Development of Generic Exposure Scenarios (GES)

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Outline

• Introduction to ESIG

• Development of Generic Exposure Scenarios
  ❖ Background
  ❖ Features
  ❖ Example output
  ❖ Experiences in application
  ❖ Cefic guidance
ESIG Members

- **HSPA**: 11 members
  - Cepsa Química
  - DHC Solvent Chemie
  - Dow Haltermann
  - ExxonMobil
  - Galp
  - Hellenic Petroleum
  - INeste Oil
  - Petrochem Carless
  - Sasol
  - Shell Chemicals
  - Total Fluides

- **OSPA**: 20 members
  - Arkema
  - BASF
  - Borealis
  - Celanese
  - Cepsa Química
  - Clariant
  - Domo
  - ExxonMobil
  - Ineos Oxide
  - Ineos Phenol
  - LyondellBasell
  - Oxea Chemicals
  - Oxochimie
  - Perstorp
  - Polimeri Europa
  - Novacap
  - Sasol
  - Sekab
  - Shell Chemicals
The Solvents' Cluster Organogram

- ECSA (Chlorinated)
- HOGPA (Hydrocarbon)
- OSPA (Oxygenated)

ESIG

+ users trade associations

HSE WG
VOC WG
IPPC WG

BuOHs
Acetone
Glycol Ethers
MEK
IPA
MIBK
Acetates

ES-VOC-CG
<table>
<thead>
<tr>
<th>Membership Category</th>
<th>Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning and maintenance</td>
<td>AISE, ACEA, AFERA, BLIC, CEIBOIS, CEPE, CINET, COLIPA, COTANCE, EURATEX, ECSA, EFPIA, EMPAC, EPC, ERA, EUROPACABLE, EUROPANEL</td>
</tr>
<tr>
<td>Automobile</td>
<td>EWPM, FEA, FECC, FEDERAUTO, FEDES, FEDIOL, FEICA, FINAT, INTERGRAF, SRM, UEA, CIA, ESSENSCIA, FEDERCHEMICA, UIC, VCI, VNCI</td>
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<tr>
<td>Self-Adhesive tapes</td>
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<td>Rubber goods</td>
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<td>Wood working</td>
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<td>Paint &amp; printing inks</td>
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<tr>
<td>Dry cleaning</td>
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<tr>
<td>Cosmetics</td>
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<tr>
<td>(Leather processing)</td>
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<tr>
<td>Textile manufacture</td>
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<tr>
<td>(Chlorinated solvents)</td>
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<tr>
<td>Pharmaceuticals</td>
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<tr>
<td>Metal packaging</td>
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<tr>
<td>Plastics converting</td>
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<td>Publication printing</td>
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<tr>
<td>Winding wires</td>
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<td>Wood preservation</td>
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</table>
Background to GES development

- ESIG members responsible for the supply of >1000 different solvents
- Widespread uses with many different applications
  - And endless different combinations of exposures
- Concern about the level of resource burden for chemical suppliers and downstream customers to manage the effective development of Exposure Scenarios to meet the ambitious REACH deadlines
  - All commodity solvents manufactured and sold at >1000 tonnes
- Reduced complexity by standardized tools and communication with downstream users \(\rightarrow\) cost and time savings for all parties
What is a Generic Exposure Scenario? (GES)

- GESs describe ESs for (groups of) substances for an area of operation/type of application within industry and are developed by M/Is in partnership with DU Associations (surrogate for individual DU)
  - Substances clustered by hazard and volatility and grouped by type of application (i.e. have a similar risk profile)
  - Each GES consolidates related tasks/activities involving potential for exposure (Contributing Scenarios) which are mapped to relevant use descriptor codes (Worker – PROC codes; Consumer – PC codes)
- M/I (Consortia) select relevant GES to support their substance registration
  - GES and supporting documentation is refined as necessary to form the substance-specific ES for demonstration of safe use and inclusion within their CSR
- ES is transferred to the e-SDS for communication to customers
Key Characteristics of GESS

