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# REACH Overview

SESHA Texas Hill Country Chapter  
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INTERNATIONAL SEMATECH

**ISMI**

MANUFACTURING INITIATIVE

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- **Keith Huckle, Christine Stevens – Dow Corning**
- **Laura Rosatto, Dirk Daneels – Honeywell**
- **Rory McCarthy – Brewer Science**
- **Catherine Jakus – JSR**
- **Eric Fortuit – Air Liquide**
- **Mike Kitchen – Rohm & Haas**

# Agenda

- REACH Overview
- ISMI/ESIA Project – Development and Application of Semiconductor Generic Exposure Scenario
- Articles
- Industry REACH Challenges - Communication
- What should device manufacturers do?

# Agenda

- **REACH Overview**
- **ISMI/ESIA Project – Development and Application of Semiconductor Generic Exposure Scenario**
- **Articles**
- **Industry REACH Challenges - Communication**
- **What should device manufacturers do?**

# Acronyms

- **REACH** - **R**egistration, **E**valuation and **A**uthorisation of **C**hemicals
- **ES** – **E**xposure **S**cenario
- **CSA** – **C**hemical **S**afety **A**ssessment
- **CSR** – **C**hemical **S**afety **R**eport
- **CMR** – **C**arcinogen, **M**utagen, **R**eproductive toxicant
- **DU** - **D**ownstream **U**ser
- **POPs** – **P**ersistent **O**rganic **P**ollutants
- **PBT** – **P**ersistent, **B**ioaccumulative, **T**oxic
- **MI** – **M**anufacturer/**I**mporter
- **RMM** – **R**isk **M**anagement **M**easure
- **RIP** – **REACH** **I**mplementation **P**rojects
- **SDS** – **S**afety **D**ata **S**heet
- **SVHC** – **S**ubstance of **V**ery **H**igh **C**oncern
- **TGD** – **T**echnical **G**uidance **D**ocument
- **vPvB** – **v**ery **P**ersistent, **v**ery **B**ioaccumulative

# What is REACH?

- New chemical regulation that will change the manner in which chemicals are regulated and used in Europe
- Strengthens industry responsibility for chemical safety
- Aims to ensure high level of protection of human health and environment
- Certain **C**hemicals supplied / imported into Europe > 1tpa will require:
  - Pre-Registration by November 2008 – share data & cost
  - Fully Registered from (2010-2018) – 11 year phase in
    - Industry “use” needs to be registered
  - An Evaluation by EU of most hazardous & highest volume
  - Authorization to use most dangerous - @1,500 substances
- A notification to EU of certain chemicals contained within final products/articles may be required

# Why is REACH different from previous regulations?

- Reverses burden of proof from Authorities to Industry.
- Places greater responsibility on all actors in chemical supply chain.
- Need for upstream communication in supply chain included for first time.
- Substances prioritized based on volumes and greatest concern.
- Central European Chemicals Agency to be established.
- Requires registrants of same substance to share core data to minimize animal testing and cost.

# REACH Timeline of Key Events

## Getting Ready for REACH



## Regulatory timeline

# Key Points: Pre-registration and Registration

- Registration required for substances in commerce in EU (est. 30,000) above 1 tpa.
- No exemption for 'existing substances'.
- Registration required for continued production/import of existing substances and to begin production/import of new substances.
- **Pre-registration of existing substances allows for phased in registration.**

# Exposure Scenario Requirements

- Registrant (Manufacturer/Importer) has to describe:
  - The processes involved in production, processing and use
  - The risk management measures by manufacturer/importer/ downstream users
  - The activities and potential exposure of workers
  - The emissions of the substance to the environment, including sewage treatment

# Exposure Scenario – Who has to do it?

- First by M/I as part of the CSA
  - Downstream user shall provide sufficient information to allow their suppliers to prepare an exposure scenario for their use in the suppliers chemical safety assessment (REACH Art. 34,2)
- Downstream User – if uses outside conditions of SDS
  - Downstream users have 12 months from receipt of safety data sheet to perform CSA (RIP1, Chap. 5.2, p. 49)

# Main Obligations for Device Manufacturers Using Substances

- **Implement operational conditions and risk management measures (RMM) communicated to device manufacturer via the exposure scenarios in the SDS Annex**
- DU obligation to identify and apply control measures to control risks. Part of registration requirements when >10 tonnes per year (CSR required)
- Verification that the information on use of chemicals, operational conditions, and risk management measures are accurate. This information will be required as an appendix to the supplier SDS

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# REACH Implementation Projects

*AIM: In close collaboration with all stakeholders, develop guidance to help fulfill the obligations under REACH.*

- **RIP 3 – Guidance for Industry**
  - 3.1 Preparing the registration dossier
  - 3.2 Preparing the CSR
  - 3.3 Information Requirements
  - 3.4 Guidance on data-sharing
  - 3.5 Guidance for Downstream Users
  - 3.6 Guidance for C&L under GHS
  - 3.7 Guidance on applications for authorization
  - 3.8 Requirements for articles

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# ISMI REACH Project History

- **Project initiated in 2005.**
  - Realization that REACH would eventually become law;
  - Gain early understanding of its potential impact on industry and suppliers.
- **Using draft regulation as guide, 74 page generic exposure assessment report written.**
  - Provides detailed information on different semiconductor processes.
  - Identifies risk management measures.

