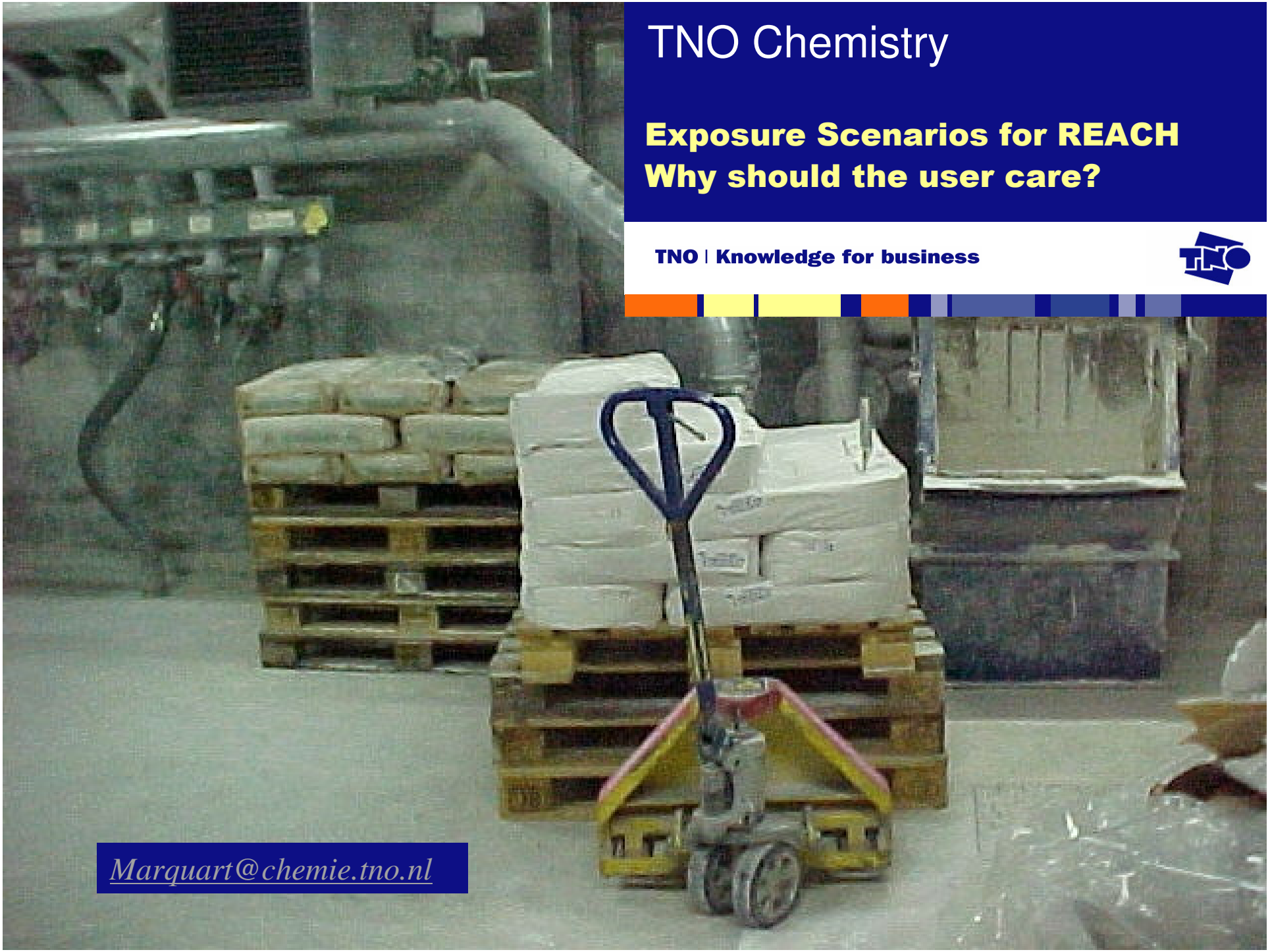


TNO Chemistry

Exposure Scenarios for REACH
Why should the user care?