1. Focus on common areas of use of a (group of) substance (that can be characterised by groups of PROCs, PCs and/or ERCs)
2. Comprise ‘simple’ titles (and descriptions) that describe the areas of use and that are understandable across DUs within and across supply chains
3. Involve the collaboration of M/I (and/or formulator) associations and DU associations
4. Represent a mapping of all (or key parts of) the supply chain for a substance (or groups of substances)
5. Follow a process that aligns with the requirements of the TGD and delivers documentation sufficient to meet these for a CSR and/or eSDS (subject to confirmation on the part of the registrant)
6. Communicate all relevant OCs and RMMs for the identified scenarios
7. Describe the ES according to a library of standard phrases
8. Uses the ECETOC TRA Tier 1 exposure modelling tool
Thorough DU Dialogue is key to the success of GES Development

1. Based on initial list of identified solvent applications, ESIG characterised exposures and emissions in supply chain

2. Relevant ESVOC trade group(s) reviewed mapping for affected uses / applications and identified where revisions required e.g. increased scope; absent PROC codes; etc.

3. ESIG developed initial GES(s) using mapping/CSA template tool.

4. Relevant ESVOC trade group(s) reviewed initial GES(s) and identified where RMMs / OCs appeared inappropriate
   - Provided input on alternative RMMs
   - If RMMs appear too stringent, then provide exposure data to support deviation away from Tier 1 approaches

5. ESIG considered / adopted changes:-
   a) Incorporated into final matrix for CSA ES submissions
   b) Populated / supporting Excel based GES using standard RMM phrases
   c) Finalised narrative version of ES for eSDS communication, and
   d) Posted information into ESVOC GES library for use by Consortia in substance specific CSA development
Current GES Titles for Solvents

- Manufacture incl. use as process solvent and extraction agent (I)
- Use as an Intermediate (I)
- Distribution (I)
- Formulation & (re)packing of substances and mixtures (I)
- Use in Coatings (I, P & C)
- Use in Cleaning agents (I, P & C)
- Lubricants (I, P & C)
- Functional fluids (I, P & C)
- Use in Oil & Gas field drilling and production operations (I, P)
- Metal working fluids / rolling oils (I,P)
- Blowing agents (I)
- Use in fuels (I, P & C)
- Use as Binders & Release agents (I, P)
- Use in Agrochemicals (P, C)
- Road and construction operations (P)
- Other consumer uses (cosmetics and personal care) (C)
- De-icing and anti-icing applications (P, C)
- Polymer processing (I, P)
- Rubber production and processing (I)
- Water treatment chemicals (I, P & C)
- Explosive manufacture and use (P)
- Mining chemicals (I)
- Use in laboratories (I, P)
- Titles allow integration of Human Health and Environmental assessments within one ES

- 22 potentially relevant GES titles
- 41 potentially relevant ESs for any solvent (consolidating 5 – 10 Contributing Scenarios per ES)
### Section 1 – Exposure Scenario Title

<table>
<thead>
<tr>
<th>Title</th>
<th>Use in coatings [GEST3_I] – Industrial [G26]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Descriptor</td>
<td>Sector of Use: Industrial (SU3)</td>
</tr>
<tr>
<td>Process Categories</td>
<td>PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15</td>
</tr>
<tr>
<td>Environmental Release Categories</td>
<td>ERC 4, ESVOC SpERC 4.3a.v1</td>
</tr>
<tr>
<td>Processes, tasks, activities covered</td>
<td>Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. [GES3_I]</td>
</tr>
</tbody>
</table>

### Section 2 – Operational conditions and risk management measures

<table>
<thead>
<tr>
<th>Section 2.1</th>
<th>Control of worker exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product characteristics</td>
<td></td>
</tr>
<tr>
<td>Physical form of product</td>
<td>Liquid, vapour pressure 0.5 - 10 kPa [OC4].</td>
</tr>
<tr>
<td>Concentration of substance in product</td>
<td>Covers percentage substance in the product up to 100 % (unless stated differently) [G13].</td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td>Covers daily exposures up to 8 hours (unless stated differently) [G2]</td>
</tr>
<tr>
<td>Other Operational Conditions affecting worker exposure</td>
<td>Assumes use at not &gt; 20°C above ambient temperature unless stated differently [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].</td>
</tr>
</tbody>
</table>
## Example – communicating safe use

