Seveso III Directive

Implications for Irish Industry

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Chartered Engineer

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Byrne Ó Cléirigh Consulting

- Management & Engineering Consultancy since 1981:
  - Energy
  - Risk Management
  - Environmental Protection
- Blue chip client base in private & public sector
Seveso / COMAH History

  - Wider range of substances
  - Environmental releases
  - Specified Area for emergency planning
  - HSA role in land-use planning
  - Specific duty on HSA to prohibit or restrict unsafe operation
  - Strong emphasis on management systems
  - Changes to Annex I to reflect ATP
Focus is on Major Accidents

• Seveso III
  – “an occurrence such as a major emission, fire or explosion resulting from uncontrolled developments in the course of the operation of any establishment covered by this Directive, and leading to a serious danger to human health or the environment, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances.”

• General duty of Operators
  – “to take all necessary measures to prevent major accidents and to limit their consequences for human health and the environment”
# Principal Obligations

<table>
<thead>
<tr>
<th>Obligation</th>
<th>Lower Tier</th>
<th>Upper Tier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification to Competent Authorities</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Major Accident Prevention Policy (MAPP) &amp; Safety Management System (SMS) to implement it</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hazard Identification and Risk Assessment (HAZID)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Internal Emergency Plan</td>
<td>~</td>
<td>✓</td>
</tr>
<tr>
<td>Information to Authorities for External Emergency Plan</td>
<td>~</td>
<td>✓</td>
</tr>
<tr>
<td>Safety Report</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Information to the Public</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Information to Planning Authorities</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Consider inter-site domino effects</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Existing Seveso Establishments

Lower Tier Establishments

Upper Tier Establishments
Transition from Seveso II to Seveso III

- Changes to the system for classifying materials
- Status of some sites could change
  - Newly qualified establishments, at lower or upper tier
  - Some operators may move from lower to upper tier, and vice versa
  - Some establishments may drop out of the regime
  - In most cases the status will remain unchanged
- Other changes
  - Derogations / safeguards
  - Information to the public
  - HSA inspections
System for Classification of Materials

- Seveso – Major Accidents involving Dangerous Substances
  - Fire Hazard (Flammable / Explosive / Oxidising)
  - Acute Toxic Hazard
  - Eco-Toxic Materials
  - Other (water reactives, some carcinogens)

- Seveso II – Dangerous Substances Directive (DSD)
  - DSD is being phased out
  - Replaced by Classification Labelling and Packaging (CLP) Regulation

System for Classification of Materials

- Changes from DSD to CLP
  - Hazard Labels → Pictograms
  - Risk Phrases → Hazard Statements

Source: www.hsa.ie
Hazard Statements

- **200**: Physical Hazards
  - Fires, explosions, corrosives etc.

- **300**: Health Hazards
  - Acute and chronic effects

- **400**: Environmental Hazards
  - Aquatic environment and ozone

- **Other Hazards (EUH Statements)**
  - Specific to EU (various older R nos.)
Seveso III Substances

• Materials identified in Annex I of Seveso III Directive
  – Part I – Categories of Dangerous Substances
  – Part 2 – Named Dangerous Substances

• Categories of Dangerous Substances
  – H – Health Hazards (acute toxicity)
  – P – Physical Hazards (various fire / explosion hazards)
  – E – Environmental Hazards (aquatic environment)
  – O – Other Hazards (water-reactives, some carcinogens)

• Named Substances generally fall within these categories

• Addition Rule for combining materials with similar hazards
Complications with Transition

- Will not be a neat transition for all hazard categories

- **Acute Toxicity:**
  - LD50, LC50 thresholds

- **Flammability:**
  - Changes to Boiling Point and Flash Point thresholds

- **Mixtures and Preparations**
  - Changes to aggregation rules (M-factor for ecotoxic materials)
Acute Toxicity – Seveso II

- Schedule 1 of SI 74 of 2006 (Seveso II Regulations)

<table>
<thead>
<tr>
<th>Categories of dangerous substances</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualifying quantity (tonnes) of dangerous substances as delivered in Article 3 (4), for the application of Articles 6 and 7</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>1. VERY TOXIC</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>2. TOXIC</td>
<td>50</td>
<td>200</td>
</tr>
</tbody>
</table>
Acute Toxicity – DSD to GHS

Increasing Toxicity

<table>
<thead>
<tr>
<th>Method</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Dermal</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Inhalation (vapour)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Inhalation (aerosol)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Inhalation (gas)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Acute Toxicity – Seveso III

- Annex I of Directive 2012/18/EU (Seveso III Directive)

