FAST results pages are included here. E-FAST saves results as tables in Microsoft® Word format.

INITIAL REVIEW EXPOSURE REPORT

Chemical ID: iso example Assessor:

ENVIRONMENTAL RELEASES			

Scenario#:   1   Number of Release Sites: 1

Release Activity:

Release Description:	WATER	LANDFILL	STACK	FUGITIVE
Total Releases:	11.20	N/A	0.00	8.73E-03
	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)

Non-sludge/Sludge

Release Days/yr:	1.00	0.00/1.00	0.00	9.00
Per Site Release:	11.20	N/A/0.00	0.00	9.70E-04
	(kg/site/day)	(kg/site/day)	(kg/site/day)	(kg/site/day)

Remarks:

INITIAL REVIEW EXPOSURE REPORT
CASE NUMBER: iso example

SIC-CODE BASED HUMAN AND AQUATIC EXPOSURES TO SURFACE WATER RELEASES

SCENARIO #:1   NUMBER OF SITES: 1   RELEASE ACTIVITY:

SIC-CODE DESCRIPTION: Adhesives and Sealants Manufacture

SIC-CODE (S):2891   EXPOSED POPULATION: Adult

WASTE WATER TREATMENT REMOVAL (%)	RELEASE DAYS	PRETREATMENT RELEASE (kg/day)	POST-TREATMENT RELEASE (kg/day)	DWT %	BCF (L/kg)
90.00	1	11.20	1.12	0.00	44.00

AQUATIC EXPOSURE ESTIMATES - SURFACE WATER									
PLANT TYPE	% ILE FACILITY	STREAM FLOW (MLD)				STREAM CONC. (ug/L)			
		Harmonic Mean	30Q5	7Q10	1Q10	Harmonic Mean	30Q5	7Q10	1Q10
ALL	50	226.89	125.13	79.03	65.02	4.94	8.95	14.17	17.23
ALL	10	66.08	13.33	7.78	6.51	16.95	84.02	143.96	172.04

DRINKING WATER AND FISH INGESTION EXPOSURE ESTIMATES						
Exposure Units	Drinking Water Results		Drinking Water Units	Fish Ingestion Results		Fish Ingestion Units
	50%	10%		50%	10%	
Cancer						
$LADD_{pot}$	1.05E-07	3.62E-07	mg/kg/day	1.99E-08	6.83E-08	mg/kg/day
$LADC_{pot}$	5.41E-06	1.86E-05	mg/L	2.38E-04	8.17E-04	mg/kg
Acute						
ADR_{pot}	7.48E-04	7.02E-03	mg/kg/day	3.90E-04	1.34E-03	mg/kg/day

SIC Code Comments:

INITIAL REVIEW EXPOSURE REPORT

CHEMICAL ID: iso example

SIC CODE EXPOSURES TO SURFACE WATER RELEASES

SCENARIO #: 1   RELEASE ACTIVITY:

SIC CODE DESCRIPTION: Adhesives and Sealants Manufacture

ASSOCIATED SIC CODES: 2891

SIC CODE RESULTS						
COC (µg/L)	Percent of Year COC Exceeded	Number of Days COC Exceeded	Release days/year	Loading (kg/site/day)	Waste Water Treatment (%)	High/Avg Analysis
1.00	0	1	1	11.20	90.00	High

INITIAL REVIEW EXPOSURE REPORT

CHEMICAL ID:iso example

INHALATION EXPOSURE ESTIMATES (POST-TREATMENT)

SCENARIO #:1   RELEASE ACTIVITY:

RELEASE DESCRIPTION:

METHOD OF CALCULATION:Screen3

EXPOSED POPULATION: Adult

Number of Sites:	1	
Per Site Fugitive Release:	9.70E-04	kg/site/day
Fugitive Release Days per Year:	9.00	days
% Removal via Fugitive Release:	0.00	%
Total Fugitive Release:	8.73E-03	kg/yr
Max Annual Average Air Concentration (Fugitive):	2.61E-04	$\mu g/m^3$
Max 24 Hour Average Air Concentration (Fugitive):	0.13	$\mu g/m^3$
Per Site Stack Release:	NA	kg/site/day
Stack Release Days per Year:	NA	days
% Removal via Stack Release:	99.90	%
Total Stack Release:	NA	kg/yr
Max Annual Average Air Concentration (Stack):	0.00	$\mu g/m^3$
Max 24 Hour Average Air Concentration (Stack):	0.00	$\mu g/m^3$

Exposure Units	Results (Stack)	Results (Fugitive)	ASSUMPTIONS			
			ED (years)	AT (years)	BW (kg)	Inh. Rate (m^3/hr)
Cancer						
$LADD_{pot}$ (mg/kg/day)	0.00	1.92E-08	30.00	75.00	71.80	0.55
$LADC_{pot}$ (mg/m^3)	0.00	1.04E-07	30.00	75.00	NA	NA
Acute						
ADR_{pot} (mg/kg/day)	0.00	2.43E-05	NA	1 day	71.80	0.55

Inhalation Comments:

Stack Parameter Data   Fugitive Parameter Data

Stack Height	10.00	Release Height:	3.00	m
Inside Stack Diameter:	0.10	Length of Release Opening:	10.00	m
Stack Gas Exit Velocity:	0.10	Width of Release Opening:	10.00	m
Stack Gas Temperature:	293.00			