TNO | Knowledge for business

Marquart@chemie.tno.nl

REACH – brief explanation

- Registration - manufacturers, importers
  - Technical dossier
  - Chemical Safety Report
- Evaluation - authorities
  - Compliance, dossier and substance
- Authorisation
  - Very hazardous substances
  - Also possibly “Restrictions”
- CHemicals

- Pre-registration
  - Stimulate cooperation

Chemical Safety Report

- Human health hazard assessment
  - Identification of Derived No Effect Level
- Environmental hazard assessment
  - Identification of Predicted No Effect Concentration
- Persistent, Bioaccumulation & Toxic (PBT) – Carcinogenicity, Mutagenicity & Reprotox → authorisation

+ if classified (Classification & labeling criteria)

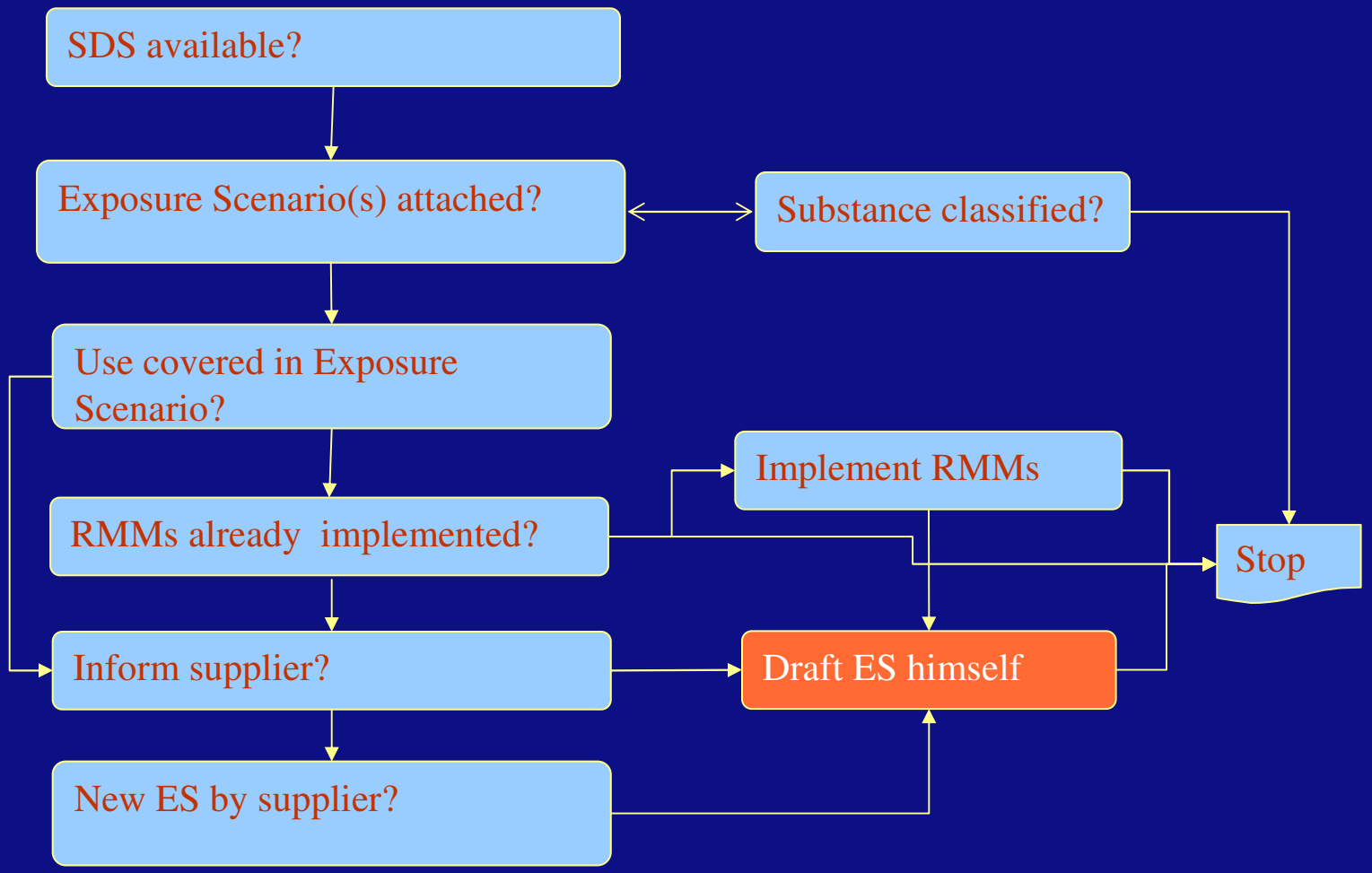
- Exposure assessment
- Risk Characterisation
- Exposure Scenarios (safe use description)
- Extended SDS

