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revised

6. Let's operate ECETOC TRA together

- Learning of the basic operation –

using the Integrated Version

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Japan Chemical Industry Association

Bangkok, 10 September, 2010

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Exposure Scenarios – *Assumption*

only for this training session

Suppose that the following scenarios exist in the supply chain as examples for this ECETOC TRA trial of risk assessment.

Note that the following scenarios are just an example for training to use the ECETOC TRA tool and may include unrealistic situations and conditions.

Scenario 1: **A company produces toluene (100,000 t/y) in refineries from crude oil. The production takes place in closed systems under strict control, because of risk of material loss, danger of environmental pollution and risk of explosions.**

Scenario 2: **The toluene is transferred in the company's dedicated facility to a formulator.**

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Exposure Scenarios – *Assumption* *(Cont'd)*

only for this training session

Scenario 3: **The formulator is received toluene (10,000 t/y) to produce a paint which contains 20% of toluene as solvent. The formulation is conducted at an indoor facility by mixing the toluene and other chemicals in multistage batch process. The duration of the work per day is more than 4 hours.**

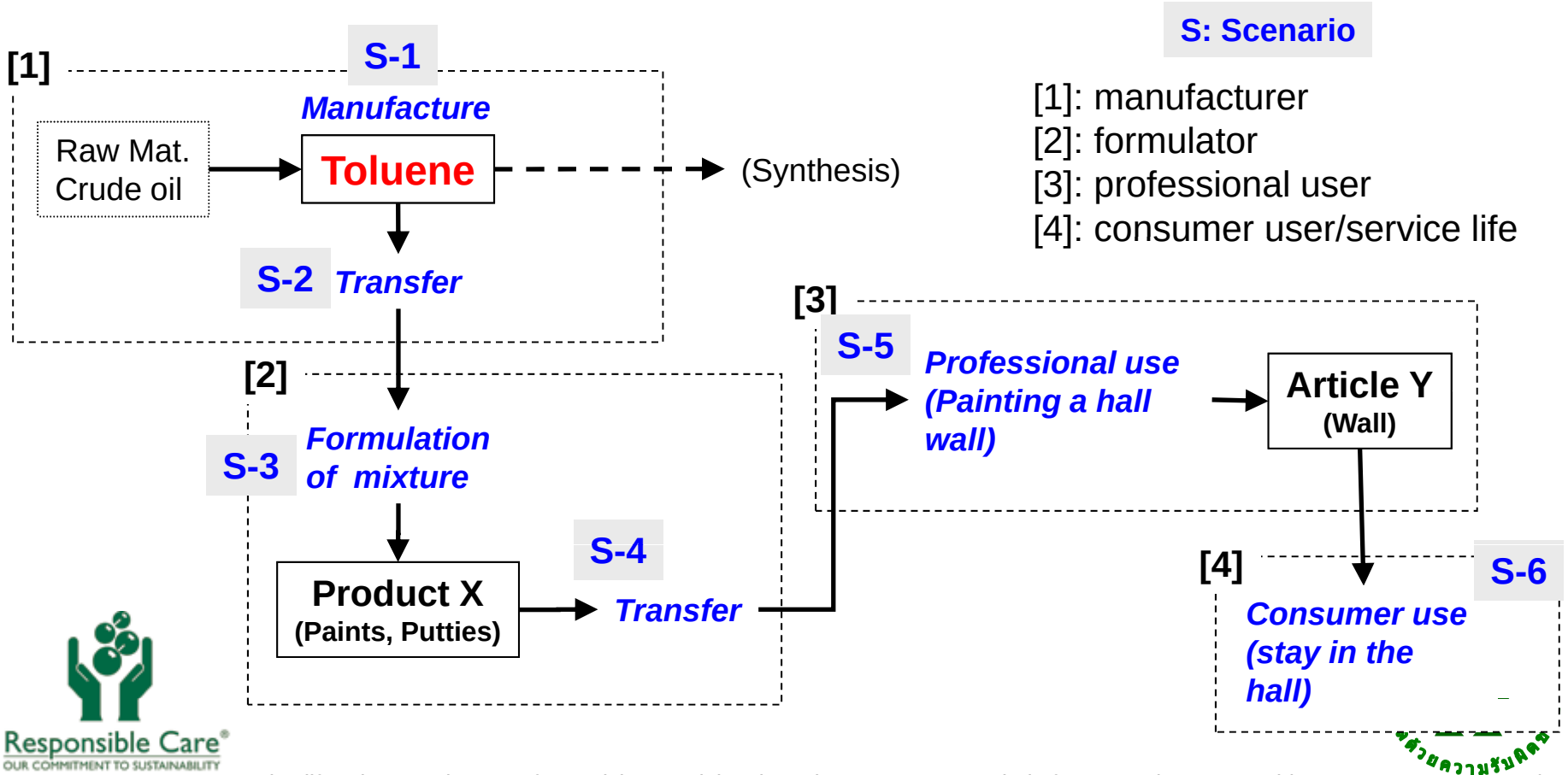
Scenario 4: **The paint produced in mixing vessels is put into small containers and transferred in non-dedicated facility.**

Scenario 5: **Carpenters use the paint (10 Kg) to paint interior walls of public small rooms (wall area 5.5 m2) with brushes for 2 hours per day without local exhaust ventilation system and respiratory protections.**

Scenario 6: **The general public spent a long time in the public hall frequently.**

Exposure Scenario

from manufacture stage to consumer use stage



Service life relates to the use of an article containing the substance over a period of >1 year. (REACH Guidance Document R17.1.2)

Exposure Scenario – *Life Cycle Tree*

Mapping use descriptors to the exposure scenario examples

-Manufacture/Import			
-Manufacture stage	ERC1		100,000 tpa
• Process during manufacturing	PROC 1		
• Process during manufacturing	PROC 8b		
-Market Sector	ERC2		10,000 tpa
-Formulation stage	ERC2		10,000 tpa
– Use related to formulation	PROC 5		
– Use related to formulation	PROC 8a		
-Professional end-use	PROC 10		1000 tpa
-Service Life (Cons.) Service		ERC11a(AC 11)	1000 tpa
• Article use (by consumers)		AC11	

Service life relates to the use of an article containing the substance over a period of >1 year. (REACH Guidance Document R17.1.2)

Exposure Scenario – *Life Cycle Tree*

Chesar 1.1

Chesar 1.1 – Toluene – trial

File Edit Window Import-Export Access Help

chesar

Life Cycle Tree × | Worker View × | Consumer View × | Environment View ×

Life Cycle	PC	PROC	Environment...	ERC	SU	AC	Tonnage	Remark
Manuf. Imp. Manufacture/Import							100000	Toluene p...
Manuf. Manufacture stage [edit]				ERC 1			100000	
Process during manufacturing [edit]		PROC 1						Toluene p...
Process during manufacturing [edit]		PROC 8b						transport
Market Sec. Market Sector [edit]	PC 9a						10000	
Form. Formulation stage [edit]			Formulation ...	ERC 2			10000	
Use related to formulation [edit]		PROC 5						formulatio...
Use related to formulation [edit]		PROC 8a						transfer
Prof. Professional end-use stage [edit]				ERC 8a			1000	
Professional use [edit]		PROC 10						
Serv. Life (Cons.) Service life stage (consumers) [edit]				ERC 11a		AC 11	1000	
Article use (by consumers) [edit]						AC 11		

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Exposure Scenario

PROCs in the Life Cycle Tree of the toluene

Use Descriptor	Name	Description
PROC 1	Use in closed process, no likelihood of exposure	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
PROC 5	Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant con-tact)	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant con-tact at any stage
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, deicers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.
PROC 8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Sampling, loading, filling, transfer, dumping, bagging in non-dedicated facilities. Exposure related to dust, va-pour, aerosols or spillage, and cleaning of equipment to be expected.
PROC 10	Roller application or brushing	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.

Exposure Scenario

AC in the Life Cycle Tree of the toluene

Use Descriptor	Name	Description
AC 11	Wood articles	Examples: Flooring, walls, furniture, toys, construction articles

Exposure Scenario

ERCs in the Life Cycle Tree of the toluene

Use Descriptor	Name	Description
ERC 1	Manufacture of Substances	Manufacture of organic and inorganic substances in chemical, petrochemical, primary metals and minerals industry including intermediates, monomers using continuous processes or batch processes applying dedicated or multi-purpose equipment, either technically controlled or operated by manual interventions
ERC 2	Formulation of Mixture (Preparation)	Mixing and blending of substances into (chemical) preparations in all types of formulating industries, such as paints and do-it-yourself products, pigment paste, fuels, household products (cleaning products), lubricants, etc.
EC 8a	Wide dispersive indoor use of processing aids in open systems	Indoor use of processing aids by the public at large or professional use. Use (usually) results in direct release into the environment/sewage system, for example, detergents in fabric washing, machine wash liquids and lavatory cleaners, automotive and bicycle care products (polishes, lubricants, deicers), solvents in paints and adhesives or fragrances and aerosol propellants in air fresheners.
ERC 11a	Wide dispersive indoor use of long-life articles and materials with low release	Low release of substances included into or onto articles and materials during their service life from indoor use. For example, flooring, furniture, toys, construction materials, curtains, foot-wear, leather products, paper and cardboard products (magazines, books, news paper and packaging paper), electronic equipment (casing).

Exposure Scenario

SPERCS: ESVOC 1, CEPE 1, CEPE 11.

Specific
ımental Release Cl

- ERC (Environmental Release Classes) specific to sector is called SPERC (specific ERC), which
  - » Is developed by Industry Sector Associations;
  - » describes the typical operations in their sectors including (conservative) release factors and efficiencies of RMM/OC;
  - » can be used for Environmental Exposure Estimates and are included in the Ecetoc TRA;
  - » The fact sheets of which are under development; and
  - » can be obtained from the CEFIC > REACH > Libraries (http://cefic.org/Templates/shwStory.asp?NID=719&HID=718).

I really appreciate all the outcomes the CEFIC provides for us!.

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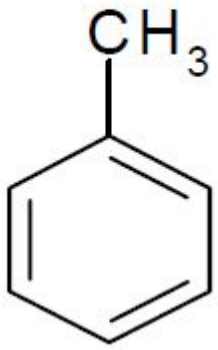
Substance Identification of *Toluene*

- CAS-No.: 108-88-3
- EINECS-No.: 203-625-9
- IUPAC name: Toluene
- Synonyms: Methylbenzene, phenyl methane, toluol, methyl benzol, methacide
- Molecular formula: C7 H8
- Molecular weight 92.15 g/mole
- Structure:



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Physical-chemical Information

		References
Physical State	liquid	-
Melting Point	-95 ° C	Merck Index
Boiling Point	110.6 ° C at 1,013 hPa	Merck Index
Flash Point (Ignition Temperature)	4 ° C (closed cup)	RAR
Auto Flammability	535 ° C	RAR
Relative Density	0.866 g/cm3 at 20 ° C	Merck Index
Vapor Pressure	3,000 Pa at 20 ° C	RAR
Octanol/water (Kow)	log Kow = 2.65	RAR
Adsorption coefficient (Koc)	177	RAR, Meylan et al. (1992)
Water Solubility	515 mg/L at 20 ° C	RAR
Aerobic biodegradability	Readily biodegradable	RAR

Physical-chemical Information

Koc

The adsorption coefficient Koc estimated from log Kow 2.65 according to the TGD (1996): log Koc = 0.81 log Kow + 0.1 = 2.24) would result in a Koc of 176.4. A QSAR estimation performed by a first-order molecular connectivity index estimated a Koc of 268 (PCKOC in EPIWIN; Meylan and Howard, 1994). The results are evidence supporting the conclusion that toluene may be considered to be a potential leacher, which may reach groundwater. The adsorption coefficient Koc of 177 is used in the risk assessment.