# Project History - Continued

- In 2006, ESIA and ISMI agreed to work jointly on REACH with focus on developing:
  - Technical paper describing industry, its ESH approach and Risk Management Measures.
  - Exposure Scenario reference document to assist suppliers with registration of semiconductor chemicals.
- Work has fed into RIP 3.2-2 and interactions with European government agencies.

# Semiconductor ES Project

## Participants:

### – ESIA/ISMI include:

- AMD, Infineon, Texas Instruments, NXP, Intel, Qimonda, STM, Micron, Freescale, Spansion

Role - provide technical information on conditions of use and risk management measures.

### – Suppliers include:

- Dow Corning, Air Products, JSR Micro, Honeywell, Rohm & Haas, BOC Edwards, Air Liquide, Brewer Science

Role – provide supplier perspective on REACH requirements such as what type of information is needed from Downstream Users for exposure scenario development.

# Semiconductor Project Objectives

1. Create a generic semiconductor industry exposure scenario reference document/template.
  - Partner with suppliers to share relevant information and data (conditions of use, RMMs & exposure estimation) as an industry sector to reduce admin burden for suppliers and for device companies of communication in supply chain
    - ensure communication in supply chain is clear, concise, not redundant and occurs in most efficient manner possible
  - Suppliers can conduct a CSA, or pass information up supply chain
  - Ensure semiconductor use is supported
  - Give suppliers adequate information to prepare safety data sheets suitable for our application of the chemical.
2. Feed into RIP 3.2-2 from DU industry point of view. Exchange learning with other industrial ES cases.

# Semiconductor Project Objectives

- Our idea: ESs that do not require detailed explanation of the manufacturing process step
  - Tool is “black box”, not important what process takes place, what is important is equipment set-up relating to exposure risks
- Our idea: group chemicals together at highest level of aggregation and then select one chemical to prove case for all the rest

# Generic ES template

- Covers all chemicals and gases.
- Contains information for a ‘first screen’ assessment, recognition that further data may be needed for more detailed exposure estimation of Substances of Very High Concern (SVHC).
- All industry participants agree on the concept and content, two options for further development:
  - “frozen” sector ES; ‘one stop shop’ for suppliers to the industry to perform preliminary CSA.
  - a template, to be modified by any device manufacturing company acting individually to provide information to suppliers.

# Generic Exposure Scenario Template

## EXPOSURE SCENARIO COMMUNICATION TOOL

**Main Category:** Industrial

**Industry Category:** Electrical/Electronics Industry

**Use Category:** Semiconductor Manufacturing

**Life Cycle Stage:** Processing of Substances, Waste Treatment & Disposal

**Detailed Description:** Semiconductor Industry Generic Exposure Scenario.

**Purpose:** Communicate conditions of use & RMIs to chemical supplier in order for a chemical safety assessment to be conducted.