Exposure Scenarios under REACH

- Descriptions of "**Safe handling**" of a substance
  - Focus on risk management
- Part of Chemical Safety Report
  - Responsibility of registrant (in general)
  - For full product chain
- Linked to exposure assessment
- Communication to users via SDS

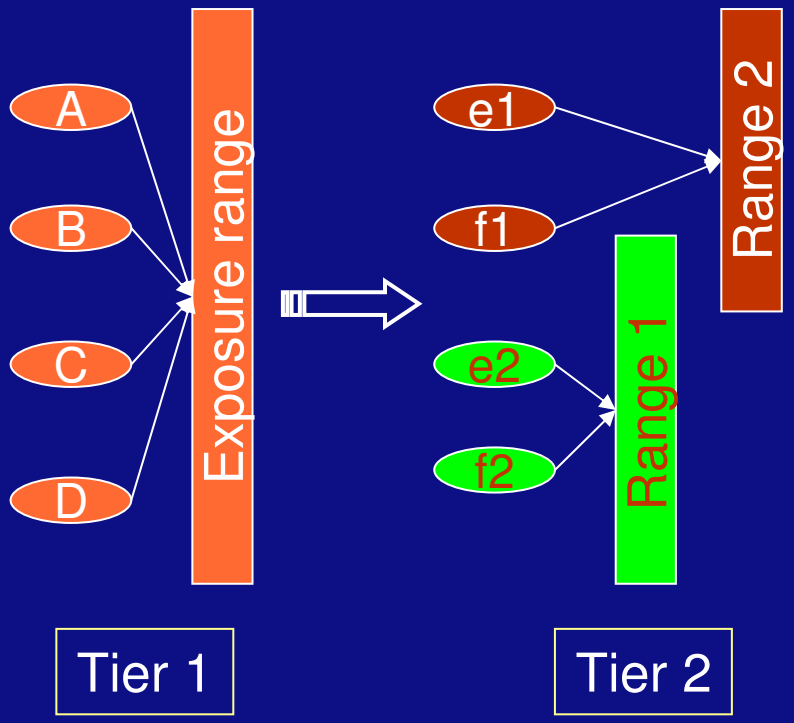
- Broad / generic ←→ narrow / specific
- Format and contents in development

Exposure Scenario by Downstream user?