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard categories in accordance with Regulation (EC) No 1272/2008</td>
<td>Qualifying quantity (tonnes) of dangerous substances as referred to in Article 3(10) for the application of</td>
<td></td>
</tr>
<tr>
<td>Lower-tier requirements</td>
<td>Upper-tier requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Section ‘H’ – HEALTH HAZARDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H1 ACUTE TOXIC Category 1, all exposure routes</strong></td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td><strong>H2 ACUTE TOXIC</strong></td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>— Category 2, all exposure routes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— Category 3, inhalation exposure route (see note 7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H3 STOT SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE</strong></td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>STOT SE Category 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Acute Toxicity – Very Toxic materials (T+)

<table>
<thead>
<tr>
<th>Dangerous Substances Classification</th>
<th>COMAH Thresholds</th>
<th>Corresponding GHS Classification</th>
<th>COMAH Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower</td>
<td>Upper</td>
<td></td>
</tr>
<tr>
<td>Very Toxic</td>
<td>5</td>
<td>20</td>
<td>H1 Acute Toxic – Category 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H2 Acute Toxic – Category 2</td>
</tr>
</tbody>
</table>

#### Toxicity Levels

- **T+**
- **T**
- **Xn**

<table>
<thead>
<tr>
<th>Route</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
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<tbody>
<tr>
<td>Oral</td>
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</tr>
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# Acute Toxicity – Toxic materials (T)

<table>
<thead>
<tr>
<th>Dangerous Substances Classification</th>
<th>COMAH Thresholds Lower</th>
<th>COMAH Thresholds Upper</th>
<th>Corresponding GHS Classification</th>
<th>COMAH Thresholds Lower</th>
<th>COMAH Thresholds Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic</td>
<td>50</td>
<td>200</td>
<td>H2 Acute Toxic – Category 2</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Category 3 (inh) or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H3 – STOT Category 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other Category 3 materials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Oral**

1. T+
2. T
3. Xn

**Dermal**

1. T+
2. T
3. Xn

**Inhalation (vapour)**

1. T+
2. T
3. Xn

**Inhalation (aerosol)**

1. T+
2. T
3. Xn

**Inhalation (gas)**

1. T+
2. T
3. Xn

![Diagram](image)
### Acute Toxicity – Toxic materials (T)

<table>
<thead>
<tr>
<th>Dangerous Substances Classification</th>
<th>COMAH Thresholds</th>
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<th>COMAH Thresholds</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lower</td>
<td>Upper</td>
<td></td>
</tr>
<tr>
<td>Toxic</td>
<td>50</td>
<td>200</td>
<td>H2 Acute Toxic – Category 2 Category 3 (inh) or H3 – STOT Category 1</td>
</tr>
<tr>
<td>Other Category 3 materials</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
</tbody>
</table>

#### Oral

- **T+**
- **T**
- **Xn**

#### Dermal

- **T+**
- **T**
- **Xn**

#### Inhalation (vapour)

- **T+**
- **T**
- **Xn**

#### Inhalation (aerosol)

- **T+**
- **T**
- **Xn**

#### Inhalation (gas)

- **T+**
- **T**
- **Xn**
# Acute Toxicity – Others

<table>
<thead>
<tr>
<th>Dangerous Substances Classification</th>
<th>COMAH Thresholds Lower</th>
<th>COMAH Thresholds Upper</th>
<th>Corresponding GHS Classification</th>
<th>COMAH Thresholds Lower</th>
<th>COMAH Thresholds Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmful</td>
<td>n.a.</td>
<td>n.a.</td>
<td>Category 3 (inh) or H3 – STOT Category 1</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other Category 3 materials</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Category 4 materials</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

**Diagram: T+ T Xn**

### Oral

- 1
- 2
- 3
- 4

### Dermal

- 1
- 2
- 3
- 4

### Inhalation (vapour)

- 1
- 2
- 3
- 4

### Inhalation (aerosol)

- 1
- 2
- 3
- 4

### Inhalation (gas)

- 1
- 2
- 3
- 4
Acute Toxicity – Effect of MW for Gases

- Gas thresholds now expressed as ppmV – previously were mg/l
Flammability

Source: [www.echa.europa.eu](http://www.echa.europa.eu)
## Example – Hydrogen Fluoride

<table>
<thead>
<tr>
<th>Dangerous Substances Directive</th>
<th>Globally Harmonised System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very Toxic (T+)</strong>&lt;br&gt;R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed</td>
<td><strong>Acute Toxic (Cat 2)</strong>&lt;br&gt;H300: Fatal if swallowed&lt;br&gt;H310: Fatal in contact with skin&lt;br&gt;H330: Fatal if inhaled</td>
</tr>
<tr>
<td><strong>Corrosive (C)</strong>&lt;br&gt;R35: Causes severe burns</td>
<td><strong>Skin Corrosive (Cat 1A)</strong>&lt;br&gt;H314: Causes severe skin burns and eye damage</td>
</tr>
</tbody>
</table>
### Example – Methanol