**Relevant to:** Chemicals used in semiconductor processes.

Activity	Iteration	Process and Conditions of Use	Worker Health Potential Exposure	Possible RMM for Worker Health	Environmental Potential Exposure Routes	Possible RMMS for Environment
				(Checkmark or list task numbers for RMMS that apply)		(Checkmark RMMS that apply)
Chemical Handling	Generic information (Provides input data for models such as ECETOC Tier 0)	<p>Tasks:</p> <p>(1) Transport and receipt of material XXX on the site.</p> <p>(2) Delivery of XXX to appropriate storage areas.</p> <p>(3) Storage of XXX.</p> <p>(4) Transport of XXX to point of supply to process.</p> <p>(5) Installation and change out of empty containers/un-used product.</p> <p>(6) Chemical pouring.</p> <p>Vol of chemical/container = a to z. Environmental Temp = X deg C</p> <p>Corresponding ECETOC TRA Tier 1 On Site Use Generic Exposure Scenario: "Use in a batch or other process (including related process stages, e.g. filtration, drying) where opportunities for exposure arise (e.g. sampling, discharging of materials)" applies for task (5) &amp; (6) above</p>	<p>Dermal: potential</p> <p>Inhalation: potential</p> <p>Ingestion: none expected</p>	<p><b>Engineering Controls:</b> Double contained chemical storage ( ), Hardware interlocks on tool/chemical enclosures( ), Pressure tested supply lines of appropriate material( ), Pressure tested double contained supply lines( ), Exhausted tool and chemical delivery enclosures( ), Bulk chemical delivery systems( ), Automated chemical delivery system( ), Automated spill control and leak sensors( ), Excess flow valves( ), Automatic flow shutoff( ), Dedicated small cylinders to minimize risk in case of rupture( ), Sub-atmospheric gas delivery system( ), Eye wash and safety shower( ), Integrated fire protection system( ).</p> <p><b>PPE:</b> Eye protection( ), Hand protection( ), Protective clothing( ), Protective footwear( ), Respiratory protection( ).</p> <p><b>Administrative Controls:</b> Environmental and Safety management systems and procedures( ), Documented procedures for tasks( ), Material Safety Data Sheets( ), Employee training( ), Hazard communication labels( ), Working Alone Restriction( ), Emergency Response Team( ).</p>	<p><b>Air:</b> None expected, no emissions under normal operating conditions; exhaust integrated required for purges &amp; emergency release only.</p> <p><b>Water:</b> Minimal, see RMM</p> <p><b>Soil:</b> None expected.</p>	<p><b>Air:</b> Releases are scrubbed through appropriate abatement systems( ), Exhaust emissions are treated to meet Integrated Pollution Prevention &amp; Control (IPPC), Member State or local authority licence requirement( ), Acid exhaust treated utilizing wet scrubbing or equivalent technology meeting IPPC, Member State or local authority requirements( ), Solvent exhaust treated utilizing thermal oxidation or equivalent technology meeting IPPC, Member State or local authority requirements( ), Point of use abatement( ), Full assessment of max emissions modelled for IPPC, Member State, or local authority licence application( ).</p> <p><b>Water:</b> Solvent waste collected separately to prevent discharge to wastewater( ), Scrubber effluent neutralized prior to discharge( ), Wastewater treated to meet local discharge limits and licensed as per IPPC, Member State or local authority requirements using acid neutralization or equivalent technology( ), Metals collection system( ), Metals treatment system( ), Recycle/reclaim procedure( ).</p> <p><b>Soil:</b> Containers of aqueous solutions may be rinsed prior to disposal( ), Description of chemical handling &amp; storage provided in IPPC, Member State or local authority licence application( ), Chemicals stored and handled as per IPPC, Member State or local authority licence requirement to avoid release to soil( ), Any hazardous waste is treated and/or disposed of in accordance with applicable regulations( ), Recycle/reclaim procedure( ).</p>
	Further information required for ES re-iteration	ECETOC Tier 1 data input: Range of flows, pressures, temperatures, amount of material used per process, anticipated quantity of emissions expected - some of the data that may be required for more detailed TRA				
Routine Operation, Processing & Non-invasive maintenance	Generic information	<p>Processes:</p> <p>(1) Processing using chemicals in an enclosed system with no human intervention or exposure anticipated. Corresponding ECETOC TRA Tier 1 On Site Use Generic Exposure Scenario: "Use in a closed batch process i.e. where no opportunity for breaching arises, including product transfers and sampling" applies.</p> <p>(2) Processing occurs in open, exhausted system with minimal exposure anticipated. Corresponding ECETOC TRA Tier 1 On Site Use Generic Exposure Scenario: "Use in a batch or other process (including related process stages, e.g. filtration, drying) where opportunities for exposure arise (e.g. sampling, discharging of materials)" applies.</p>	<p>Dermal: none expected</p> <p>Inhalation: none expected</p> <p>Ingestion: none expected</p>	<p><b>Engineering Controls:</b> Double contained chemical storage ( ), Hardware interlocks on tool/chemical enclosures( ), Pressure tested supply lines of appropriate material( ), Pressure tested double contained supply lines( ), Exhausted tool and chemical delivery enclosures( ), Bulk chemical delivery systems( ), Automated chemical delivery system( ), Automated spill control and leak sensors( ), Excess flow valves( ), Automatic flow shutoff( ), Dedicated small cylinders to minimize risk in case of rupture( ), Sub-atmospheric gas delivery system( ), Eye wash and safety shower( ), Integrated fire protection system( ).</p> <p><b>PPE:</b> Eye protection( ), Hand protection( ), Protective clothing( ), Protective footwear( ), Respiratory protection( ).</p> <p><b>Administrative Controls:</b> Environmental and Safety management systems and procedures( ), Tool operation and maintenance specs provide detailed information on chemical hazard control for specific tasks( ), Material Safety Data Sheets( ), Quantitative exposure assessment monitoring conducted during operation and maintenance activities confirms hazard control measure are sufficient( ), Documented procedures for tasks( ), Employee training( ), Hazard communication labels( ), Working Alone Restriction( ), Emergency Response Team( ).</p>	<p><b>Air:</b> Exhaust emissions</p> <p><b>Water:</b> Wastewater discharge.</p> <p><b>Soil:</b> No exposure</p>	<p><b>Air:</b> Releases are scrubbed through appropriate abatement systems( ), Exhaust emissions are treated to meet Integrated Pollution Prevention &amp; Control (IPPC), Member State or local authority licence requirement( ), Acid exhaust treated utilizing wet scrubbing or equivalent technology meeting IPPC, Member State or local authority requirements( ), Solvent exhaust treated utilizing thermal oxidation or equivalent technology meeting IPPC, Member State or local authority requirements( ), Point of use abatement( ), Full assessment of max emissions modelled for IPPC, Member State, or local authority licence application( ).</p> <p><b>Water:</b> Solvent waste collected separately to prevent discharge to wastewater( ), Scrubber effluent neutralized prior to discharge( ), Wastewater treated to meet local discharge limits and licensed as per IPPC, Member State or local authority requirements using acid neutralization or equivalent technology( ), Metals collection system( ), Metals treatment system( ), Recycle/reclaim procedure( ).</p> <p><b>Soil:</b> Description of chemical handling &amp; storage provided in IPPC, Member State or local authority licence application( ), Chemicals stored and handled as per IPPC, Member State or local authority licence requirement to avoid release to soil( ), Any hazardous waste is treated and/or disposed of in accordance with applicable regulations( ), Recycle/reclaim procedure( ).</p>
	Further information required for ES re-iteration	Range of flows, pressures, temperatures, amount of material used per process, anticipated quantity of emissions expected - some of the data that may be required for more detailed TRA				
Invasive Routine Maintenance, Non-routine troubleshooting	Generic information	<p>Tasks:</p> <p>(1) Invasive routine maintenance such as chamber wet clean; machinery is opened for system maintenance and cleaning at ambient temperature and pressure.</p> <p>(2) Fault finding/non routine troubleshooting. A technician can theoretically spend up to a maximum of 10 hours per day, 4 days a week performing these tasks. Corresponding ECETOC TRA Tier 1 On Site Use Generic Exposure Scenario: "Use in a batch or other process (including related process stages, e.g. filtration, drying) where opportunities for exposure arise (e.g. sampling, discharging of materials)" applies.</p>	<p>Dermal: potential</p> <p>Inhalation: potential</p> <p>Ingestion: none expected</p>	<p><b>Engineering Controls:</b> Double contained chemical storage ( ), Hardware interlocks on tool/chemical enclosures( ), Pressure tested supply lines of appropriate material( ), Pressure tested double contained supply lines( ), Exhausted tool and chemical delivery enclosures( ), Bulk chemical delivery systems( ), Automated chemical delivery system( ), Automated spill control and leak sensors( ), Excess flow valves( ), Automatic flow shutoff( ), Dedicated small cylinders to minimize risk in case of rupture( ), Sub-atmospheric gas delivery system( ), Maintenance hazardous purge system( ), Eye wash and safety shower( ), Integrated fire protection system( ).</p> <p><b>PPE:</b> Eye protection( ), Hand protection( ), Protective clothing( ), Protective footwear( ), Respiratory protection( ).</p> <p><b>Administrative Controls:</b> Environmental and Safety management systems and procedures( ), Material Safety Data Sheets( ), For non standard tasks a documented risk assessment will determine the appropriate hazard control measures( ), Employee training( ), Hazard communication labels( ), Working Alone Restriction( ), Emergency Response Team( ).</p>	<p><b>Air:</b> Exhaust emissions</p> <p><b>Water:</b> Wastewater discharge.</p> <p><b>Soil:</b> No exposure</p>	<p><b>Air:</b> Releases are scrubbed through appropriate abatement systems( ), Exhaust emissions are treated to meet Integrated Pollution Prevention &amp; Control (IPPC), Member State or local authority licence requirement( ), Acid exhaust treated utilizing wet scrubbing or equivalent technology meeting IPPC, Member State or local authority requirements( ), Solvent exhaust treated utilizing thermal oxidation or equivalent technology meeting IPPC, Member State or local authority requirements( ), Point of use abatement( ), Full assessment of max emissions modelled for IPPC, Member State, or local authority licence application( ).</p> <p><b>Water:</b> Solvent waste collected separately to prevent discharge to wastewater( ), Scrubber effluent neutralized prior to discharge( ), Wastewater treated to meet local discharge limits and licensed as per IPPC, Member State or local authority requirements using acid neutralization or equivalent technology( ), Metals collection system( ), Metals treatment system( ), Recycle/reclaim procedure( ).</p> <p><b>Soil:</b> Description of chemical handling &amp; storage provided in IPPC, Member State or local authority licence application( ), Chemicals stored and handled as per IPPC, Member State or local authority licence requirement to avoid release to soil( ), Any hazardous waste is treated and/or disposed of in accordance with applicable regulations( ), Recycle/reclaim procedure( ).</p>
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# Generic ES Template