(EC(2003): Risk Assessment Report, Toluene, p 38)

Toxicological information

Hazard Characterization			
Exposure Scenario	***Critical Data***	***Assessment factor***	***Reference Value (DNEL, 1, OEL)***
Worker risk – inhalation (long-term)	NOAEC: 1,125 mg/m3	12.5	99.5 mg/m3
Worker risk – dermal (long-term)	NOAEL: 625 mg/kg/day (oral)	30*	21 mg/kg/day (dermal)
Consumer risk – inhalation (long-term)	NOAEC (corrected) **: 72.9 mg/m3	25	2.9 mg/m3
Consumer risk – dermal (long-term)	NOAEL: 625 mg/kg/day (oral)	100	6.25 mg/kg/day (dermal)
Consumer risk – oral (long-term, via environment)	NOAEL: 625 mg/kg/day	15*	42 mg/kg/day
Consumer risk – worst case	Repro. LOAEC: 330 mg/m3 (human)	10*	33 mg/m3

*: = Minimal MOS in RAR

Toxicological information

Inhalation, Long-term

Summary of general toxicity in animals after inhalation exposure

Data from studies in rats and mice have been found. The 2-year study by Gibson and Hardisty showed no toxicity at 300 ppm (1,125 mg/m3), which was the highest dose level of that study. In the well-reported 15-week NTP rat study, 625 ppm (2,344 mg/m3) did not cause adverse effects. ...

A clear inhalation NOAEC of 1,125 mg/m3 (300 ppm) has been identified in the Gibson and Hardisty 2-year study. In the NTP studies a NOAEC of 625 ppm (2,344 mg/m3) was identified in the 15-week study, while 600 ppm (2,250 mg/m3) was a LOAEC for changes in the nasal cavity, forestomach and kidney in the 15-month and 2-year study. The toxicity of lower concentrations administered for 2 years was not examined by NTP. The exposure duration of the 2-year studies is considered the most relevant for evaluation of effects of long-term exposure in man. The 300 ppm (1,125 mg/m3) NOAEC of Gibson and Hardisty does not appear unrealistically low compared with the 600 ppm LOAEC of NTP and will be taken forward to the risk characterisation.

(EC(2003): Risk Assessment Report, Toluene, p 163)

Ecotoxicological information

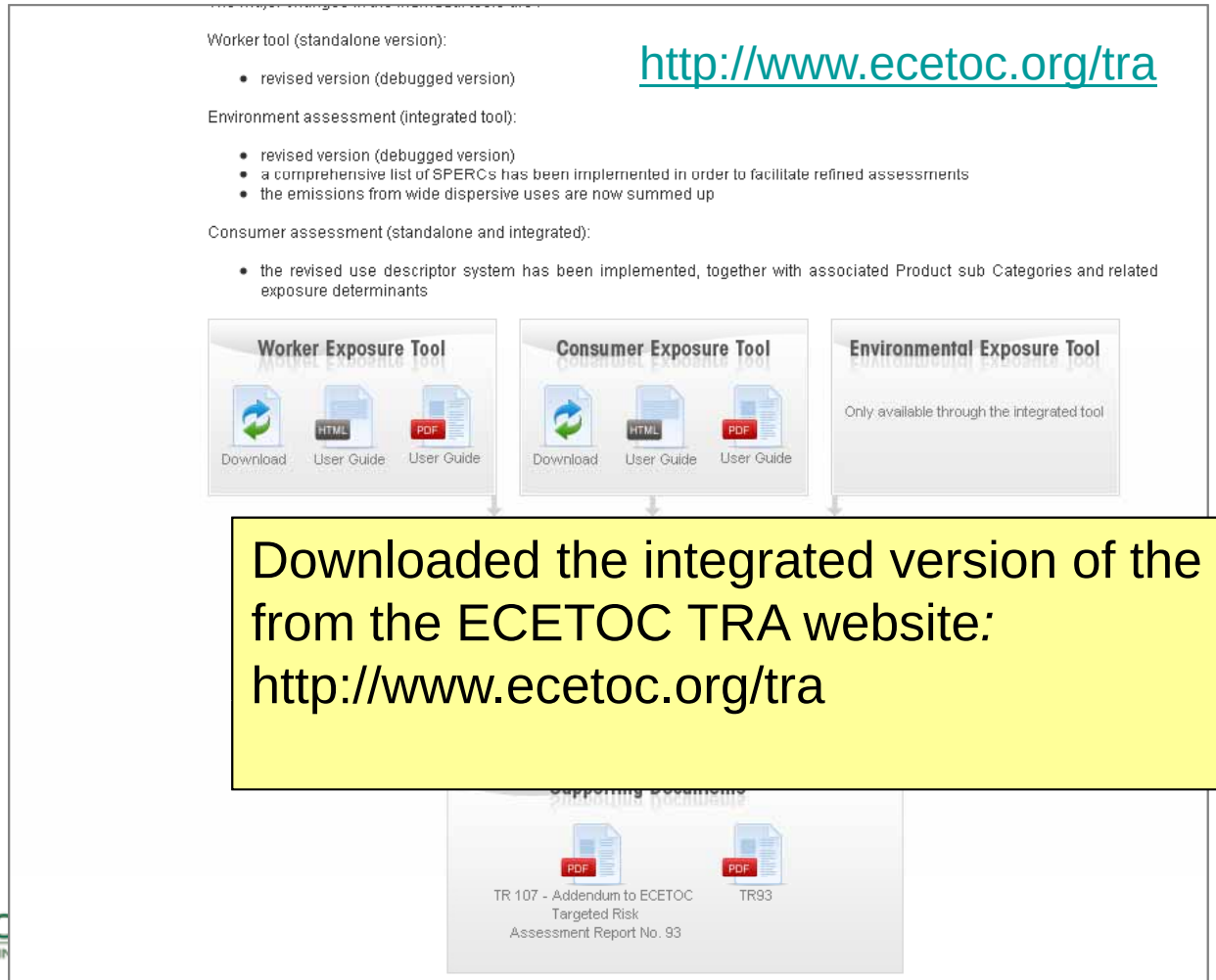
Hazard Characterization			
Scenario	***Critical Data***	***Assessment factor***	***Reference Value (PNEC)***
Environment risk – Activate Sludge	EC50(24hr): 84 mg/L	10	8.4 mg/L
Environment risk – Fresh water	NOEC: 0.74 mg/L (Daphnia Repro)	10	0.074 mg/L
Environment risk – Fresh water sediment	Equilibrium Partition Method*** (Fresh water)	-	0.46 mg/kgdwt (EUSES)
Environment risk – Marine water	NOEC: 0.74 mg/L (Daphnia Repro) (Fresh water)	100	0.0074 mg/L (Marine water)
Environment risk – Marine water sediment	Equilibrium Partition Method*** (Fresh water)	10	0.0046 mg/kg.dwt (EUSES)
Terrestrial Compartment	NOEC 15 mg/kg.dwt	50	0.3 mg/kg.dwt

***: TGD 2003 part 2, p.113 equation (70)

Contents

Exercise

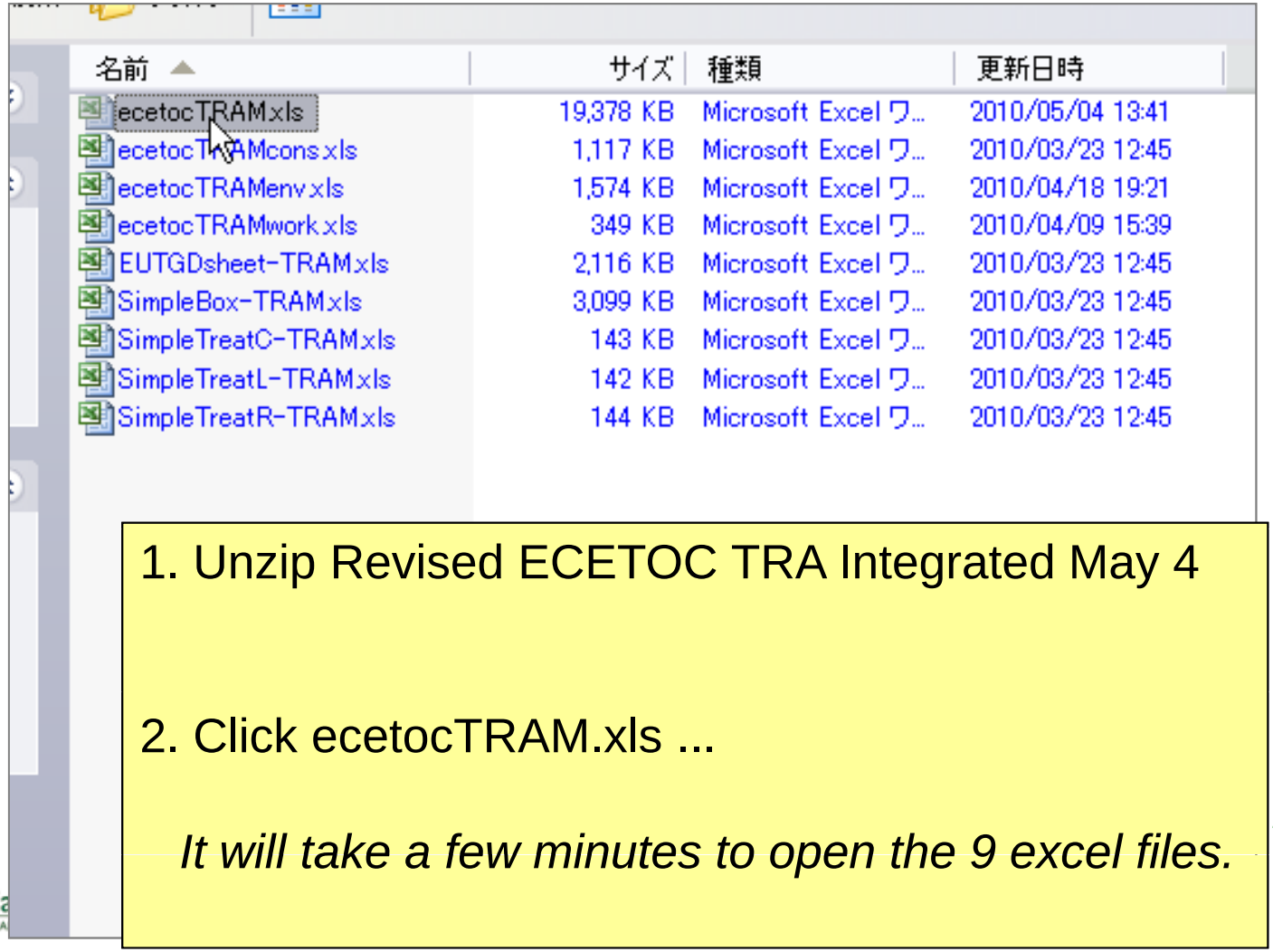
Download the ECETOC TRA



Downloaded the integrated version of the ECETOC TRA from the ECETOC TRA website*:*
http://www.ecetoc.org/tra