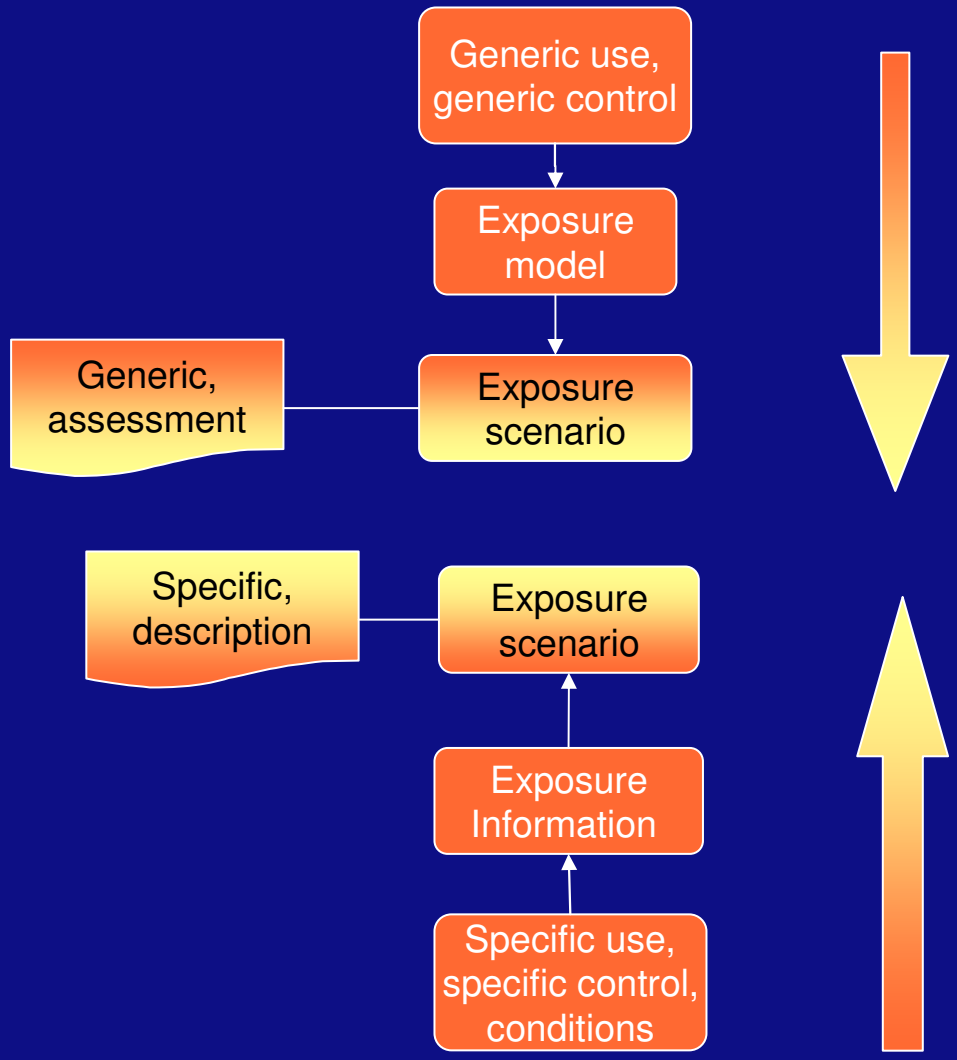


Determinants in Exposure scenario

- Highly critical determinants
  - Necessary for rough assessment
  - Phys. Chem. Substance/product
  - LEV
  - Minimal amount
- Important determinants
  - Percentage in product
  - Amount used/use rate
  - Type and size of packaging
  - Other RMMs
  - Viscosity of product
- Complicated assessmenst
  - More specific inputs
  - Measurement of exposure