Activity:	Chemical Handling		Routine Operation, Processing, Non-invasive maintenance		Invasive Routine Maintenance, Non-routine troubleshooting	
	1	2	1	2	1	2
Iteration						
Process & Conditions of Use						
Worker Health Potential Exposure						
Possible RMM for Worker Health ( <i>check mark all that apply</i> )						
Environmental Potential Exposure						
Possible RMM for Environment ( <i>check mark all that apply</i> )						

# SC Exposure Scenario for HCl(gas)

- Using SC ES template, industry developed ES for Hydrogen Chloride gas (HCl(g)) for 3 SC use activities
  - chemical handling,
  - routine processing applications,(enclosed systems)
  - invasive maintenance
- Substance properties data table for HCl(g) was determined
- Process and conditions of use for HCl(g) determined
- DU's tested SC industry generic ES template to ascertain if level of detail allowed for exposure assessment to be undertaken
- Worked with SC chemical supplier experts to input qualitative and quantitative chemical specific data into ECETOC- Targeted Risk Assessment (TRA) model

# HCl<sub>(g)</sub> ES Outcome

- Level of detail in ES template was more than adequate for Tier 0 and adequate for Tier 1 assessment
- SC anticipates that format and content of ES for HCl(g) will be applicable for a variety of gases in use in the sector
- ECETOC-TRA model did not take into consideration all of the RMM for maintenance and therefore did not predict the “true” risk

# Learning/Feedback to RIP3.2

- **Some suppliers** were **concerned** that tentative **ES** developed for HCL<sub>(g)</sub> using generic ES template **contains too much detail** - If each sector provided this much detail on their 'identified uses' suppliers will be overwhelmed. **Other suppliers believed not enough detail** was provided.
- Existing legislation that governs, S&H at the workplace, site specific operating permits and equipment safety standards already ensure that we control potential exposures to chemicals. Thus we need a method to factor this into the process of developing an ES. Important to avoid redundant legislation as a user. This point should be assessed in the evolution of the technical guidance document (TGD).
- DU's companies are typically not well versed in registrant's assessment criteria. To be of use, ES must contain information that registrant requires to undertake the CSA. Many DU sector's do not have clear knowledge of the process of chemical registration, RA models, toxicology data, tests.
- SC like other DU sectors have a large number of SME's in the supply chain. Important all actors in supply chain are included in ES communication.