Exercise

Open ECETOC TRA



1. Unzip Revised ECETOC TRA Integrated May 4

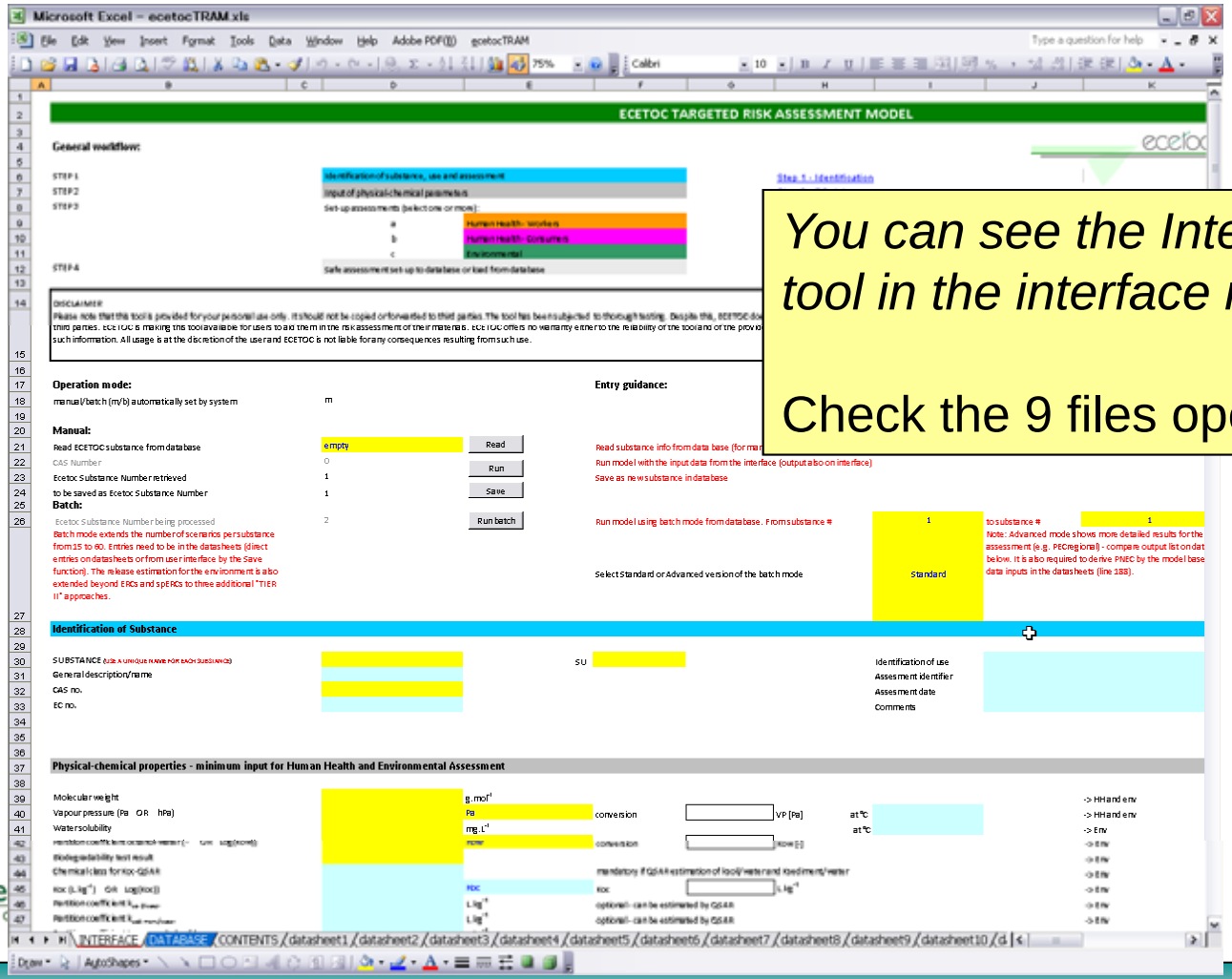
2. Click ecetocTRAM.xls ...

It will take a few minutes to open the 9 excel files.

Exercise

Open ECETOC TRA

Interface Sheet in ecetocTRAM.xls



You can see the Interface to operate the tool in the interface mode.

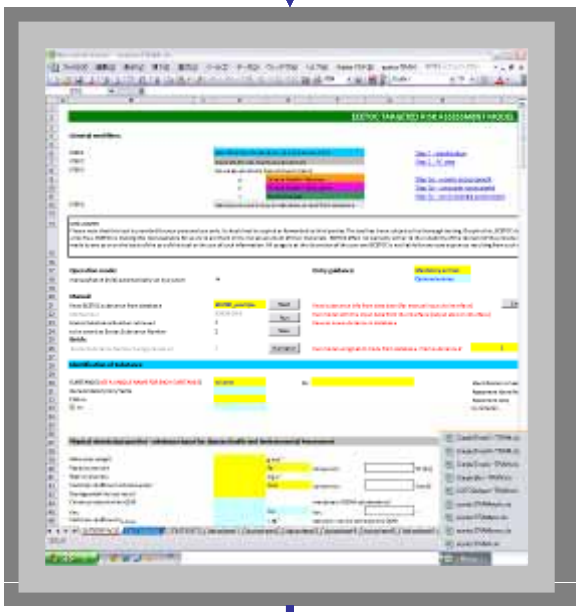
Check the 9 files open.

Overview of the procedures by the ECETOC TRA

Reference Values

Uses, OC/RMM …

Physico-chemical data



Estimated Exposure

RCR

Legends

Use Category …

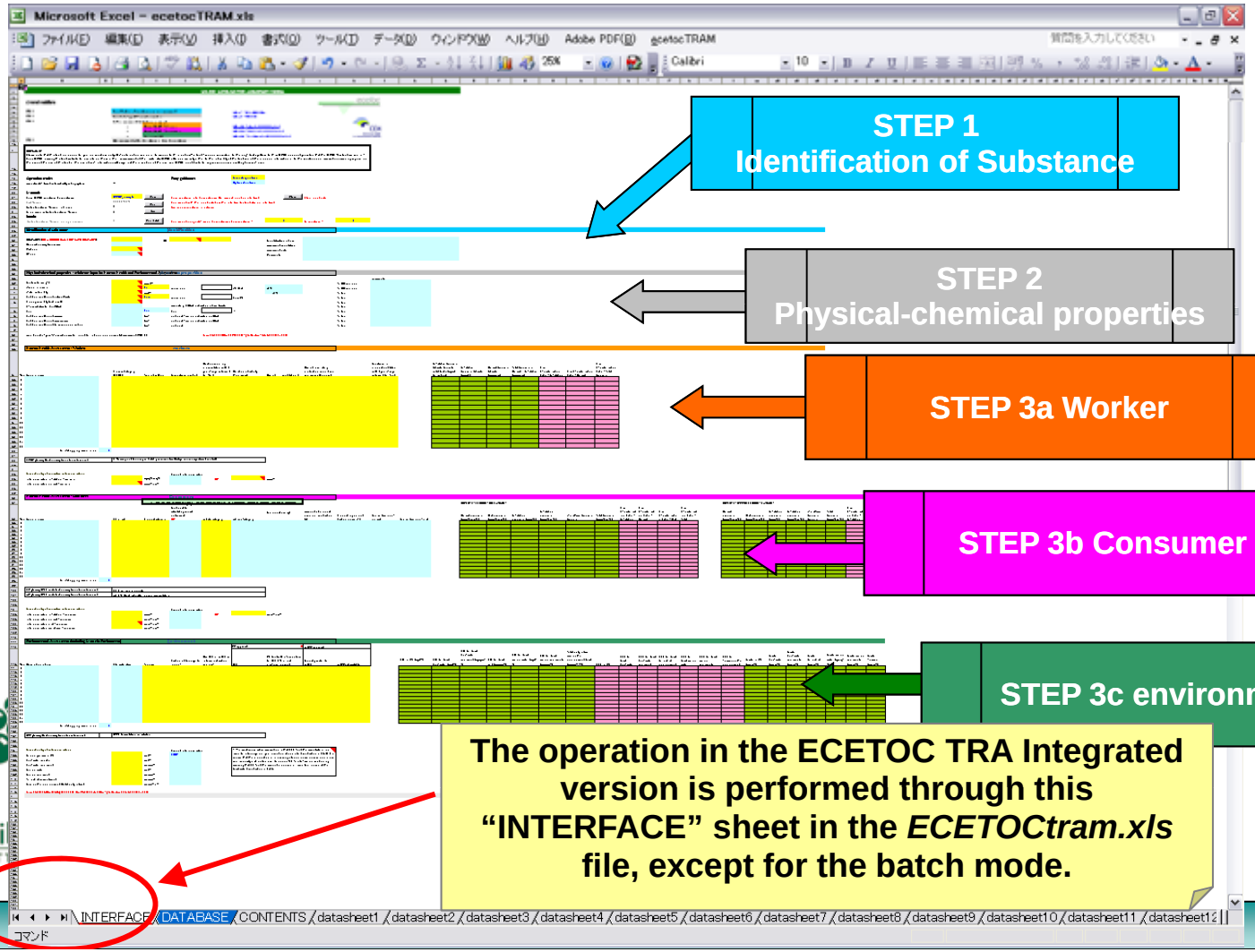
Reference Value

(Other Input)

Output data

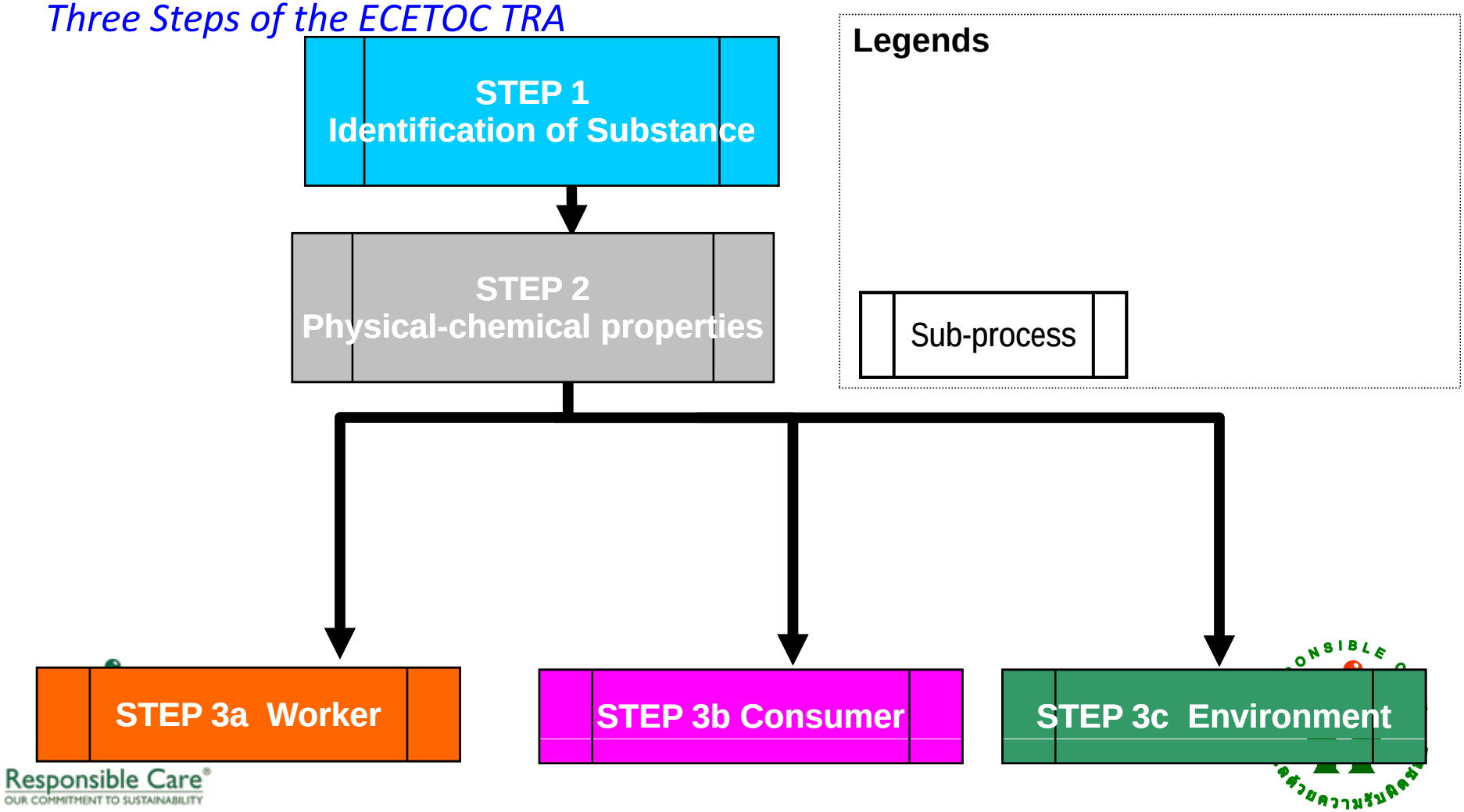
Overview of the procedures by the ECETOC TRA