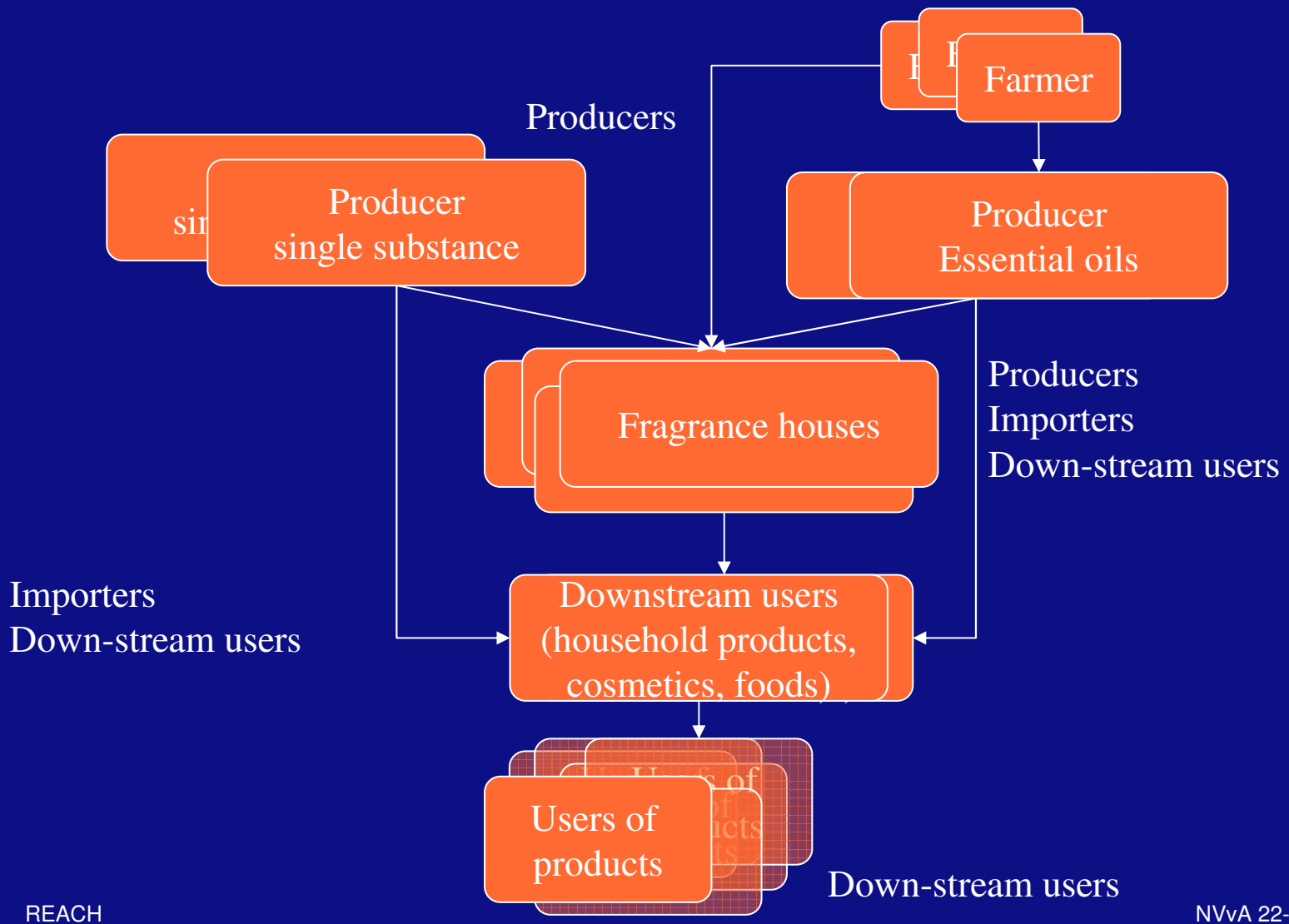
Two approaches



Top-down
Made by registrant
Focus: assessment

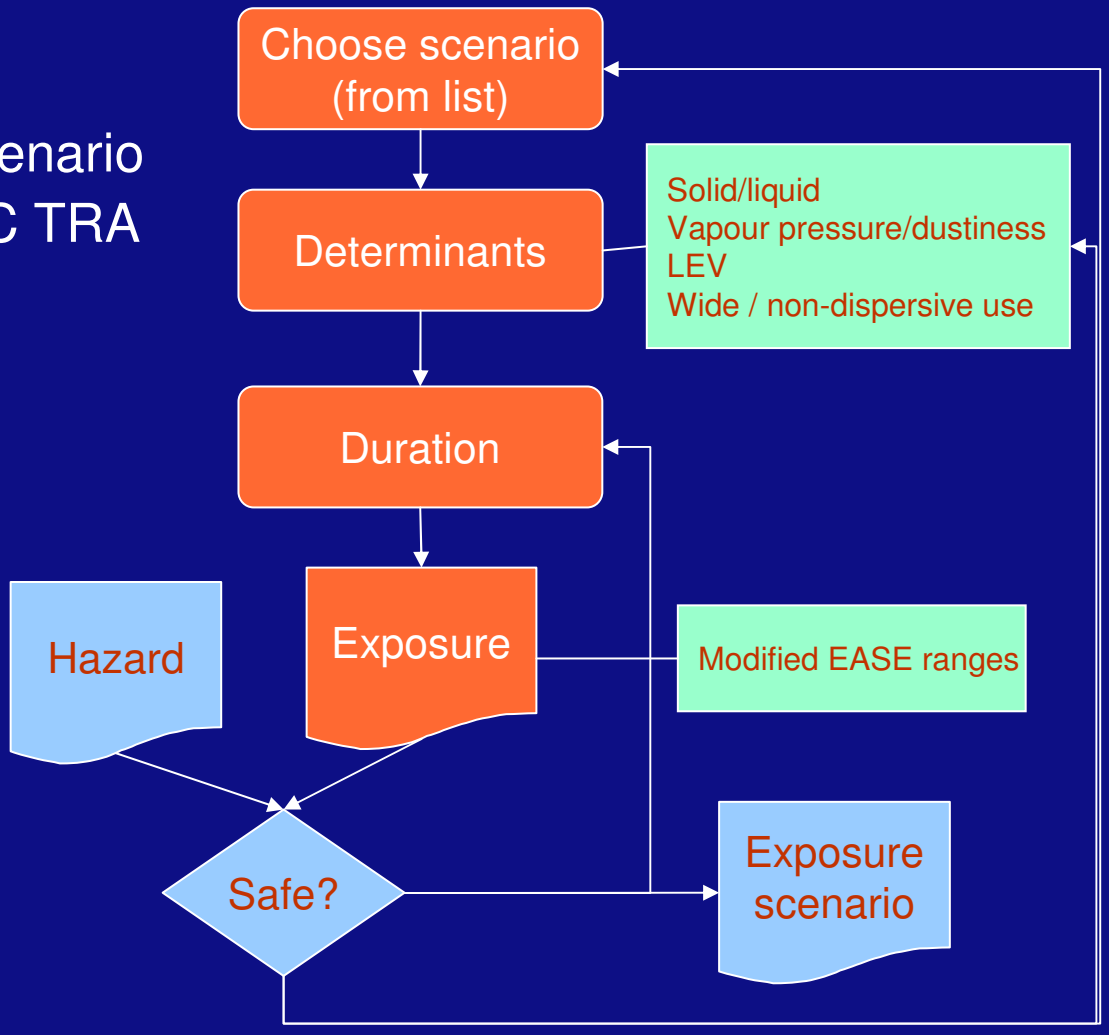
Bottom-up
Made by downstream user
Focus: description