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- **What is the standardized approach for supplier/registrant when faced with having to conduct a tier 2 risk assessment in the absence of exposure monitoring data?** Models can make conservative assumptions that may mandate unnecessary and inappropriate RMMs.
- DU's would get clarity through the establishment of a standardized approach for Tier 2 risk assessment with data inputs defined.
- Vital information generated by any 'user bottom up' approach to communication needs to be useful and manageable for suppliers/registrants.
- Adoption of uniform assessment methodology & questionnaires (if necessary) by suppliers would greatly reduce admin burden.

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# Consultant Feedback from Reach Implementation Project (RIP 3.2)

## Level of Detail in HCl gas Exposure Scenario

- ESIA/ISMI ES submitted to RIP3.2
  - Waste life stage not included
  - No justification for exposure pathways not considered
  - Risk Assessments carried out under Chemical Agents Directive and IPPC Directive show HCl(g) is adequately controlled
  - Feedback from supplier that the level of detail is too high
- Consortium Feedback
  - Waste life stage to be included
  - Include justification for exposure pathways not considered
  - Quoted Article 2 para 4 of REACH: the regulation shall be applied without prejudice to further directives
  - Requirement for further detail

# Level of Detail Required in ES - Environmental

- ESIA/ISMI ES submitted to RIP3.2
  - Type of Abatement system named
  - Mass emission figures not provided
  - Direct release to soil not considered
  - ECETOC Tiered Risk Assessment used
- Consortium Feedback
  - Indicate removal efficiency of abatement system
  - Sum total emissions to give a typical point source emission rate
  - Specify frequency of emissions
  - Direct releases to soil via deposition or sewage sludge 'could be of interest at least on the regional scale assessment'
  - ECETOC not sophisticated enough to model HCl gas, need to do quantitative assessment

# Level of Detail Required in ES - Occupational

- ESIA/ISMI ES submitted to RIP3.2

- Qualitative risk assessment presented
- No measured data provided
- RMM described generically – e.g. ‘sufficient ventilation provided’ (determined by trained IH professionals)

- Consortium Feedback

- Quantitative risk assessment required
- Measured data required
- RMM should describe the detail of the current practice

# Consultant Feedback from REACH Implementation Project (RIP 3.2)

- Measured exposure data must include statistical background
- Generic ES Template is good tool for communication in supply chain
- Welcomed information we provided on our use of ECETOC Tiered Risk Assessment Tool

# Semiconductor Industry Comments to ES TGD Final Draft

- **Guidance, while workable for a single chemical, does not work as well in complex manufacturing environments where multiple chemicals are used in same equipment or share waste treatment systems.**
  - **Guidance should offer flexibility in information required to perform exposure estimate**
  - **Risk assessments carried out to comply with other regulations (chemical agents directive, IPPC directive, etc) should be adequate to demonstrate no adverse effects.**
- **TGD lacks guidance on ‘generic’ or ‘standardised’ exposure scenarios.**
- **TGD avoids use of REACH regulation terminology ‘Use Category’ which should be defined with examples provided.**

# Outcome of August 2007 RIP 3.2-2 Exposure Scenario Workshop

- ES will look for less information.
- Broad 'generic scenarios' favored by most M/Is.
- Technical function of substance no longer part of use descriptor system.
- M/I final ES supplied to DU not necessarily suitable for final DU.
  - Formulators will need to 'translate' for their customer groups.
- ECETOC-TRA preferred for worker and consumer risk assessment.
- Comparable tool based on EUSES needed for environmental assessment.
- Should be a library of generic conditions of use.
- cTGD not likely to change much from latest draft.

# Exposure Scenario Summary & Conclusion

- Managing flow of information between DUs & suppliers in manner that is clear, concise, not redundant and occurs in most efficient manner possible may be challenge based on current direction from RIP3.2 project coordinators.
- Ultimately, it may be large chemical companies at top of supply chain who will determine level of detail they are able and willing to gather in order to suffice for their registration dossiers.
- **Ensuring semiconductor chemicals are pre-registered is critical.**

# Agenda

- REACH Overview
- ISMI/ESIA Project – Development and Application of Semiconductor Generic Exposure Scenario
- **Articles**
- Industry REACH Challenges - Communication
- What should device manufacturers do?

# Articles and Registration

- Producers/importers of articles **must register substances in articles** if:
  - Substance is **intended to be released** under normal or reasonably foreseeable conditions of use; and
  - Substance **present >1 tpa per producer/importer.**
- Pre-registration allows for phased-in registration.