Interface sheet in the integrated version of ECETOC TRA Ver.2



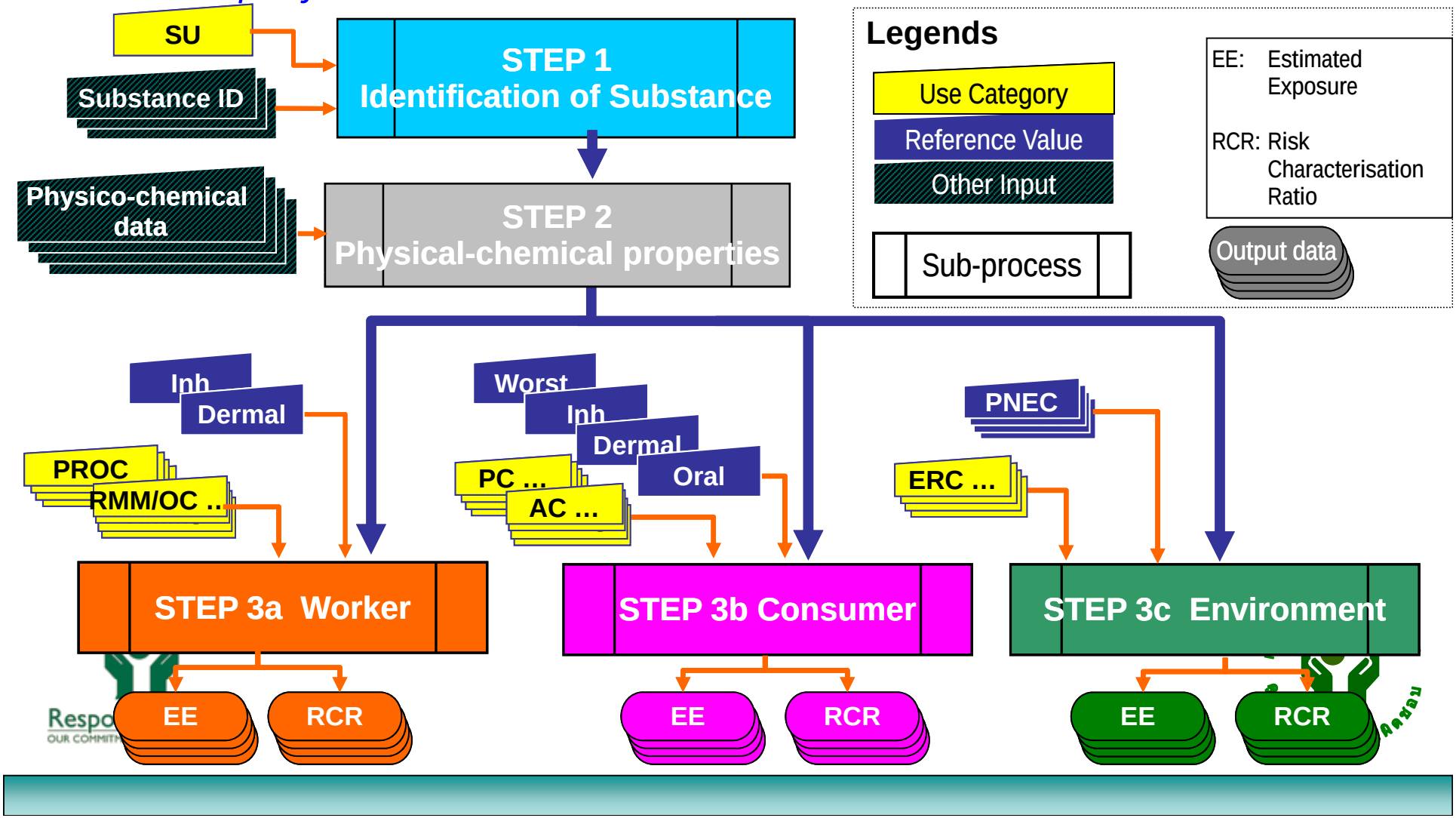
Overview of the procedures by the ECETOC TRA

Three Steps of the ECETOC TRA



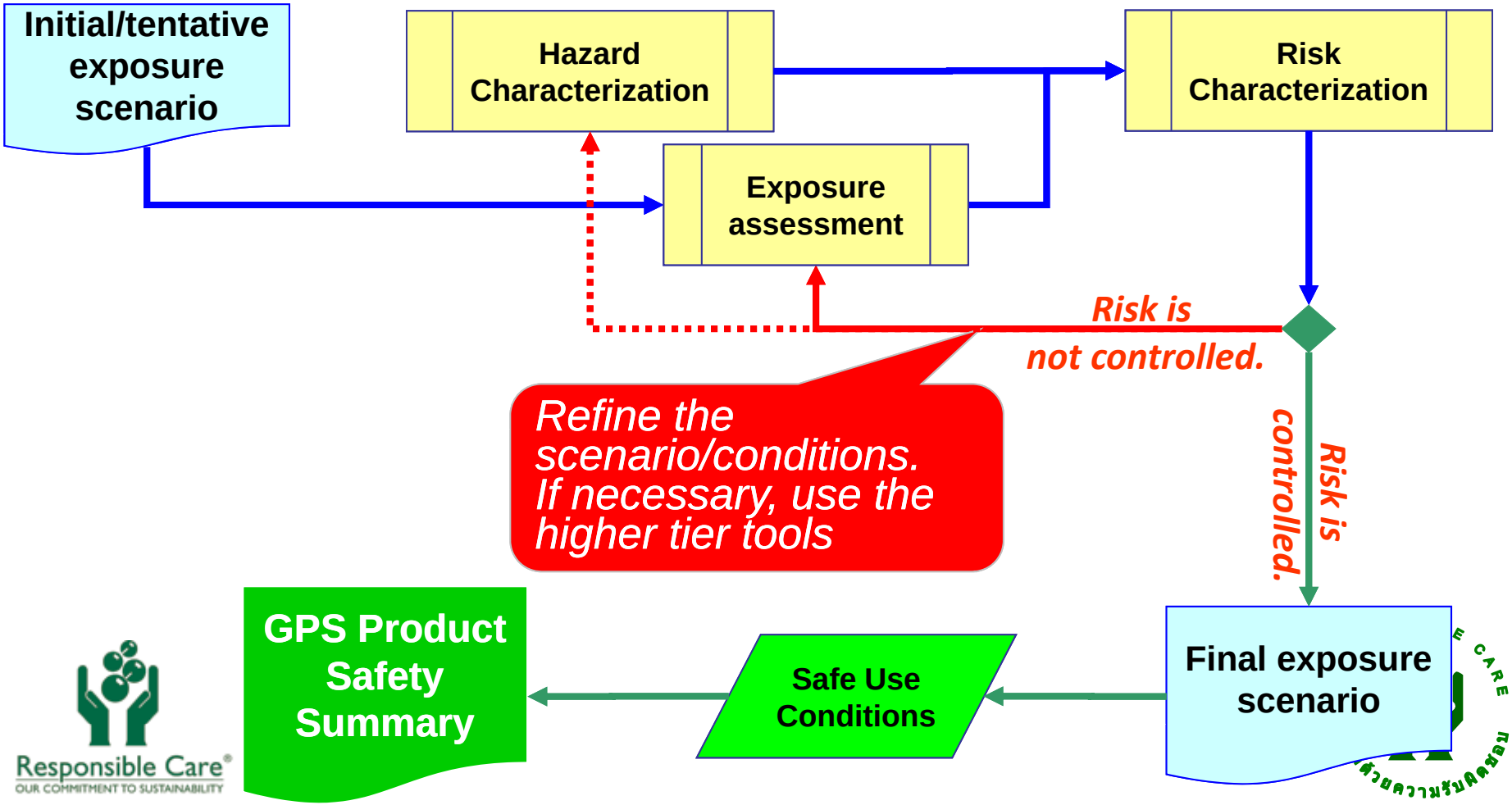
Overview of the procedures by the ECETOC TRA

Three Steps of the ECETOC TRA



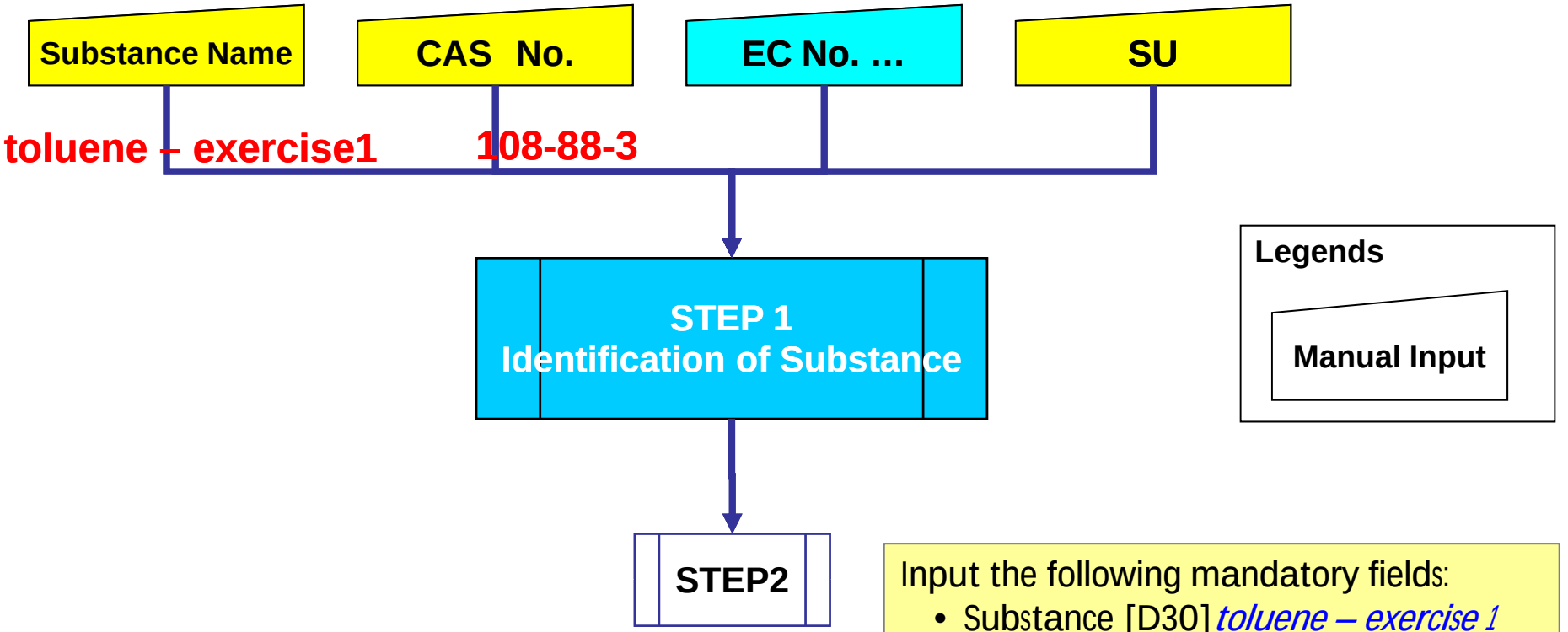
Overview of the procedures by the ECETOC TRA