SPORT - complex product chain



REACH Implementation Project 3.2-1

- Description of process
- “Tentative” Exposure Scenario
- Assessment → ECETOC TRA
- “Final” ES
- Annex to the SDS



Example outcome “Tier 1” ECETOC TRA

Table 2. The first iteration of Tier 1 assessment of the production of paint; inhalation exposure

Task	**Duration**	**LEV present?**	**Substance**	**GEV**[1)]	**Estimated exposure**[1)]	**MOE**	**Assessment factor**	Further assessment required
Mixing[a)]	> 4 hours	Yes	Diethanolamine	1	1	1	2	**Yes**
			Turpentine	1	25	0.04	2	**Yes**
			Ethylene glycol monoethyl ether	Not relevant	25	--	--	**--**
			Yellow 53	1	5	0.2	2	**Yes**
Mixing[b)]	1- 4 hours	No	Diethanolamine	1	3	0.33	2	**Yes**
			Turpentine	1	30	0.03	2	**Yes**
			Ethylene glycol monoethyl ether	Not relevant	30	--	--	**--**
			Yellow 53	1	15	0.07	2	**Yes**
(Dis)charging	1-4 hours	No	Diethanolamine	1	6	0.17	2	**Yes**
			Turpentine	1	30	0.03	2	**Yes**
			Ethylene glycol monoethyl ether	Not relevant	30	--	--	**--**
			Yellow 53	1	30	0.03	2	**Yes**
Filling	1-4 hours	No	Diethanolamine	1	6	0.17	2	**Yes**
			Turpentine	1	60	0.017	2	**Yes**
			Ethylene glycol monoethyl ether	Not relevant	60	--	**--**	**--**

RIP 3.2 – Textile dye

Scenario	Industrial use of textile dyes
Activities	• Industrial textile dyeing (exhaust process and padding process) • Raw material and onsite waste handling
Conc. in product	Up to 100 %
Duration/ frequency	Full shift, full year
RMM required 	Always • LEV for weighing and mixing • Segregate weighing area • Closed or covered mixer or hopper High contamination • Chemical resistant gloves • Half mask filter with FFP1

‘VASt’ project

PROGRAMMA VERSTERKING ARBOBELEID STOFFEN

- Information on processes, tasks, controls
  - Branches
  - Prior information at TNO
- Top-down: assessment cf. RIP 3.2 approach
  - Per process step
  - Discuss with industry
- Bottom-up:
  - Specific information – including exposure data
  - Structured workplace visits
  - Per full process
  - Discuss with industry

Primer-surfacer in car body repair - top-down

- Based on substance with highest risk

Scenario	Car body repair painting primer-surfacer
Activities	• Filling spray gun • Spraying
Type of substances	Liquids and solids (powders)
Duration and frequency	Daily; filling ≤ 1 hour per day; spraying ≤ 4 hour per day
Risk management measures	*Filling:* In mixing room; LEV (reduction ≥ 90%) *Spraying:* In preparation room: LEV (reduction ≥ 98%) *Both:* Gloves APF ≥ 6 + respiratory protection APF ≥ 4