# Article: Notification Requirements

- Producers/importers of articles must **notify** the agency if an article contains a substance:
  - Identified as an SVHC on candidate list for inclusion in Annex XIV of REACH;
  - Present in quantities >1tpa per P/I;
  - Present in concentration above 0.1%; and
  - Risk of human or environmental exposure during use of article (including disposal).
- Article 33 requires suppliers of these articles to **communicate information available** to recipient of article on SVHC present in the article. Requirements extends to consumers on request and must be provided free of charge within 45 days of receipt of request.

# Agenda

- REACH Overview
- ISMI/ESIA Project – Development and Application of Semiconductor Generic Exposure Scenario
- Articles
- **Industry REACH Challenges - Communication**
- What should device manufacturers do?

# Industry REACH Challenges

- Understanding internally and through the supply chain:
  - Which chemical **substances** are used - IP challenges.
  - **Volumes imported/used** for purposes of understanding registration timelines.
  - **Aligning on expectations for materials declarations** within supply chain for articles (semiconductor devices).
- **Data compilation and availability.**
- **Control administrative burden:**
  - IT tools to support data management.
  - Development of “generic” exposure scenarios that can be used to prove “safe use” (no exposure to workers and environment).
  - Development of valid models to show “safe use” based on RMM in place.
- **How do non-EU legal entities register?**
- **IP protection.**
- **Much is still unclear – how REACH is supposed to work is still not defined.**
  - e.g., register “semiconductor use” or “industrial use”?

# Communication

**Supplier(s)**

- Pre-register chemical
- Register use
- Safety Data Sheets
  - Guidance on safe use
  - Specific use
- Exposure Scenarios

**MAY HAVE TO PROVIDE**

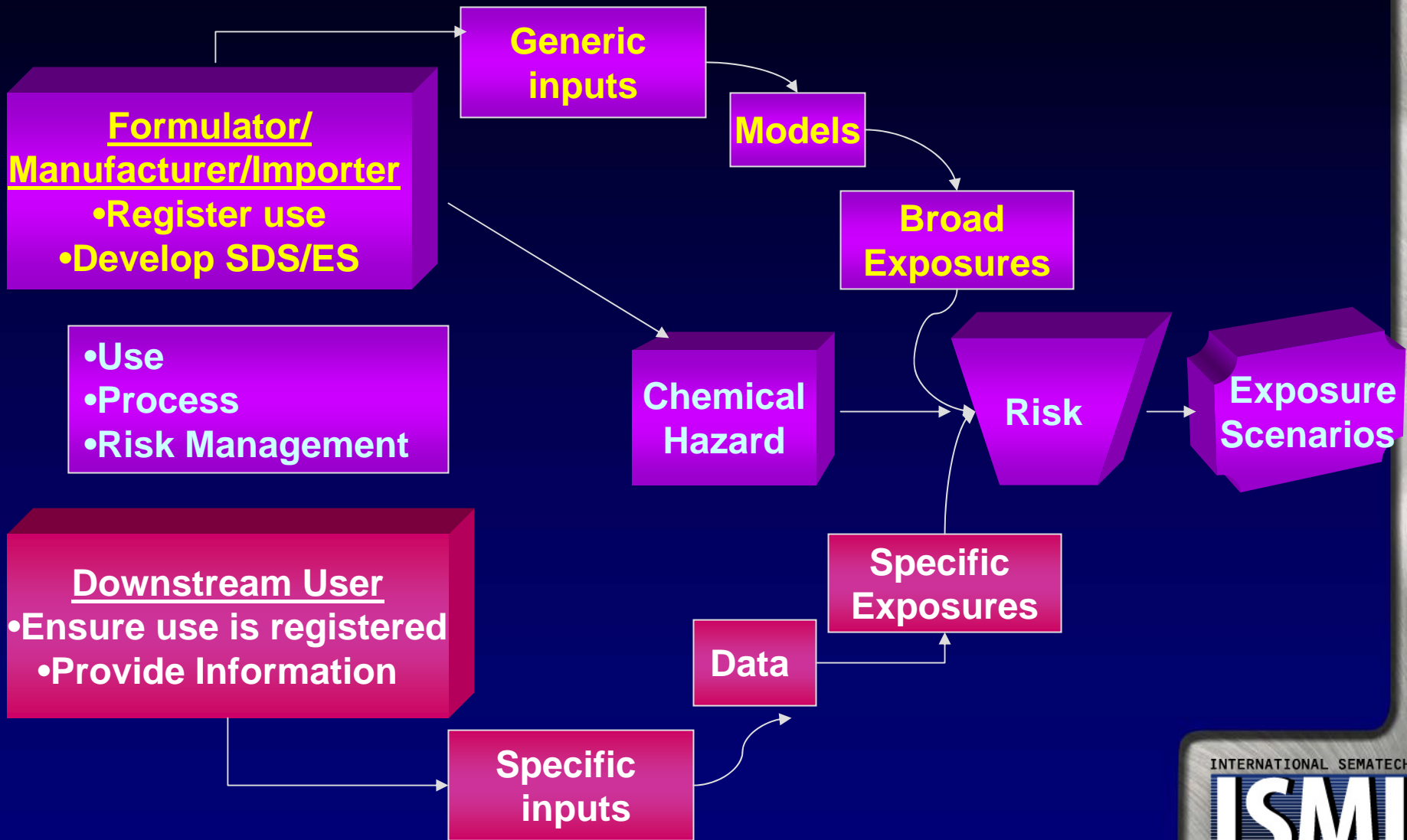
- Specific Uses
- Use information
- Risk Management Measures
- IH & environmental data, if needed
- New chemical hazard information