<table>
<thead>
<tr>
<th>Dangerous Substances Directive</th>
<th>Globally Harmonised System</th>
</tr>
</thead>
<tbody>
<tr>
<td>R11: Highly Flammable</td>
<td>H225: Highly Flammable Liquid and Vapour (Cat 2)</td>
</tr>
<tr>
<td>Toxic (T)</td>
<td>Acute Toxic (Cat 3)</td>
</tr>
<tr>
<td>R23/24/25: Toxic by inhalation, in contact with skin and if swallowed</td>
<td>H301: Toxic if swallowed</td>
</tr>
<tr>
<td>R39/23/24/25: Danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed</td>
<td>Acute Toxic (Cat 3)</td>
</tr>
<tr>
<td></td>
<td>H311: Toxic in contact with skin</td>
</tr>
<tr>
<td></td>
<td>Acute Toxic (Cat 3)</td>
</tr>
<tr>
<td></td>
<td>H331: Toxic if inhaled</td>
</tr>
<tr>
<td></td>
<td>STOT SE 1</td>
</tr>
<tr>
<td></td>
<td>H370: Causes damage to organs</td>
</tr>
</tbody>
</table>
Named Substances (some examples)

- HFO reclassified by Concawe (R52/53 to R50/53)
  - New Regulations will include this as a Named Substance
- Biofuels
  - Alternative fuels serving the same purposes and with similar properties as regards flammability and environmental hazards
- Mixtures of Sodium Hypochlorite
  - If classed as Aquatic Acute Cat 1 solely due to presence of NaClO
- Others
  - BF₃, Anhydrous NH₃ and H₂S – limited implications
Summary – Classification of Materials

• DSD and CLP systems are not aligned
  – Some T+ materials will have higher Qualifying Quantities: $\Sigma q/Q \downarrow$
  – Some Xn materials will become Seveso materials: $\Sigma q/Q \uparrow$
  – Some implications for certain Flammable materials: $\Sigma q/Q \uparrow$

• Addition rule still used for inventory calculation

• Different types of establishment under legislation
  – New: Newly constructed or due to changes at site
  – Existing: Qualifies under Seveso II and Seveso III without changing status
  – Other
Derogations / Safeguards

• Scope for materials to be excluded regardless of Hazard Classification
  – If it is impossible in practice for a particular dangerous substance to cause a release of matter or energy that could create a major accident under normal and abnormal conditions which can reasonably be foreseen

• Industry can make the case – decision made by Commission

• Scope also for additional materials to be included
  – Where they would not otherwise qualify on the basis of hazardous properties

• Cater for future changes in material classifications
Information to the Public

• Changes to Seveso Directive to reflect Aarhus Convention
  – Provision of Information to the Public
  – Public participation in decision-making
  – Access to justice on environmental matters
  – Lower and Upper Tier establishments and to the authorities (Article 14)

• Additional requirements for Upper Tier establishments
  – Information on Safety Report
  – To be made available electronically
Information to the Public

• Requirements for all operators unless Article 22 applies

• Provisions for Confidentiality
  – Commercial sensitivity
  – Security considerations

• Not yet clear how much information or what format
  – Information on Safety Report – how much detail; template?
  – Available electronically – website?
Inspections by HSA

• Flexible system based on hazard/risk
• Upper Tier – annual (or more frequent)
• Lower Tier – three yearly (or more frequent)
  – Frequency can be changed if CA draws up inspection programme based on systematic appraisal of the MAH at the site concerned
• Cross-reference with other inspections under EU legislation
• Operators must include up-to-date information on HSA inspections as part of their online information to public
Ongoing Compliance

• Notifications
  – Inventory calculation ($\Sigma q/Q$) will need to be updated
  – Review information on neighbouring establishments

• MAPP / SMS
  – Not significant; should be updated to reference the new legislation
  – Specific procedures may need to be updated to reflect changes

• HAZID and Safety Report
  – Case-by-case basis – how significant are the changes?
  – Subject to periodic review in any case
Ongoing Compliance

• Internal Emergency Plan
  – Should reflect the hazards on site (significant changes to HAZID?)

• External Emergency Plan
  – For new plans – public concerned should have opportunity to comment
  – Public concerned – not just those within the Specified Area
Land Use Planning

- Robust system already in place (Individual & Societal Risk)

(From HSA LUP guidance document)
Conclusions

• Similar to Seveso II (not as significant as Seveso I → II)

• Status of some sites may change as a result of new system
  – Changes in materials’ classification (ongoing)
  – Efforts at EU level to moderate Seveso implications

• Potential Areas of Interest in coming years
  – $\Sigma q/Q$ calculation (particularly for those close to existing thresholds)
  – Information to Public (CA to develop guidance or templates?)
  – Inspections
Seveso III Directive

Implications for Irish Industry

Thomas Leonard, BE MEngSc
Chartered Engineer

28th November 2013