モデル名称	E-FAST(Exposure and Fate Assessment Screening Tool)					
開発国	米国	開発機関 開発者				
入手方法 (URL•価格等)	<u>http://www.epa.gov/c</u>	oppt/exposure/pubs/	<u>efast.htm</u>			
モデルの 目的概要	環境(大気、水域、埋め立て スクリーニングレベルで推定す	こ)への排出及び消費者製 するツール。吸入、経皮、៛	品からの排出による化学物質の環境中濃度を 経口曝露量を推定可能。			

## 操作手順

1.EFAST プログラムのアイコンをクリックして実行する。



3.「Chemical ID」タブから ID を選択し、パラメーターを入力した後、「Select This Chemical ID」

をクリックする。

] PChem/Fate		~	
Y Help	PChem/Fate Inputs Screen		
	Chemical ID:	tmpcas	
Modules	Chemical Name:	metane	
General Population and	Bioconcentration Factor:	No BCF	☑ No BCF available?
Ecological Exposure	Wastewater Treatment Removal:	9.00	%
From Industrial Releases	Adsorption to Wastewater Treatment Sludge:	9.00	%
Surface Water	Drinking Water Treatment Removal:	9.00	%
🔽 Landfill	Groundwater Migration Descriptor:	Slow	-
Ambient Air	Fugitive Air Emissions Removal:	9.00	*
🗸 Down-the-Drain	Stack Air Emissions Bemoval:	9.00	*
✓ Consumer Exposure Pathway	Consumer Product Weight Fraction (central tendency):	1.00	
Probabilistic Dilution Model (PDM)	Consumer Product Weight Fraction (high end):	1.00	
	Molecular Weight:	2.00	q/mole
	Vapor Pressure:	100.00	torr (mm Hg) 🔻
	Select This Chemical	ID	

4.最初の画面に戻ったら「Models for Screening-Level Exposure Estimates」タブをクリックする。



・4つ(「General Population and Ecological Exposure from Industrial Releases」、「Down The Drain」、 「Consumer Exposure Pathway」、「Probabilistic Dilution Model(PDM)」)のモジュールから一つ選 択が出来る。

4-1. 4つのモジュールで「General Population and Ecological Exposure from Industrial Releases」 タブをクリックした場合。

🔋 Screening Level Inputs		
Release Info Page		
General Release Info Select ar	n SIC Code	
Chem ID/Rel # tmpcas,1	Select the types of releases (surface water, landfill, ambient air). Next, input the amount of release and number of days/year of release. For surface water, you must also select a facility or SIC code and concentrations of concern if required. For ambient air, you must calculate air concentrations before continuing if selected.	Help
	Surface water 🔽 Landfill 🔽 Ambient air	ן (
👘 Delete selected run	Surface Water Landfill Ambient Air	
Enter Release Activity Below: # Sites 1 + (# sites with identical releases)	□ No dose calculations required       SW Common         Release       9.00       kg/site/day       Days per year of Release:       9         Choose facility or SIC code analysis:       ○       Facility       NPDES #, name:       ○         ③ SIC Code       Description:       Leather Tanning, Finishing	ent days/yr
© Next Release Activity General Remarks	☐ Include PDM run	
	✓ Release activities completed? Continue to Exposure Factors page	

・放出のタイプ(Surface Water, Landfill, Ambient air)を選択できる。

4-1-1.「Surface Water」タブでは「Facility」と「SIC Code」の中で一つをクリックする。

4-1-1-1. 「Facility」をクリックした場合、施設の名前などの入力から選択が出来る。

🚦 Screening Level Inputs			
Release Info Page			
General Release Info Select a facility			
Rel	ease Information - Facility Selection	Screen	? Help
Locate facilities where this field Fac	ility name 🔹 has the following su	bstring: SCHOOL	_
<ul> <li>Search by state NPDES</li> <li>Search by region two letters</li> </ul>	entries in this model must use the following er state abbreviation followed by seven digit	format: ts.	
Area of initial search	Perform search for facilities		
All states 🗾			
	Double click the desired facility	Note: This is an a	octive facility.
NPDES FACILITY NAME	LOCATION	REACH	REACH NAME
W10035866 SCHOOL DISTRICT C	IF SUPERIO SUPERIOR WI	04010301013	NEMADJI R
			>
🗍 Search I	or endangered species in the vicinity of this	e facility	