**Downstream User(s)**

INTERNATIONAL SEMATECH

**ISMI**  
MANUFACTURING INITIATIVE

# REACH Supply Chain Communication (Building exposure scenarios)

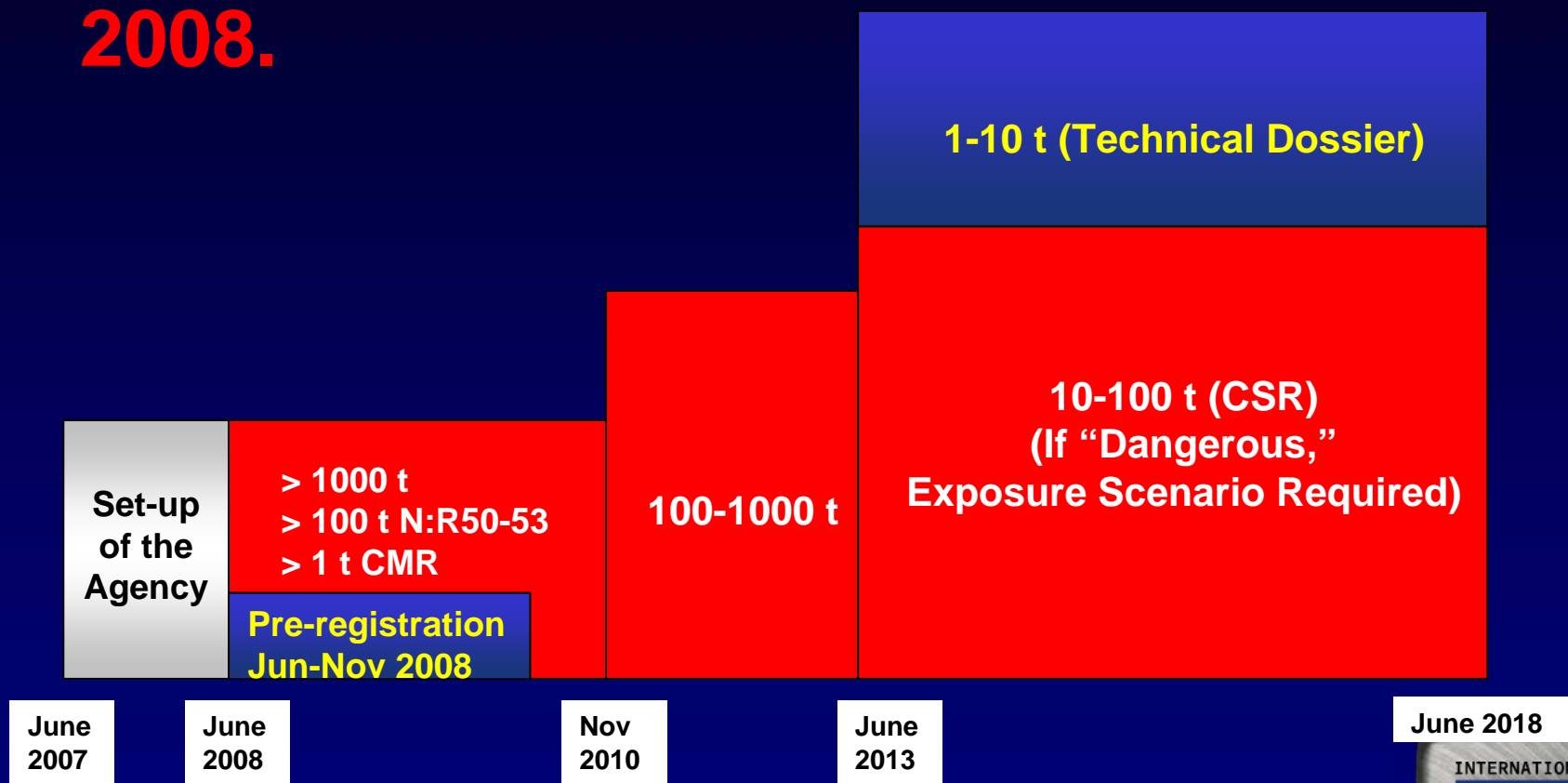


# Agenda

- REACH Overview
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- Articles
- Industry REACH Challenges - Communication
- **What should device manufacturers do?**

# EU REACH Regulation

- **First deadline, pre-registration of existing chemicals, 1 Jun. – 30 Nov. 2008.**



# What should device manufacturers do if operating in /importing to Europe?

- **Get educated about REACH.**
- Inventory chemicals and articles intentionally released.
- Communicate with suppliers:
  - Pre-registration
  - Registration
  - Conditions of use and exposure
  - Risk management measures

# What should device manufacturers do if operating in /importing to Europe?

- Get educated about REACH.
- **Inventory chemicals and articles intentionally released.**
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  - Conditions of use and exposure
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# What should device manufacturers do if operating in /importing to Europe?