Iterative Process in the Risk Assessment to get the safe use condition of your



Exercise

STEP 1 – Substance Identification



Input the following mandatory fields:

- Substance [D30] *toluene – exercise 1*
- CAS no. [D32] *108-88-3*
- SU [F30] *All*

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Exercise

STEP 1 – Substance Identification

27				
28	**Identification of Substance**			
29				
30	**SUBSTANCE** (USE A UNIQUE NAME FOR EACH SUBSTANCE)	toluene -- exercise 1	SU	ALL
31	General description/name	trial		
32	CAS no.	108-88-3		
33	EC no.			
34				
35				
36				

Input the following mandatory fields:

- Substance [D30] *toluene – exercise 1*
- CAS no. [D32] *108-88-3*
- SU [F30] *All*

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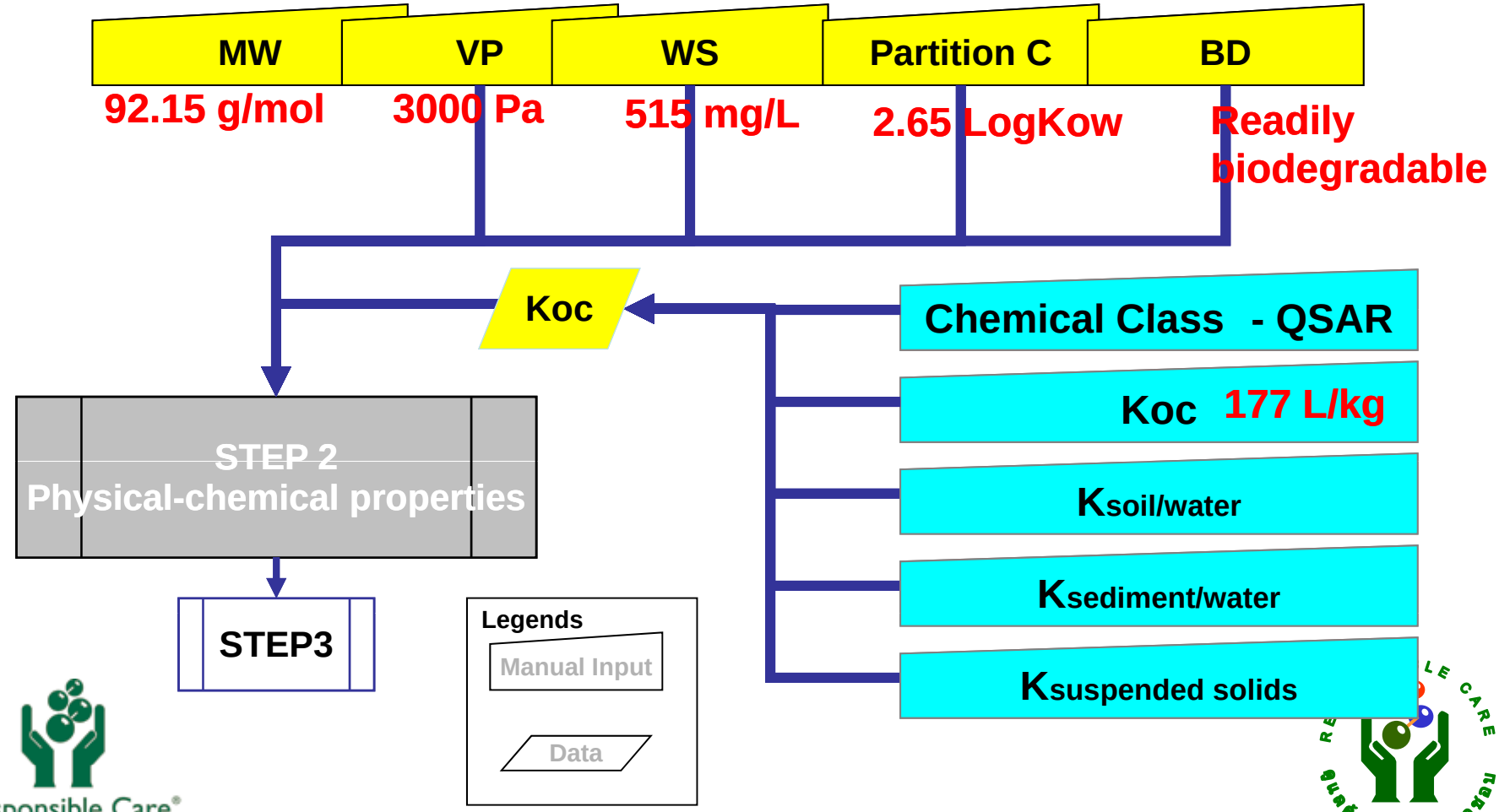
Exercise

STEP 2 – Physical chemical properties



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Exercise

STEP 2 – Physical-chemical properties

37	**Physical-chemical properties - minimum input for Human Health and Environmental Assessment**				
38					
39	Molecular weight		92.15	$g.mol^{-1}$	
40	Vapour pressure (Pa OR hPa)		3.00E+03	Pa	conversion
41	Water solubility		515	$mg.L^{-1}$	
42	Partition coefficient octanol-water (- OR Log(Kow))		2.65E+00	logKow	conversion
43	Biodegradability test result		readily biodegradable		
44	Chemical class for Koc-QSAR		Predominantly hydrophobics		mandatory if QSAR estimat
45	Koc ($L.kg^{-1}$) OR Log(Koc))		1.77E+02	Koc	Koc
46	Partition coefficient $k_{soil/water}$			$L.kg^{-1}$	optional - can be estimate
47	Partition coefficient $k_{sediment/water}$			$L.kg^{-1}$	optional - can be estimate
48	Partition coefficient to suspended solids			$L.kg^{-1}$	optional
49					
50	Additional physi				Inp
51					

Input the following mandatory fields:

- Molecular weight [D39] *92.15*
- Vapour Pressure [D40] *3000* [E40] *Pa*
- Water Solubility [D41] *515*
- Partition coefficient O/W [D42] *2.65* [E42] *LogKow*
- Biodegradation [D43] *Readily biodegradable*
- Koc [D45] *177* [E45] *Koc*

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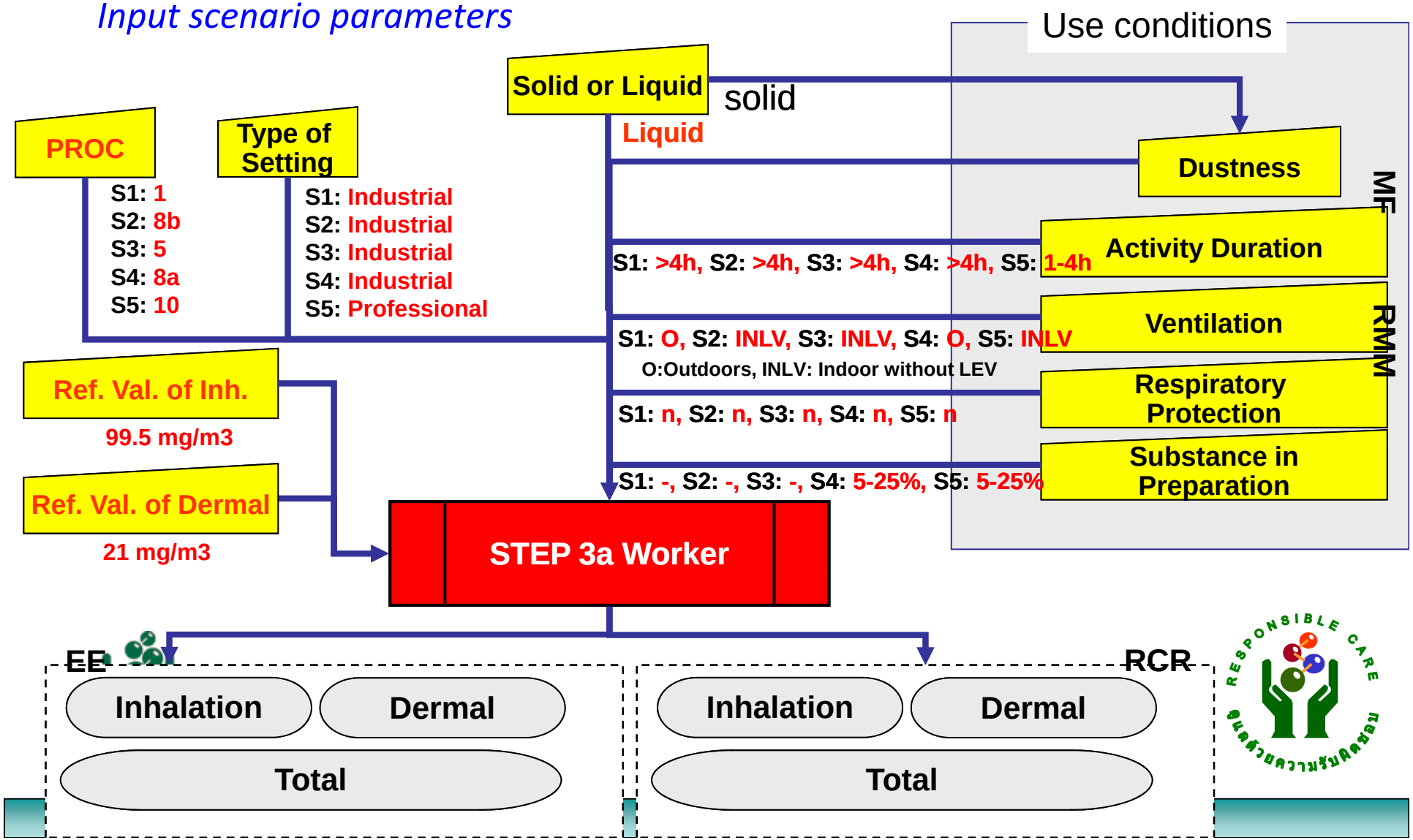
Exercise

STEP 3a – Worker

Input scenario parameters



Exercise

STEP 3a – Worker

Input scenario parameters

	A	B	C	D	E	F	G	H	I	J	K	L
53		**Human Health Assessment - Workers**										
54	No.	Scenario name		Process Category (PROC)	Type of setting	Is substance a solid?	Dustiness during process (clear cell if you change column F to "No")	Duration of activity [hours/day]	Use of ventilation ?	Use of respiratory protection and, if so, minimum efficiency ?		Substance in preparation ? (clear cell if you change column F to "Yes")
55	1	**manufacture**		**PROC 2**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**No**		**No**
56	2	**Transfer**		**PROC 8b**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**No**		**No**
57	3	**Formulation**		**PROC 5**	**industrial**	**No**		**>4 hours (default)**	**Indoors without LEV**	**No**		**No**
58	4	**Transfer**		**PROC 8a**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**No**		**5-25%**
59	5	**professional use (wall paining)**		**PROC 10**	**professional**	**No**		**1 - 4 hours**	**Indoors without LEV**	**No**		**5-25%**

Input the values based on the scenario examples *(See the table above)*

The sizes of the columns of the table above are changed from the original ecetoc tra work sheet to be able to shown in this slide.