4-1-1-2.「SIC Code」をクリックした場合、記述された項目の中から選択が出来る。



4-1-2.「Landfill」タブでは「Non-sludge」と「Sludge」の入力ができる。

🔋 Screening Level Inputs		
Release Info Page		
General Release Info Select an	SIC Code	
Chem ID/Rel # tmpcas,1	Select the types of releases (surface water, landfill, ambient air). Next, input the amount of release and number of days/year of release. For surface water, you must also select a facility or SIC code and concentrations of concern if required. For ambient air, you must calculate air concentrations before continuing if selected.	
	🔽 Surface water 🔽 Landfill 🔽 Ambient air	
🚡 Delete selected run	Surface Water Landfill Ambient Air	
Enter Release Activity Below:		
	□ No dose calculations required Landfill Comment	
# Sites 1 🔹	Non-sludge: 0.00 kg/site/day 0 days/yr	
(# sites with identical releases)	Sludge: 0.81 kg/site/day 9 days/yr	
©⇒ Next Release Activity General Remarks		
	✓ Release activities completed? Continue to Exposure Factors page	

4-1-3.「Ambient Air」タブでは「Stack Releases」と「Fugitive Releases」の入力ができる。なお「Max annual avg air concentration」と「Max 24 hr avg air concentration」を入力するためには「Calculate Air Concentration」をクリックする。

E=FAST2 Downwind Concentration Predictor	
E-FAST2 will use EPA's SCREEN3 Model to predict the downwind exposure concentration to your chemical. Chemical ID Impost	
Stack Release     23     kg/site/day     23     days/yr     % removal via stack release     9	
Fugitive Releases 23 kg/site/day 23 days/yr % removal via fugitive 9	
Release Information     Meteorological and Terrain Information       Ambient Temperature     293       K     •	
Stack Parameter Data           Stack Height         10         Image: The second sec	
Inside Stack Diameter 0.1 m v Length of Release Opening: 10 m v Part 10 m v Pa	
Stack Gas Exit Velocity 0.1 m/sec v Width of Release Opening: 10 m v	
Stack Gas Temperature 293 K 💌	
Results     Stack     Fugitive       Max annual avg concentration:     1.76E-03     1.44E-02     mg/m3       Max 24 hour avg concentration:     0.14     2.86     mg/m3	

·条件を入力した後、「Submit to SCREEN3 Model」タブをクリックすると「Max annual avg air

concentration」と「Max 24 hr avg air concentration」の数値が算出される。「Return to E-FAST2」 をクリックして前の画面に戻る。

4-1-4.	Release	activities	completed?	Continue to	Exposure	Factors	page」	タフ	「をク	IJ	ック	1 す	る。
--------	---------	------------	------------	-------------	----------	---------	-------	----	-----	----	----	-----	----

🔋 Screening Level Inputs			
Release Info Page Exposure Factors			
Exposur	e Factors		<b>?</b> Help
Chemical ID: tmpcas			
Body weight:	71.80 k	kg	
Exposure duration (cancer):	30.00 y	years	
Averaging time (cancer):	75.00 y	years	
Drinking water ingestion (chronic):	1.40 L	L/day	
Drinking water ingestion (acute):	6.00 L	L/day	
Fish ingestion (chronic):	6.00 g	g/day	
Fish ingestion (acute):	129.00 g	g/day	
Inhalation rate*:	0.55 m	m3/hr	
* 24 hour/day exposure Calculate, save results, and display results pages	period is assume	ed	

4-1-5.パラメーターを入力した後、「Calculate, save results, and display results pages」タブをクリ ックする。

4-1-6.「Environmental Releases」、「SIC Code」、「Rivers」「Landfill」などの結果が算出される。

Environmental Releases   SIC Code   Landfill	Close
Chem ID/Rel #       Impcas.1       Environmental Release Results	,
Remarks	
Release Activity: Number of Sites: 1	
Release Values	
Surface Water Landfill Stack Fugitive Total Releases: 81.00 7.29 529.00 529.00	
(before treatment) (kg/yr) (kg/yr) (kg/yr)	
Release days/yr: 9.00 0.00/9.00 23.00 23.00	
(before treatment) Non-Sludge/Sludge	
Per site release 9.00 0.00/0.81 23.00 23.00	
(kg/site/day) (kg/site/day) (kg/site/day)	
Print Pac	e