- Get educated about REACH.
- Inventory chemicals and articles intentionally released.
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  - Pre-registration
  - Registration
  - Conditions of use and exposure
  - Risk management measures

# Disclaimer

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# Back up

Activity:	Chemical Handling	Routine Operation, Processing, Non-invasive	Invasive Routine Maintenance, Non-routine trouble-shooting
Iteration	1	<p><b>Tasks:</b></p> <ul style="list-style-type: none"> <li>(1) Transport and receipt of material XXX on the site.</li> <li>(2) Delivery of XXX to appropriate storage areas.</li> <li>(3) Storage of XXX.</li> <li>(4) Transport of XXX to point of supply to process.</li> <li>(5) Installation and change out of empty containers/un-used product.</li> <li>(6) Chemical pouring.</li> </ul> <p>Vol of chemical/container = a to z. Environmental Temp = X deg C</p> <p>Corresponding ECETOC TRA Tier 1 On Site Use Generic Exposure Scenario: "Use in a batch or other process (including related process stages, e.g. filtration, drying) where opportunities for exposure arise (e.g. sampling, discharging of materials)" applies for task (5) &amp; (6) above</p>	
Process & Conditions of Use			
Worker Health Potential Exposure			
Possible RMM for Worker Health ( <i>check mark all that apply</i> )			
Environmental Potential Exposure			
Possible RMM for Environment ( <i>check mark all that apply</i> )			



Activity:	Chemical Handling		Routine Operation, Processing, Non-invasive maintenance		Invasive Routine Maintenance, Non-routine trouble-shooting	
	1	2	1	2	1	2
Iteration						
Process & Conditions of Use						
Worker Health Potential Exposure						
Possible RMM for Worker Health ( <i>check mark all that apply</i> )						
Environmental Potential Exposure						
Possible RMM for Environment ( <i>check mark all that apply</i> )						

**Dermal: potential**  
**Inhalation: potential**  
**Ingestion: none expected**



Activity:	Chemical Handling	Routine Operation, Processing	Invasive Routine Maintenance, Non-routine Maintenance, Double-shooting
Iteration	<p><b>Engineering Controls:</b> Double contained chemical storage ( ), Hardware interlocks on tool/chemical enclosures( ), Pressure tested supply lines of appropriate material( ), Pressure tested double contained supply lines( ), Exhausted tool and chemical delivery enclosures( ), Bulk chemical delivery systems( ), Automated chemical delivery system( ), Automated spill control and leak sensors( ), Excess flow valves( ), Automatic flow shutoff( ), Dedicated small cylinders to minimize risk in case of rupture( ), Sub-atmospheric gas delivery system( ), Eye wash and safety shower( ), Integrated fire protection system( ).</p> <p><b>PPE:</b> Eye protection( ), Hand protection( ), Protective clothing( ), Protective footwear( ), Respiratory protection( ).</p> <p><b>Administrative Controls:</b> Environmental and Safety management systems and procedures( ), Documented procedures for tasks( ), Material Safety Data Sheets( ), Employee training( ), Hazard communication labels( ), Working Alone Restriction( ), Emergency Response Team( ).</p>		2
Process & Conditions			
Worker Health Potential Exposure			
Possible RMM for Worker Health ( <i>check mark all that apply</i> )			
Environmental Potential Exposure			
Possible RMM for Environment ( <i>check all that apply</i> )			



Activity:	Chemical Handling		Routine Operation, Processing, Non-invasive maintenance		Invasive Routine Maintenance, Non-routine trouble-shooting	
	1	2	1	2	1	2
Iteration						
Process & Conditions of Use						
Worker Health Potential Exposure						
Possible RMM for Worker Health ( <i>check mark all that apply</i> )						
Environmental Potential Exposure						
Possible RMM for Environment ( <i>check mark all that apply</i> )						

**Air: Exhaust emissions.**  
**Water: Wastewater discharge.**  
**Soil: No exposure.**



Activity:	Chemical Handling	Routine Operation	Invasive Routine Maintenance
Iteration	<p><u>Air:</u> Releases are scrubbed through appropriate abatement systems( ). Exhaust emissions are treated to meet Integrated Pollution Prevention &amp; Control (IPPC), Member State or local authority licence requirement( ), Acid exhaust treated utilizing wet scrubbing or equivalent technology meeting IPPC, Member State or local authority requirements( ), Solvent exhaust treated utilizing thermal oxidation or equivalent technology meeting IPPC, Member State or local authority requirements( ), Point of use abatement( ), Full assessment of max emissions modelled for IPPC, Member State, or local authority licence application( ).</p> <p><u>Water:</u> Solvent waste collected separately to prevent discharge to wastewater( ), Scrubber effluent neutralized prior to discharge( ), Wastewater treated to meet local discharge limits and licensed as per IPPC, Member State or local authority requirements using acid neutralization or equivalent technology( ), Metals collection system( ), Metals treatment system( ), Recycle/reclaim procedure( ).</p> <p><u>Soil:</u> Description of chemical handling &amp; storage provided in IPPC, Member State or local authority licence application( ), Chemicals stored and handled as per IPPC, Member State or local authority licence requirement to avoid release to soil( ), Any hazardous waste is treated and/or disposed of in accordance with applicable regulations( ), Recycle/reclaim procedure( ).</p>		
Process & Conditions of Use			
Worker Health Potential Exposure			
Possible RMM for Worker Health ( <b>check mark all that apply</b> )			
Environmental Potential Exposure			
Possible RMM for Environment ( <b>check mark all that apply</b> )			