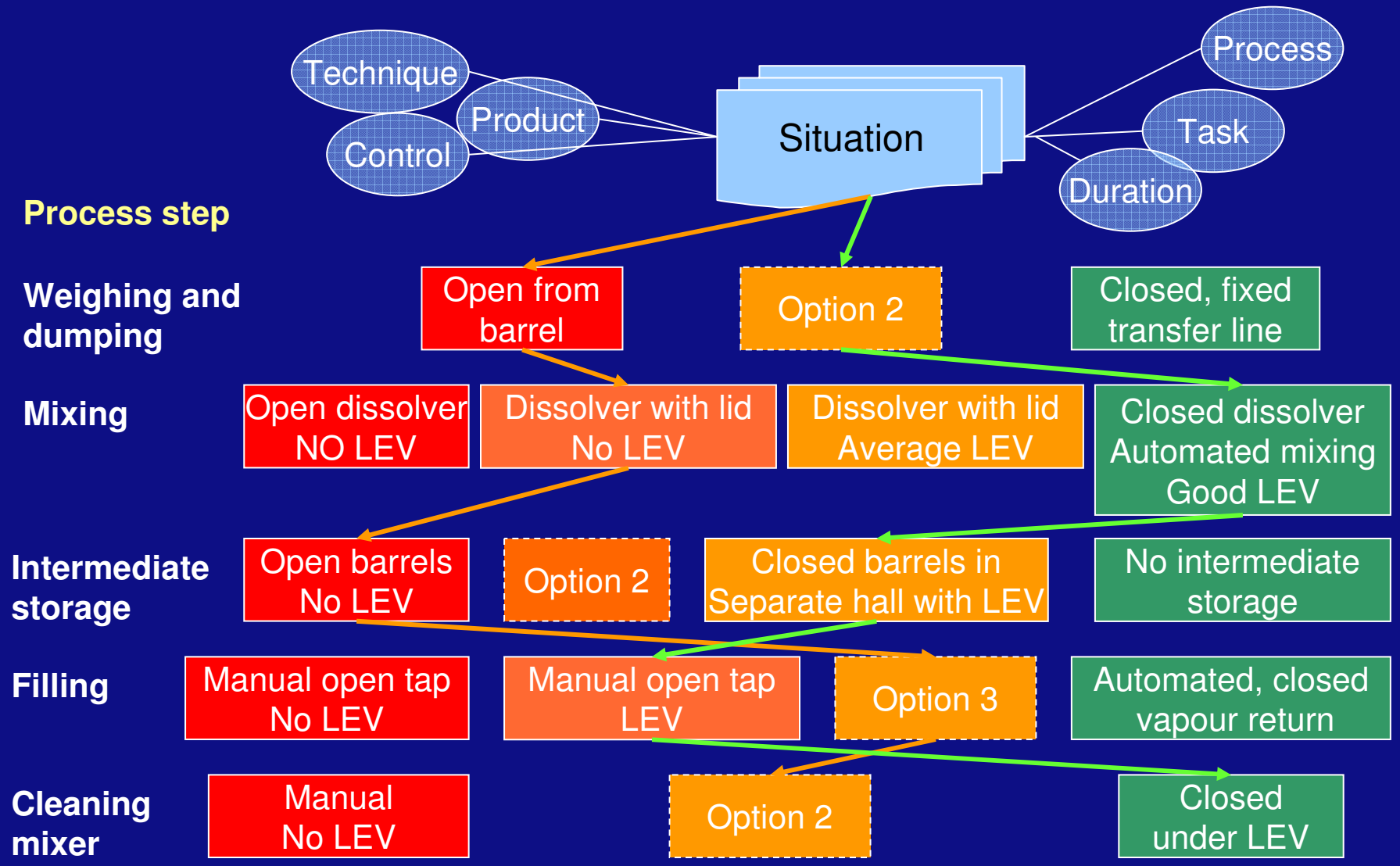
Exposure data?