Meteorological and Terrain Information:

Surrounding Land Use:	Rural	
Terrain Height:	0.00	m
Distance to Residence of Interest:	100.00	m
Meteorological Class:	Full	
Stability Class:	NA	
Wind Speed:	NA	

Downwash Information:

Facility Length:	NA	m
Facility Width:	NA	m
Facility Height:	NA	m

INITIAL REVIEW EXPOSURE REPORT

Chemical ID: iso example Assessor:

ENVIRONMENTAL RELEASES

Scenario#:   2   Number of Release Sites: 1

Release Activity:

Release Description:	WATER	LANDFILL	STACK	FUGITIVE
Total Releases:	0.00	N/A	0.00	3.30E-03
	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)

Non-sludge/Sludge

	WATER	LANDFILL	STACK	FUGITIVE
Release Days/yr:	0.00	0.00/0.00	0.00	1.00
Per Site Release:	0.00	N/A/0.00	0.00	3.30E-03
	(kg/site/day)	(kg/site/day)	(kg/site/day)	(kg/site/day)

Remarks:

INITIAL REVIEW EXPOSURE REPORT
CHEMICAL ID: iso example

INHALATION EXPOSURE ESTIMATES (POST-TREATMENT)

SCENARIO #:2   RELEASE ACTIVITY:

RELEASE DESCRIPTION:

METHOD OF CALCULATION:Screen3

EXPOSED POPULATION: Adult

Number of Sites:	1	
Per Site Fugitive Release:	3.30E-03	kg/site/day
Fugitive Release Days per Year:	1.00	days
% Removal via Fugitive Release:	0.00	%
Total Fugitive Release:	3.30E-03	kg/yr
Max Annual Average Air Concentration (Fugitive):	9.88E-05	$\mu g/m^3$
Max 24 Hour Average Air Concentration (Fugitive):	0.45	$\mu g/m^3$
Per Site Stack Release:	NA	kg/site/day
Stack Release Days per Year:	NA	days
% Removal via Stack Release:	99.90	%
Total Stack Release:	NA	kg/yr
Max Annual Average Air Concentration (Stack):	0.00	$\mu g/m^3$
Max 24 Hour Average Air Concentration (Stack):	0.00	$\mu g/m^3$

Exposure Units	Results (Stack)	Results (Fugitive)	ASSUMPTIONS			
			ED (years)	AT (years)	BW (kg)	Inh. Rate (m^3/hr)
Cancer						
$LADD_{pot}$ (mg/kg/day)	0.00	7.27E-09	30.00	75.00	71.80	0.55
$LADC_{pot}$ (mg/m^3)	0.00	3.95E-08	30.00	75.00	NA	NA
Acute						
ADR_{pot} (mg/kg/day)	0.00	8.29E-05	NA	1 day	71.80	0.55

Inhalation Comments:

Stack Parameter Data   Fugitive Parameter Data

Stack Height	10.00	Release Height:	3.00	m
Inside Stack Diameter:	0.10	Length of Release Opening:	10.00	m
Stack Gas Exit Velocity:	0.10	Width of Release Opening:	10.00	m
Stack Gas Temperature:	293.00			

Meteorological and Terrain Information:

Surrounding Land Use:	Rural	
Terrain Height:	0.00	m
Distance to Residence of Interest:	100.00	m
Meteorological Class:	Full	
Stability Class:	NA	
Wind Speed:	NA	

Downwash Information:

Facility Length:	NA	m
Facility Width:	NA	m
Facility Height:	NA	m

12.4.2 Entering E-FAST Results into the SF Summary Assessment Worksheet

You enter the following E-FAST aquatic and human exposure predictions into the EXPOSURE MODELS section of the worksheet.

GENERAL POPULATION EXPOSURE VALUES: E-FAST			
Aquatic Exposure:			
Lowest Acute COC – Aquatic Exposure			20 /µg/L (green algae acute/4, rounded to 1 sig. digit)
Lowest Chronic COC – Aquatic Exposure			1 µg/L (fish chronic value/10, rounded to 1 sig. digit)
Predicted Environmental Concentration (PEC)			84 µg/L (ppb)
PEC Exceeds Chronic COC (days / year)			1 day
Human Exposure:			
	Cancer LADDpot	**Chronic ADDpot**	**Acute ADRpot**
Drinking Water	3.62×10^{-7} mg/kg-day	6.79×10^{-7} mg/kg-day	7.02×10^{-5} mg/kg-day
Fish Ingestion	6.83×10^{-8} mg/kg-day	1.28×10^{-7} mg/kg-day	1.34×10^{-5} mg/kg-day
Fugitive Emissions [drumming]	1.92×10^{-8} mg/kg-day	3.6×10^{-8} mg/kg-day	2.43×10^{-5} mg/kg-day
Fugitive Emissions [reactor cleaning]	7.27×10^{-9} mg/kg-day	1.36×10^{-8} mg/kg-day	8.29×10^{-5} mg/kg-day
Incineration Emissions			
Landfill Leaching			
Dermal – Consumer Use			
Inhalation – Consumer Use			