・入力した条件によって結果のタブは変わる。

4-2.4 つのモジュールで「Down The Drain」タブをクリックした場合。

Disposal Model
isposal Inputs Consumer Disposal Inputs ? Help
Chemical ID: Impcas Production Volume: 0.00 kg/year Exposure Duration: 0.00 years PDM Option © Run PDM (SIC Code Analysis) © Do NOT run PDM (SIC Code Analysis)
Run the Disposal Model

4-2-1.パラメーターを入力した後、「Run the Disposal Model」をクリックすると結果が算出される。

🚺 Disposal Model							
Disposal Inputs Disposal F	esults						
		Disp	osal Results			7 Hel	
		_					
Production Volume:	23.0	0 kg/year	Ехро	sed Population:	Adult		
WWT Removal:	9.0	0 %	Pretre	atment release:	2.	17E-07 g/perso	on/day
Release days:	365.0	0 days	Post-tre	atment release:	. 1.3	97E-07 g/perse	on/day
Bioconcentration Factor:	0.0	0 L/kg					
Drinking Water Information	Fish Ingestion In	formation Cor	ncentrations Exposure Estimate	25		F	Print Page
Exposure Type	50%ile Res.	10%ile Res.	ED (yrs)	AT (yrs)	BW (kg)	IR (L/day)	
		Cancer		75.00			
LADDpot (mg/kg/day)	2.94E-12	4.99E-11	3.00	75.00	71.80	1.40	
LADCpot (mg/L)	1.51E-10	2.56E-09	3.00	75.00	NA	NA	
		Acute		· · · · · · · · · · · · · · · · · · ·			
ADRpot (mg/kg/day)	1.07E-09	2.36E-08	NA	1 day	71.80	6.00	
	, ,						

4-3. 4 つのモジュールで「Consumer Exposure Pathway」タブをクリックした場合。

🚨 Consumer Ex	posure Module (CEM)	
<u>File</u> <u>R</u> un Model	Help	
	Introduction	
	Introduction Scenario Inhalation Input Day of Use Days After Use Dermal Input	
	Consumer Exposure Module (CEM)	
	CEM is an interactive model which calculates conservative estimates of potential inhalation and dermal exposure	
	to consumer products. Because the model incorporates upper percentile and mean input values for various exposure factors in the calculation of potential exposures / doses, the exposure / dose estimates are considered	
	to be 'high end ' to ' bounding ' estimates (Guidelines for Exposure Assessment, USEPA, 1992). The dermal portion of CEM uses a film: thickness approach, which assumes that exposure occurs from a thin layer of the	
	consumer product on a defined surface area, to determine potential exposure. Few data exist on the actual thickness of films of various products on human skin. Therefore, due to the uncertainty associated with the	
	amount of product forming a film on the skin, the dermal exposure estimates are considered less certain than those calculated in the inhalation portion of CEM.	
	Default exposure factor values have been extracted from U.S. EPA1s Exposure Factors Handbook (August 1997). This handbook can be obtained from the Agency by calling (513) 569-7562, or can be obtained at the	
	http://www.epa.gov/ORD/WebPubs/exposure web site.	
	Identification Number: Product:	
	Junitowi	
	Model Fun Comments (this entry allows the user to enter any tree flowing textual description about the model run.)	

4-3-1.「Scenario」タブをクリックし、パラメーターを選択する。



4-3-2.「Inhalation Input」タブをクリックし、数値を入力する。



4-3-3.「Day of Use」タブをクリックし、パラメーターから条件を設定する。

Day of Use D	)ata				
Introduction S	cenario Inhalation I	nput Day of Use	Days After Use Derr	nal Input	
Scenario: Fabric	Protector			_	
12:00 Midnigh	t 1. Bedroom	12:00 NOO!	1 2. Kitchen 🔽	Room of Use	
1:00 AM	1. Bedroom	▼ 1:00 PM	4. Living Room 🖉	1. Bedroom 💌	
2:00 AM	1. Bedroom	2:00 PM	6. Car 💌	Zone 1 Volume	
3:00 AM	1. Bedroom	3:00 PM	7. Out 💌	40 m3	
4:00 AM	1. Bedroom	▼ 4:00 PM	4. Living Room 👤		
5:00 AM	1. Bedroom	▼ 5:00 PM	2. Kitchen	369 m3	
6:00 AM	1. Bedroom	■ 6:00 PM	2. Kitchen 👤	]	
7:00 AM	2. Kitchen	▼ 7:00 PM	7. Out 💌	9:00am	
8:00 AM	3. Bathroom	▼ 8:00 PM	4. Living Room 💌	]	
9:00 AM	1. Bedroom	9:00 PM	4. Living Room 💌	Note: Except for the Solid	
10·00 AN	1 5 Utilitu Boom		4 Living Boom	user must be in the Room of Use for the selected	
11.00 44		11:00 PM		Duration of Use.	
TT:00 AN	1 4. Living Room	<b>11.00</b> PM	I. Bedroom	1	
Quick Assist	Note: Day of Use d	ata is only applicable	for the inhalation model.		