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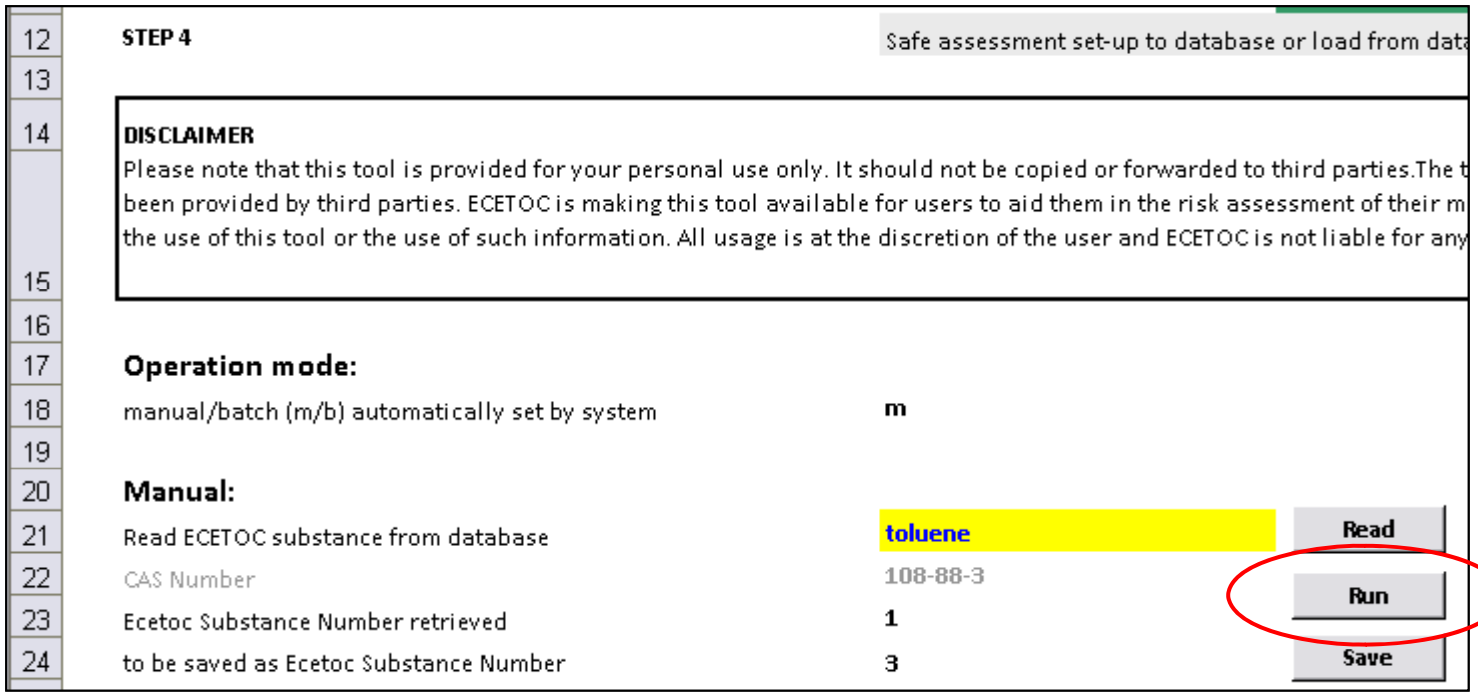
Exercise

STEP 3a – Worker

Run calculating



Click the button **Run** to start calculating.

Exercise

STEP 3a – Worker

Look at the results

	A	
53		H
54	No.	Sc
55	1	m
56	2	Tr
57	3	Fc
58	4	Tr
59	5	pr

	N	O	P	Q	R	S	T
53							
54	Inhalative Exposure Estimate (ppm for volatiles) / (mg/m3 for solids)	Inhalative Exposure Estimate (mg/m3)	Dermal Exposure Estimate (mg/kg/day)	Total Exposure = Dermal + Inhalative (mg/kg/day)	Risk Characterisation Ratio - Inhalation	Risk Characterisation Ratio - Dermal	Risk Characterisation Ratio - Total Exposure
55	7.00E+00	2.69E+01	1.37E+00	5.21E+00	#VALUE!	#VALUE!	#VALUE!
56	3.50E+01	1.34E+02	6.86E+00	2.61E+01	#VALUE!	#VALUE!	#VALUE!
57	5.00E+01	1.92E+02	1.37E+01	4.11E+01	#VALUE!	#VALUE!	#VALUE!
58	2.10E+01	8.06E+01	1.37E+01	2.52E+01	#VALUE!	#VALUE!	#VALUE!
59	3.60E+01	1.38E+02	2.74E+01	4.72E+01	#VALUE!	#VALUE!	#VALUE!

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Scroll-right to N column and you can look at the results.
Think the meaning of value in the each column.
Note also "#VALUES!" In the Risk Characterisation Ratio fields.
Think why no values?

Exercise

STEP 3a – Worker

Input Reference Values

	A	B	C	D	E	F	G	H	I
68	14								
69	15								
70		*for debugging scenario no.*	5						
71									
72		PROC glossary (text descriptions for reference):		8a -Transfer of chemicals from/to vessels/ large containers at n					
73									
74									
75		Manual entry of indicative reference values				Basis of reference value:			
76		reference value inhalation - workers			mg.kg-1 day-1	DNEL	OR	9.95E+01	mg.m-3
77		reference value dermal - workers		21	mg.kg-1 day-1	DNEL			

Input the following mandatory fields:

- reference value inhalation - workers [H76] *99.5*
- reference value dermal - workers [D77] *21*

Run again and Look over the results.

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Exercise

STEP 3a – Worker

Risk characterization

	A	
53		H
54	No.	Sc
55	1	m
56	2	Tr
57	3	Fc
58	4	Tr
59	5	pr

	N	O	P	Q	R	S	T
53							
54	Inhalative Exposure Estimate (ppm for volatiles) / (mg/m3 for solids)	Inhalative Exposure Estimate (mg/m3)	Dermal Exposure Estimate (mg/kg/day)	Total Exposure = Dermal + Inhalative (mg/kg/day)	Risk Characterisation Ratio - Inhalation	Risk Characterisation Ratio - Dermal	Risk Characterisation Ratio - Total Exposure
55	7.00E+00	2.69E+01	1.37E+00	5.21E+00	2.70E-01	6.53E-02	3.35E-01
56	3.50E+01	1.34E+02	6.86E+00	2.61E+01	1.35E+00	3.27E-01	1.68E+00
57	5.00E+01	1.92E+02	1.37E+01	4.11E+01	1.93E+00	6.53E-01	2.58E+00
58	2.10E+01	8.06E+01	1.37E+01	2.52E+01	8.10E-01	6.53E-01	1.46E+00
59	3.60E+01	1.38E+02	2.74E+01	4.72E+01	1.39E+00	1.31E+00	2.70E+00

Note that the RCRs are calculated.
The red cell means the risk is not controlled.
At the next step, refine the assessment to find out the use conditions to be “green” i.e. “the risk is controlled”.

Exercise

STEP 3a – Worker

Refine

	A	B	C	D	E	F	G	H	I	J	K	L
53		**Human Health Assessment - Workers**										
54	No.	Scenario name		Process Category (PROC)	Type of setting	Is substance a solid?	Dustiness during process (clear cell if you change column F to "No")	Duration of activity [hours/day]	Use of ventilation ?	Use of respiratory protection and, if so, minimum efficiency ?		Substance in preparation ? (clear cell if you change column F to "Yes")
55	1	**manufacture**		**PROC 2**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**No**		**No**
56	2	**Transfer**		**PROC 8b**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**90%**		**No**
57	3	**Formulation**		**PROC 5**	**industrial**	**No**		**>4 hours (default)**	**Indoors with LEV**	**No**		**No**
58	4	**Transfer**		**PROC 8a**	**industrial**	**No**		**>4 hours (default)**	**Outdoors**	**90%**		**5-25%**
59	5	**professional use (wall paining)**		**PROC 10**	**professional**	**No**		**1 - 4 hours**	**Indoors with LEV**	**No**		**5-25%**

Find out the safe use conditions (to control the risk)

For example,

- *in Scnario 2, 4, use respiratory protection (90%)*
- *In Scnario 3. 5, use LEV*

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Exercise

STEP 3a – Worker

Refine, Risk characterization

	A	
53		H
54	No.	Sc
55	1	m
56	2	Tr
57	3	Fc
58	4	Tr
59	5	pr

	N	O	P	Q	R	S	T
53							
54	Inhalative Exposure Estimate (ppm for volatiles) / (mg/m3 for solids)	Inhalative Exposure Estimate (mg/m3)	Dermal Exposure Estimate (mg/kg/day)	Total Exposure = Dermal + Inhalative (mg/kg/day)	Risk Characterisation Ratio - Inhalation	Risk Characterisation Ratio - Dermal	Risk Characterisation Ratio - Total Exposure
55	7.00E+00	2.69E+01	1.37E+00	5.21E+00	2.70E-01	6.53E-02	3.35E-01
56	3.50E+00	1.34E+01	6.86E+00	8.78E+00	1.35E-01	3.27E-01	4.62E-01
57	5.00E+00	1.92E+01	6.86E-02	2.81E+00	1.93E-01	3.27E-03	1.96E-01
58	2.10E+00	8.06E+00	1.37E+01	1.49E+01	8.10E-02	6.53E-01	7.34E-01
59	7.20E+00	2.76E+01	1.37E+00	5.32E+00	2.78E-01	6.53E-02	3.43E-01

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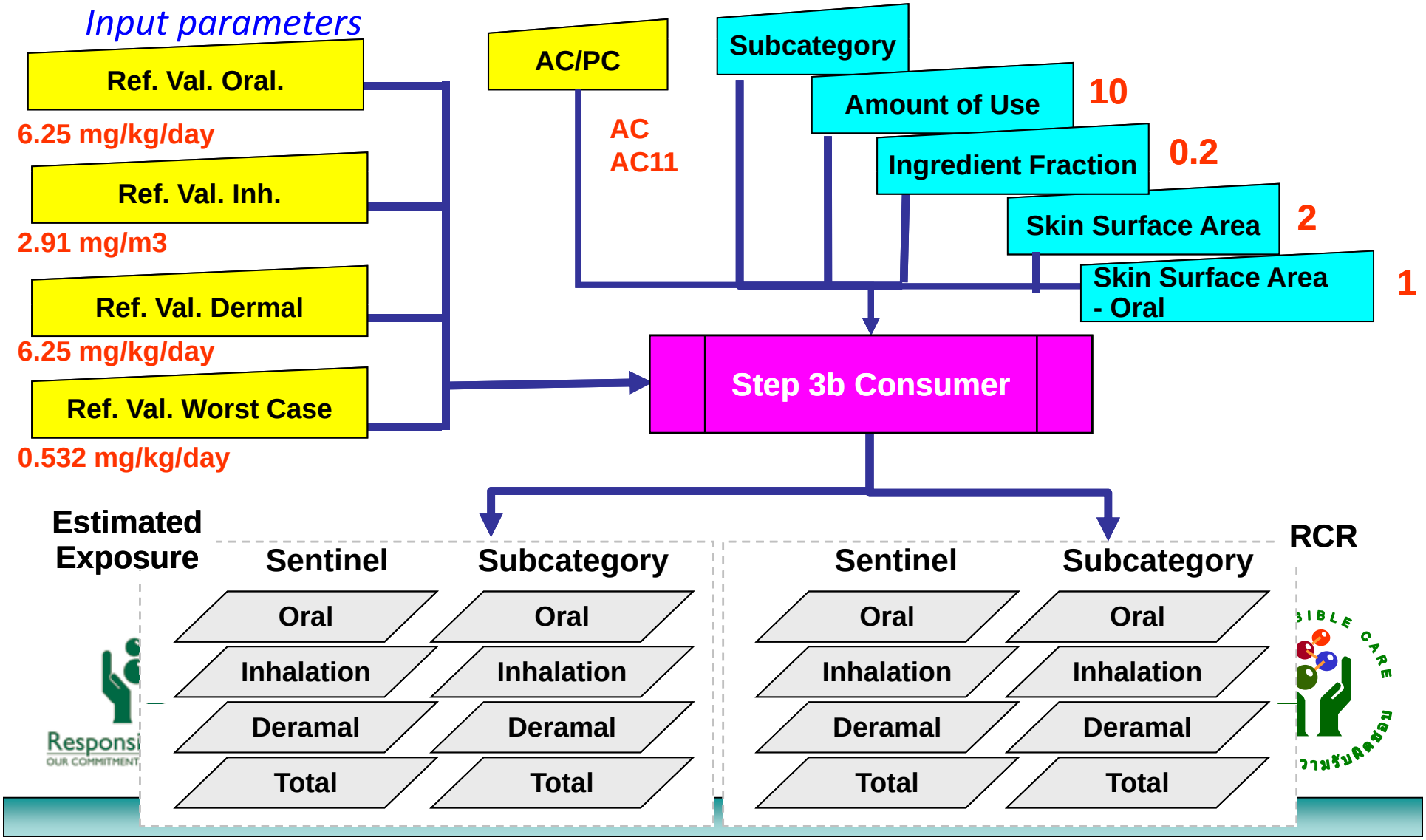
Now, we could find the OC/RMM to control the risk of the toluene on the worker scenarios.