- Paint industry
  - Volatile Organic Compounds (total)
    - Limited detail (tasks + exposure controls)
  - More useful data available - confidentiality
  - Limited other data sets from research – sufficient details
    - Powder dumping
    - Liquid transfer

- Car body repair shops
  - No data at companies
  - Some useful data from research

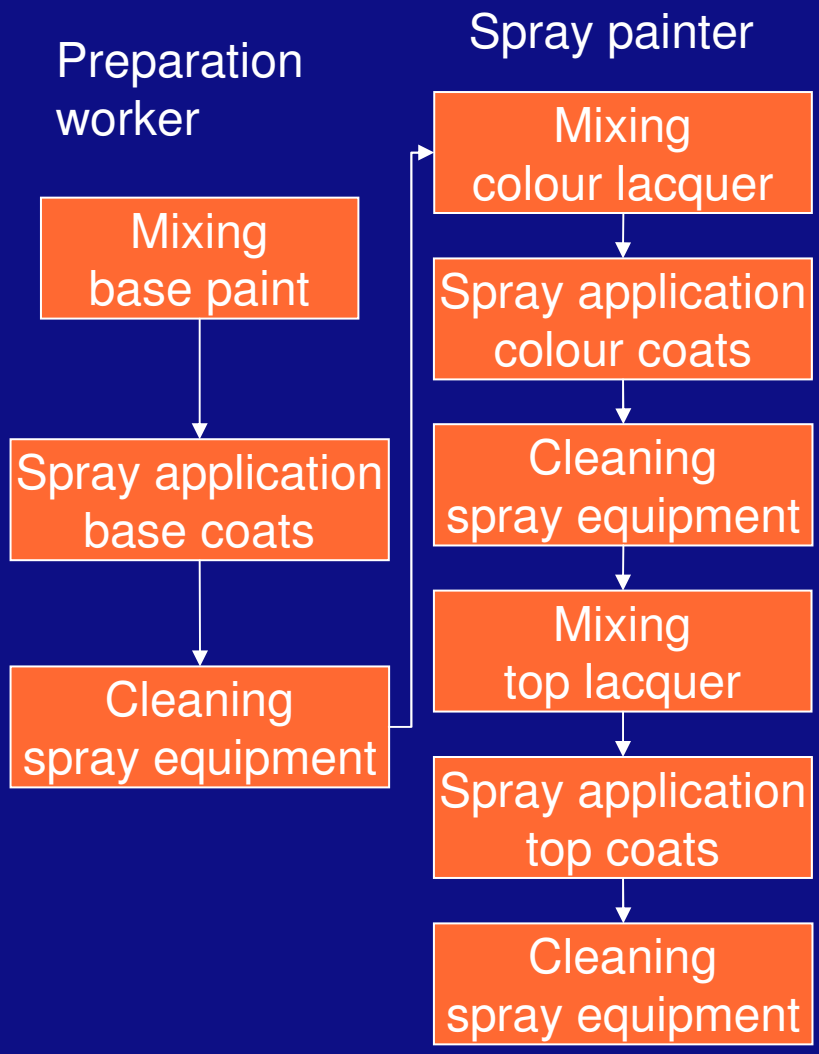
- Large data gaps!

Bottom-up: Exposure Scenario Builder



Bottom-up - Car body repair painting

- General process flow
- Limited variation in major process steps
- Fixed combinations task, work area and controls
- One single scenario for whole industry



Exposure scenario car body repair painting

Exposure control measures available and in use	
General	• Mechanical area ventilation
Mixing	• LEV at edges of work tables • No LEV above weighing balance • Close paint cans after use
Spraying	Base coat LEV ceiling to wall compartmenting by plastic curtains Colour and top coats Spray booths with laminar flow system: ceiling to bottom Both HVLP spray guns
Cleaning spray equipment	LEV at spray gun cleaning machine and at edges of work tables

Exposure scenarios for REACH
Why should the user care?

- "Top-down" scenarios
  - Generic and conservative
  - Not fit to users
- Possibly many scenarios for the same process
  - Several suppliers , many substances

- Active users
  - Cooperation in branche(s) → market power
- "Bottom-up" scenarios
  - Structure available information
    - Use, Processes, Conditions, RMM, Exposure levels
  - Understandable for downstream users
  - Flexibility in Exposure Scenarios

Final recommendations

- Provide information upstream
- Use generic tools, models
- And specific information

Advanced tool needed

- Gather exposure data
- Cooperate in product chain
- **Use occupational hygiene expertise**

Thank you!