4-3-4.「Days After Use」タブをクリックし、パラメーターから条件を設定する。

umer Exposure Module (CE In Model Help	EM)						
<u></u>							
Da	y After Use Dat	a					
Intr	oduction Scenario	Inhalation Input	Day of Use	Days After Us	e Dermal Input		
S	cenario: Fabric Protec	tor					
	12:00 Midnight	1. Bedroom	•	12:00 NOON	2. Kitchen	-	
	1:00 AM	1. Bedroom	•	1:00 PM	4. Living Room	•	
	2:00 AM	1. Bedroom	•	2:00 PM	7. Out	•	
	3:00 AM	1. Bedroom	•	3:00 PM	7. Out	•	
	4:00 AM	1. Bedroom	-	4:00 PM	4. Living Room	•	
	5:00 AM	1. Bedroom	•	5:00 PM	2. Kitchen	•	
	6:00 AM	1. Bedroom	-	6:00 PM	2. Kitchen	•	
	7:00 AM	1. Bedroom	•	7:00 PM	7. Out	•	
	8:00 AM	3. Bathroom	•	8:00 PM	4. Living Room	•	
	9:00 AM	2. Kitchen	-	9:00 PM	4. Living Room	•	
	10:00 AM	4. Living Room	-	10:00 PM	4. Living Room	•	
	11:00 AM	4 Living Boom	-	11:00 PM	1 Bedroom	-	
		H. Elving Hoom			Tr. Dedroom		
Qu	ick Assist Note:	Day After Use data is	only applica	ble for the inhala	tion model.		

4-3-5.「Run Model」の「Submit Date」タブをクリックすると結果が算出される。

🔒 Consumer I	xposure Module (CEM)		
<u>F</u> ile <u>R</u> un Model	Help		
	Inputs Outputs - Inhalation	<u>eturn to Input Scree</u>	
	ID Num: tmpcas	CBM Inputs	
	Product: unknown	Chemical Name: metane	
	Scenario: Fabric Protector	Population: Adult	
	Molecular Weight (g/mole) Consumer Product Weight Fraction - Central Tendency	2 VP (torr) 100 1 Consumer Product Weight Fraction - High-End 1	
	Inhalation Inputs		
	Frequency of Use (chronic) (events/yr)	3 Exposure Duration (chronic) (years) 57	
	Mass of Product Used - Central Tendency (g)	80 Mass of Product Used - High-End (g) 369	
	Inhalation Rate During Use (m3/hr)	1.1 Inhalation Rate After Use (m3/hr) 0.55	
	Zone 1 Volume (m3)	40 Whole House Volume (m3) 369	
	Duration of Event - Central Tendency (hrs/ev	) 0.1667 Duration of Event - High-End (hrs/ev) 0.5	
	Air Exchange Rate (air xongs/hr) Portion of Aerosol in Air (unitless)	0.45 Body Weight (kg) 71.8 0.01	
	Activity Patterns		
	User: 111111123154246	7 4 2 2 7 4 4 4 1 Start Time: 9	
	Non-User: 111111113244247	7 4 2 2 7 4 4 4 1 Room of Use: 1. Bedroom	
	Hour: U 6 12 Dermal Inputs	18	
	There are no Dermal inputs for this scenario		
	Averaging Time (chronic) Averaging Time (acute)	2.74e+04 days 1.00e+00 days	