Exercise

STEP 3b – Consumer

Input parameters



Exercise

STEP 3b – Consumer

Input scenario parameters

	A	B	C	D	E	F	G	H	I	J	K	L	M
78													
79													
80		Human Health Assessment - Consumer											
81					F YOU MADE CHANGES TO THE PC/AC, PRODUCT/ARTICLE CATEC								
82	No.	Scenario name		PC or AC	Product category	PC sub-category (optional for calculating subcat outcomes) OR	Article category	AC sub-category	Is product a spray?	Amount of product used per application (g)	Product ingredient fraction by weight	Skin surface area - dermal	Skin surface area - oral
83	1	in a room with the wall painted in paint cotaning toluene as solvent		AC			AC11_Wood_articles			1.00E+04	0.2	2: inside hands / one hand / palm of	1: some fingertips
84	2												

Input the values based on the scenario examples *(See the table above)*

The sizes of the columns of the table above are changed from the original ecetoc tra work sheet to be able to shown in this slide.

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Exercise

STEP 3b – Consumer

Input reference values

	A	B	C	D	E	F	G	H	I
104		**Manual entry of indicative reference values**				Basis of reference value			
105		reference value inhalation - consumer		2.91E+00	$mg.m^{-3}$		OR		$mg\ kg^{-1}\ day^{-1}$
106		reference value dermal - consumer		6.25E+00	$mg\ kg^{-1}\ day^{-1}$				
107		reference value oral - consumer		6.25E+00	$mg\ kg^{-1}\ day^{-1}$				
108		reference value worst case - consumer		5.32E-01	$mg\ kg^{-1}\ day^{-1}$				

Input the following mandatory fields:

- reference value inhalation - consumer [D105] *2.91*
- reference value dermal - consumer [D106] *6.25*
- reference value oral - consumer [D107] *6.25*
- Reference value worst case – consumer [D108] *0.532*

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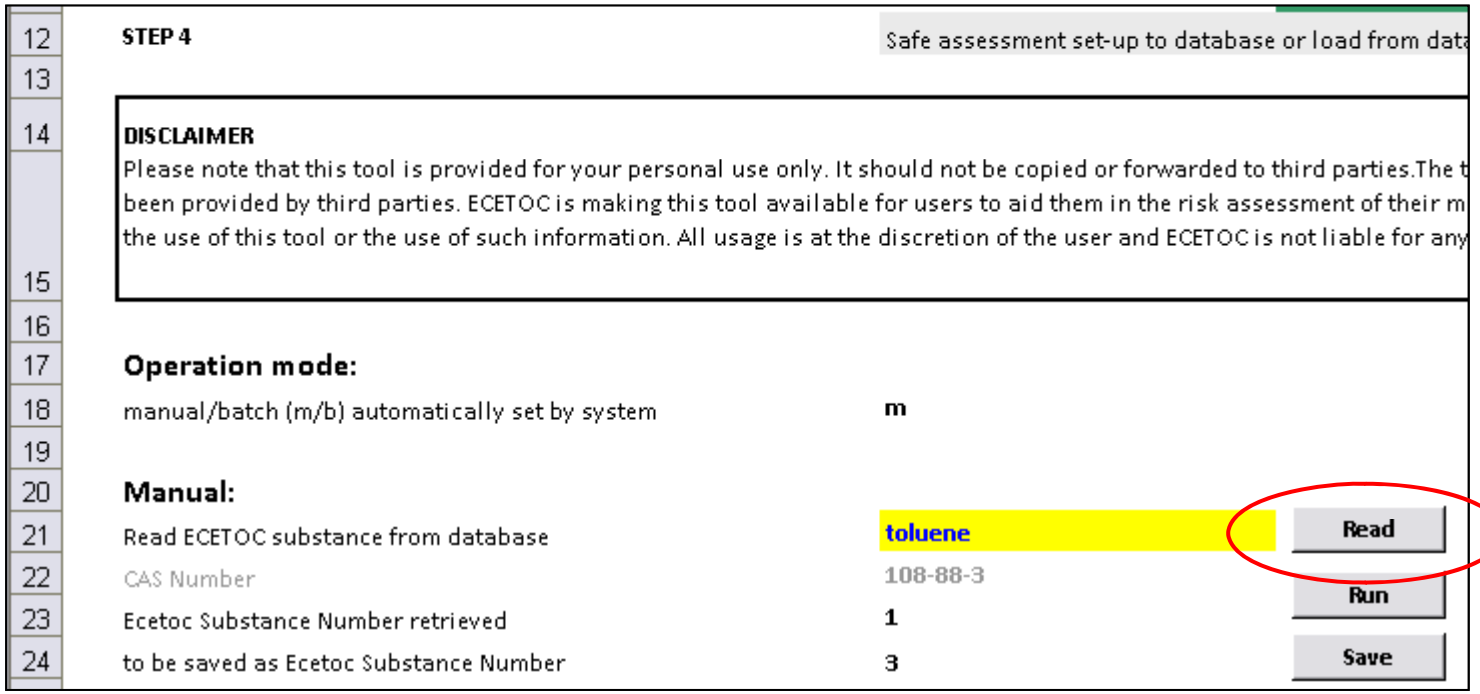
Exercise

STEP 3b – Consumer

Run calculating



Click the button **Run** to start calculating.

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Exercise

STEP 3b – Consumer

Look at the results

	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
80										
81	OUTPUT BY SENTINEL PRODUCT CATEGORY									
82	Dermal exposure (mg.kg-1.day-1)	Oral exposure (mg.kg-1.day-1)	Inhalation exposure (mg.m-3)	Inhalation exposure (mg.kg-1.d-1)	Total Exposure (mg.kg-1.d-1)		Risk Characterisation Ratio - Inhalation	Risk Characterisation Ratio - Dermal	Risk Characterisation Ratio - Oral	Risk Characterisation Ratio - Total Exposure
83	1.46E+01	1.00E+00	7.50E+04	1.37E+04	1.37E+04		2.58E+04	2.33E+00	1.60E-01	2.58E+04

Scroll to Cell Z80 and you can look at the results.
The exposures were estimated and we could find the risk of inhalation, dermal, and total are not controlled.

How you can control the risks?

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Exercise

STEP 3b – Consumer

Refine

	A	B	C	D	E	F	G	H	I	J	K	L	M
79													
80		Human Health Assessment - Consumer											
81					F YOU MADE CHANGES TO THE PC/AC, PRODUCT/ARTICLE CATEC								
82	No.	Scenario name		PC or AC	Product category	PC sub-category (optional for calculating subcat outcomes) OR	Article category	AC sub-category	Is product a spray?	Amount of product used per application (g)	Product ingredient fraction by weight	Skin surface area - dermal	Skin surface area - oral
83	1	in the room with walls painted in the paint containing toluene as solvent		AC			AC11_Wood_articles	Walls and flooring (also applicable to non-		1.00E+04	0.000005	2: inside hands / one hand / palm of hands	1: some fingertips
84													

Find out the conditions of safe use (to control the risk)

For example,

- *As AC subcategory, select "Walls and flooring (also applicable to non-wood materials)", and*
- *As Product ingredient fraction by weight, change 5E-6*

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Exercise

STEP 3b – Consumer

Refine, Risk characterization

	O	P	Q	R	S	T	U	V	W	X
80										
81	OUTPUT BY PRODUCT SUBCATEGORY									
82	Dermal exposure (mg.kg-1.day-1)	Oral exposure (mg.kg-1.day-1)	Inhalation exposure (mg.m-3)	Inhalation exposure (mg.kg-1.d-1)	Total Exposure (mg.kg-1.d-1)		Risk Characterisation Ratio - Inhalation	Risk Characterisation Ratio - Dermal	Risk Characterisation Ratio - Oral	Risk Characterisation Ratio - Total
83	3.57E-05		2.50E+00	4.57E-01	4.57E-01		8.59E-01	5.72E-06		8.59E-01

Scroll to Cell O80 and you can look at the results for AC-Subcategory.

Now, we could reach the Safety Conditions for the wall painted in paint containing toluene as solvent.

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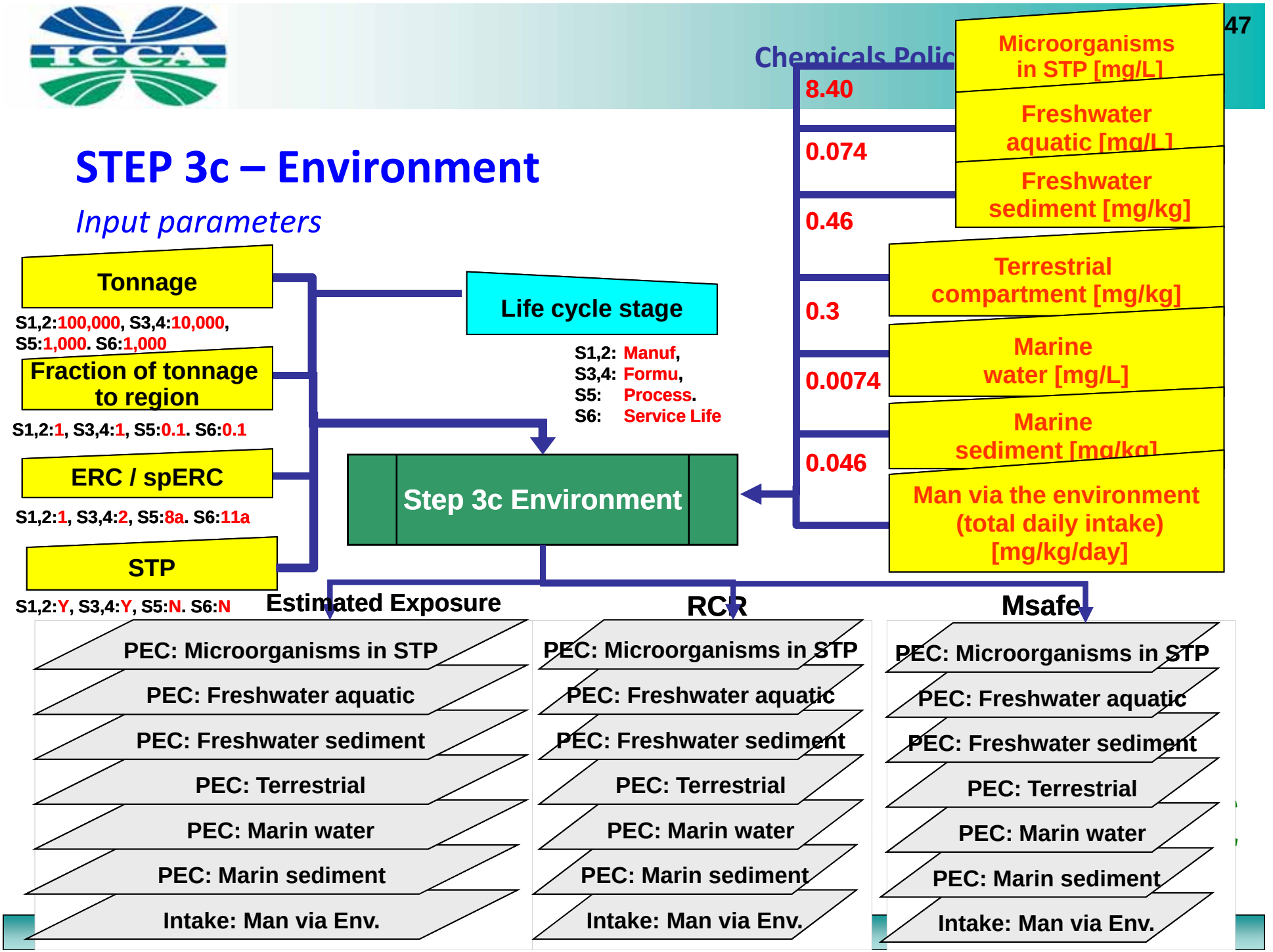
STEP 3c – Environment