<table>
<thead>
<tr>
<th>Contributing Scenarios</th>
<th>Risk Management Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>General measures (skin irritants) [G19]</td>
<td>Avoid direct contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with the substance is likely. Clean up contamination / spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop [E3]</td>
</tr>
<tr>
<td>General exposures (closed systems) [CS15]. With sample collection [CS56]. Use in contained systems [CS38].</td>
<td>No other specific measures identified [E20].</td>
</tr>
<tr>
<td>Mixing operations (closed systems) [CS29].</td>
<td>No other specific measures identified [E20].</td>
</tr>
<tr>
<td>Preparation of material for application [CS96] Mixing operations (open systems) [CS30].</td>
<td>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11].</td>
</tr>
<tr>
<td>Film formation - force drying, stoving and other technologies [CS99]</td>
<td>No other specific measures identified [E].</td>
</tr>
<tr>
<td>Spraying (automatic/robotic) [CS97]</td>
<td>Carry out in a vented booth provided with laminar airflow [E59].</td>
</tr>
<tr>
<td>Manual [CS34]. Spraying [CS10].</td>
<td>Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). [E11]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]</td>
</tr>
</tbody>
</table>

### General measures applicable to all activities

- **Avoid direct contact with product.**
- **Identify potential areas for indirect skin contact.**
- **Wear gloves (tested to EN374) if hand contact with the substance is likely.**
- **Clean up contamination / spills as soon as they occur.**
- **Wash off any skin contamination immediately.**
- **Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.** [E3]

### Standard phrases to Support Transition into SDS and translation

- **CS and RMMs relevant for a task (PROC) clearly distinguished and described in manner relevant for DU**

### Transition into SDS and translation

- **Contributing Scenarios**
  - General measures (skin irritants) [G19]
  - General exposures (closed systems) [CS15]. With sample collection [CS56]. Use in contained systems [CS38].
  - Mixing operations (closed systems) [CS29].
  - Preparation of material for application [CS96] Mixing operations (open systems) [CS30].
  - Film formation - force drying, stoving and other technologies [CS99]
  - Spraying (automatic/robotic) [CS97]
  - Manual [CS34]. Spraying [CS10].
2010 Experiences in application

- Efficiencies of scale achieved
- Delivery against the 1st Registration deadline achieved
- Facilitated sensible use alignment dialogue with DUs prior to registration; limited feedback post registration on Uses overlooked
- GES concept applied by a number of Consortia, not just Solvents, aiding consistency and standardisation
  - Supporting ease of transition into Safety Data Sheets
  - Communication of consistent message to Downstream Users (although may be packaged differently due to differences in company SDS systems)

Require understanding in their application; tight timescales impacted effective training of Consultants

Limited opportunity to incorporate identified adjustments / improvements into the GES documentation during the 2010 registration period
Cefic GES guidance & tools:

- Developing GES under REACH, July 2009
  - supporting peer reviewed article in the BOHS Annals Occup Hyg Vol 55, No.5, pp 451-464, 2011
- GES Worker Chemical Safety Assessment Template, Feb 2010 (update in hand)
- Specific Environmental Release Classes (SPERCs), April 2010
- SPERC Guidance, July 2010
- Extended library of SpERCs and supporting justifications, Sept 2011
- Collation of Sector Association information supporting development of Exposure Scenarios

http://www.cefic.org/Industry-support/Implementing-reach/Documents-and-tools1
Thank you for your attention!
Background to GES Development

TOTAL INDUSTRY NUMBER ES = $L \times N \times M$
Background to GES development

- **SOLVENT**: SOLVENT 1, SOLVENT 2, SOLVENT 3, SOLVENT 4, SOLVENT 5, SOLVENT 6, SOLVENT X, SOLVENT Y, SOLVENT Z
- **USE**: USE 1, USE 2, USE 3, USE 4, USE 5, USE 6, USE α, USE β, USE γ

**GES 1** (CSA1)
**GES 2** (CSA2)
**GES 3** (CSA3)
**GES 22** (CSA22)