## 4-4. 4つのモジュールで「Probabilistic Dilution Model(PDM)」タブをクリックした場合。

🧊 Screening Level Resu	lts							
						C	Close	
PDM Site PDM SIC Code	1					_		
		PDM Site-S	necific Page		Help			
Release Number:		Note: this is an active site.						
tmpcas,1 💌	NPDES Number: W10	035866 <fi< td=""><td>nd Entered NPDES</td><td>Select a NPDE</td><td>S W10035866</td><td></td><td><b>-</b></td><td></td></fi<>	nd Entered NPDES	Select a NPDE	S W10035866		<b>-</b>	
	Release Activity:			Discharge Type	: Direct			
New Release Number	Facility Name: SCH	OOL DISTRICT	OF SUPERIOR	WWT Remova	l:	9.00 %	6	
	Facility Location: SUP	ERIOR WI	1	Release Days	s:	9.00 d	lays/yr	
付 Clear Page	Reach Number: 040	10301013	Concent	tration of Concerr	r:	0.00 u	ıg/L	
	Reach Name: NEM	EMADJI R Pretreatment Relea			: 9.00 kg		.g/site/d	iay
	Facility on Reach? O Y	'es 🖲 No 🔿 L	nk. Post-l	reatment Release		8.19 k	.g/site/d	ay
Carias Chatias	Gaging Station ID: U402	24430 💌	<b>`</b>	dean Stream Flow	r: 3	42.44 M	ALD ALD	
Gaging Station	reriod of Record: 1172	2773 - 0372378: 5792		Low Stream Flow	. 10	32.00 M		
		5152		Lindent Flot				
Submit.		PDM Site	-Specific Estimates	🤄 🙀 Clear	r Results Table	Print	Page	
COC Percent	of Year COC Exceeded	l Number of Da	ays COC Exceeded	Release Days	Pretreat Load	WWT		
(ug/L)	(%)	(Daj	rs)	(Days)	(kg/site/day)	(%)	<u>^</u>	
							~	
· · · · · · · · · · · · · · · · · · ·		!						

4-4-1.「PDM Site」タブではパラメーターの入力後、「Submit」をクリックすると、結果が算出 される。

🔋 Screening Level Results					
				Close	
PDM Site PDM SIC Code					
	PDM Site-Specific	Page	Help		
Release Number:		, ago	Note: this is an ac	tive site.	
tmpcas,1	WI0035866 <find ente<="" td=""><td>red NPDES Select a NI</td><td>PDES W10035866</td><td>•</td><td></td></find>	red NPDES Select a NI	PDES W10035866	•	
Release Activity		Discharge	Гуре: Direct		
New Release Number Facility Name	SCHOOL DISTRICT OF SUF	ERIOR WWT Rem	oval:	<mark>9.00</mark> %	
Facility Location	SUPERIOR WI	Release	Days:	9.00 days/yr	
Keach Number	04010301013	Concentration of Con	cern: 2	3.00 ug/L	
Reach Name	NEMADJI R	MADJI R Pretreatment Release:			'day
Facility on Reach	P ∩ Yes ⊙ No ∩ Unk.	Post-treatment Rel	ease:	8.19 kg/site/	'day
Gaging Station ID		Mean Stream	Flow: 34	2.44 MLD	
Gaging Station Period of Record:	F202	Low Stream	Flow: 13		
daging Station Number of Observations.	5752	Emuent		E-UZ MLU	
Submit. Save	PDM Site-Specifi	<mark>c Estimates 🛛 🖄</mark> (	Clear Results Table	Print Page	
COC Percent of Year COC Exc	eeded Number of Days COC	Exceeded Release Da	ys Pretreat Load	WOT	
(ug/L) (%)	(Days)	(Days)	(kg/site/day)	(%)	
23.00 1	5	9	9.00	9.00	
				~	
	1	1			

4-4-2.「PDM SIC Code」タブではパラメーターの入力後、「Submit」をクリックすると、結果が 算出される。

🔋 Screening	Level Results	5							
								Close	
PDM Site PI	DM SIC Code								
		PI	OM SIC Code Result	S			7 He	lp	
		Release Activi	ty:						
Helease Num	iber:	SIC Code Descriptio	n: Can (metal) Manufac	ture				•	
1		SIC Code	es: 3411						
🗊 New Re	lease Number	WWT Remov	al: 9.00	%	Pretreatme	ent Release:		3.00 kg/sit	e/day
		Release Day	<b>s:</b> 3	days/year	Post-treatme	ent Release:		<mark>2.73</mark> kg/sit	e/day
	Co	ncentration of Conce	m: 3.00	ug/L					
					High	end scenario			
					O Avera	age case scenar	io		
		😫 Clear this Scree	n Submit. 9	iave					
			PDM SIC Code Estimate	s	٩	🛔 Clear Results	Table	Print Page	
COC	Percent of Ye	ar COC Exceeded Nu	mber of Days COC Ex	ceeded Re	lease Days	Pretreat Load	WWT		
(ug/L)	(&)		(Days)		(Days)	(kg/site/day)	(%)	Analysis	
3.00	1		3		3	3.00	9.00	High <sup>.</sup>	