Input parameters



STEP 3c – Environment

Input parameters

	A	B	C	D	E	F	G	H	I	J	K
111		**Environmental Assessment (including Man via Environment)**									
112								ERC approach		spERC approach	
113	No.	Description of use		Life cycle stage	Tonnage	Fraction of tonnage to region (for ERCs 1-7 and 12a,12b = 1, ERC 8-11b = 0.1)*	Use ERC or spERC as release estimation approach	ERC (mandatory in all cases as use descriptor !)	STP for ERC (default is Yes, unless for ERC 1-7 and 12a, 12b direct discharge is given)	Industry sector for spERC	spERC (select appropriate spERC - default STP setting is linked to spERC)
114	1	Manufacture & Transfer		Manufacturing	1.00E+05	1	ERC	ERC1	yes		
115	2	Formulation & Transfer		Formulation	1.00E+04	1	ERC	ERC2	yes		
116	3	Professional use (Painiting Wall)		Processing	1.00E+03	0.1	ERC	ERC8a	no		
117	4	In room with the wall painted containing toluene as solvent		Service life	1.00E+03	0.1	ERC	ERC11a	no		

Input the values based on the scenarios
(See the table above)

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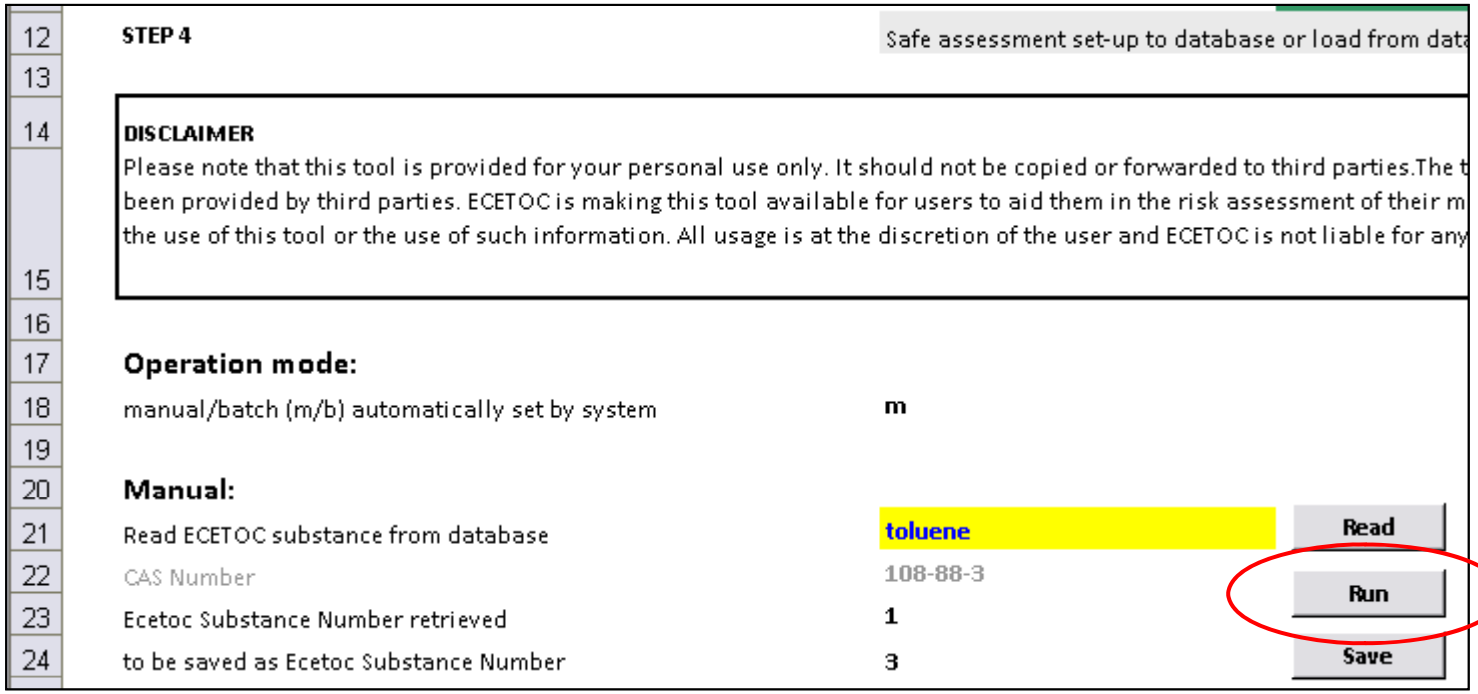
Exercise

STEP 3c – Environment

Run calculating



Click the button Run to start calculating.

Exercise

STEP 3c – Environment

Look at the results

	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
111														
112														
113	PEC in STP ($mg.L^{-1}$)	PEC for local freshwater ($mg.L^{-1}$)	PEC for local freshwater sediment ($mg.kg_{dwt}^{-1}$)	PEC for local soil ($mg.kg_{dwt}^{-1}$)	PEC for local marine water ($mg.L^{-1}$)	PEC for local marine sediments ($mg.kg_{dwt}^{-1}$)	Total daily intake man via the environment regional ($mg.kg_{dw}^{-1}.d^{-1}$)	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR for humans via the environment regional
114	6.55E+02	6.55E+01	1.40E+03	3.11E+02	6.55E+00	1.40E+02	5.22E-04	7.80E+01	8.86E+02	3.03E+03	1.04E+03	8.86E+02	3.03E+03	2.32E-04
115	2.18E+01	2.19E+00	4.66E+01	1.04E+01	2.19E-01	4.66E+00	5.22E-04	2.60E+00	2.96E+01	1.01E+02	3.45E+01	2.96E+01	1.01E+02	2.32E-04
116	no STP	3.25E-02	6.93E-01	1.14E-05	3.16E-03	6.74E-02	5.22E-04	no STP	4.39E-01	1.51E+00	3.80E-05	4.28E-01	1.46E+00	2.32E-04
117	no STP	5.14E-03	1.10E-01	1.14E-05	4.26E-04	9.08E-03	5.22E-04	no STP	6.95E-02	2.38E-01	3.80E-05	5.76E-02	1.97E-01	2.32E-04

Scroll to Cell M111 and you can look at the results.

You find that the exposures and RCRs were estimated and that you cannot decided that the risks were controlled for environmental stages, Manufacture, Formulation, and Processing.

How you can get the results the controls of the risks?

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Exercise

STEP 3c – Environment

Refine

	A	B	C	D	E	F	G	H	I	J	K
111		**Environmental Assessment (including Man via Environment)**									
112								ERC approach		spERC approach	
113	No.	Description of use		Life cycle stage	Tonnage	Fraction of tonnage to region (for ERCs 1-7 and 12a,12b = 1, ERC 8-11b = 0.1)*	Use ERC or spERC as release estimation approach	ERC (mandatory in all cases as use descriptor !)	STP for ERC (default is Yes, unless for ERC 1-7 and 12a, 12b direct discharge is given)	Industry sector for spERC	spERC (select appropriate spERC - default STP setting is linked to spERC)
114	1	Manufacture & Transfer		Manufacturing	1.00E+05	1	spERC	ERC1	yes	ESVOC	ESVOC 1
115	2	Formulation & Transfer		Formulation	1.00E+04	1	spERC	ERC2	yes	CEPE	CEPE 1
116	3	Professional use (Painiting Wall)		Processing	1.00E+03	0.1	spERC	ERC8a	no	CEPE	CEPE 11
117	4	In room with the wall painted containing toluene as solvent		Service life	1.00E+03	0.1	ERC	ERC11a	no		

Find out the safe use conditions (to control the risk)

For example,

- *Use spERCs: ESVOC 1, CEPE 1 and CEPE 11 respectively for Manufacture, Formulation and Processing.*

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Exercise

STEP 3c – Environment

Look at the results

after *the refinement*

	M	N	O	P	Q	R	S	T	U	V	W			
111														
112														
113	PEC in STP ($mg.L^{-1}$)	PEC for local freshwater ($mg.L^{-1}$)	PEC for local freshwater sediment ($mg.kg_{dwt}^{-1}$)	PEC for local soil ($mg.kg_{dwt}^{-1}$)	PEC for local marine water ($mg.L^{-1}$)	PEC for local marine sediments ($mg.kg_{dwt}^{-1}$)	Total daily intake man via the environment regional ($mg.kg_{dw}^{-1}.d^{-1}$)	RCR in STP	RCR for local freshwater	RCR for local freshwater sediment	RCR for local terrestrial environment	RCR for local marine water	RCR for local marine sediments	RCR for humans via the environment regional
114	3.28E+01	3.28E+00	6.98E+01	1.55E+01	3.28E-01	6.98E+00	3.92E-05	3.90E+00	4.43E+01	1.52E+02	5.18E+01	4.43E+01	1.52E+02	2.77E-05
115	0.00E+00	2.46E-04	5.23E-03	3.20E-02	2.04E-05	4.35E-04	3.92E-05	0.00E+00	3.32E-03	1.14E-02	1.07E-01	2.76E-03	9.45E-03	2.77E-05
116	1.80E-04	2.64E-04	5.61E-03	8.67E-05	2.22E-05	4.73E-04	3.92E-05	2.14E-05	3.56E-03	1.22E-02	2.89E-04	3.00E-03	1.03E-02	2.77E-05
117	no STP	2.59E-04	5.52E-03	1.65E-06	2.18E-05	4.64E-04	3.92E-05	no STP	3.50E-03	1.20E-02	5.49E-06	2.94E-03	1.01E-02	2.77E-05

The refinement by spERCs lead to the results of the controlled risks except for the manufacturing process.

Seeking out the conditions for the controlled risks in the manufacturing process requires the higher tier assessment.

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Acknowledgement

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Thank you for your kind attention !

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