



REACH, RoHS, and WEEE:

Use of European Union Directives to
Increase NPEP Partnership

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Outline

- Previous Directives
 - RoHS (Restriction of Hazardous Substances)
 - WEEE (Waste from Electrical and Electronic Equipment)
- New Directive
 - REACH (Registration, Evaluation, Authorization and Restriction of Chemicals)
- Region III Success Stories with RoHS
- Relevance of REACH with NPEP Program

European Union

- 27 Member States
- Current candidates

– Croatia



– Former Yugoslav Republic of Macedonia



– Turkey



Restriction of Hazardous Substances (RoHS)

- Directive 2002/95/EC
 - Restricts the use of specific materials in electrical and electronic products
 - All applicable products in the EU market after July 1, 2006 must be in compliance
- Which companies are affected by the RoHS Directive?
 - Businesses that sell applicable electronic products, sub-assemblies or components directly to EU countries
 - Businesses that sell to resellers, distributors or integrators; that in turn sell products to EU countries
- “Companies that... ignore RoHS regulations, or that don't take the issue of compliance seriously, are granting... valuable opportunities in the marketplace for compliant competitors.”

RoHS (continued)

- RoHS specifies maximum levels for the following six restricted materials:
 - Cadmium (Cd): 100 ppm
 - Mercury (Hg): 100 ppm
 - Lead (Pb): 1000 ppm
 - Polybrominated Biphenyls (PBB): 1000 ppm
 - Polybrominated Diphenyl Ethers (PBDE): 1000 ppm
 - Hexavalent Chromium (CrVI): 1000 ppm
- X-ray fluorescence analyzers are used for screening and verification of RoHS compliance.

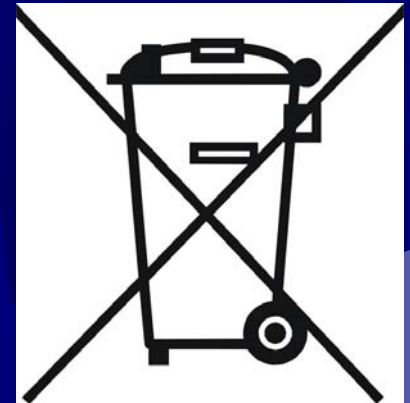


RoHS (continued)

- **The following product categories are *impacted* under the RoHS Directive:**
 - *Large and small household appliances:* refrigerators, hair driers, irons
 - *Computing & communications equipment:* computers, printers, phones
 - *Consumer electronics:* TVs, DVD players, stereos, video cameras
 - *Lighting:* lamps, lighting fixtures, light bulbs
 - *Power tools:* drills, saws, nail guns, sprayers, lathes, trimmers, blowers
 - *Toys and sports equipment:* videogames, electric trains, treadmills
 - *Automatic dispensers:* vending machines, ATM machines
- **The following products are currently *exempted* from RoHS compliance:**
 - Large stationary industrial tools
 - Control and monitoring equipment
 - National security use and military equipment
 - Medical devices
 - Some light bulbs and some batteries
 - Spare parts for electronic equipment in the market before July 1, 2006

Waste from Electrical and Electronic Equipment (WEEE)

- Directive 2002/96/EC
 - Mandates the treatment, recovery and recycling of electric and electronic equipment
 - All applicable products in the EU market after August 13, 2006 must pass WEEE compliance and carry the "Wheelie Bin" sticker
 - Consumers will be able to return equipment to producers free of charge



How are RoHS and WEE related?

- WEEE compliance aims to encourage the design of electronic products with environmentally-safe recycling and recovery in mind.
- RoHS compliance dovetails into WEEE by reducing the amount of hazardous chemicals used in electronic manufacture.

REACH

Registration
Evaluation
Authorization and
Restriction of
CHemicals



A major reform of EU chemical's policy, affecting all global supply chains that produce and use chemicals, including US exporters.

Pre-REACH

- Directive 67/548/EEC
 - A total of 3368 dangerous substances were tested for classification and labeling purposes (Annex I in REACH).
- Regulation (EEC) No 793/93
 - New chemicals had to be tested before placed in the market
 - Notification and testing from volumes as low as 10 kg per year
 - No provisions for over 100,000 existing chemicals
- Public authorities were responsible for undertaking risk assessments of substances instead of manufacturers and importers.
- Industrial users and formulators had no obligation to disclose information about exposure.

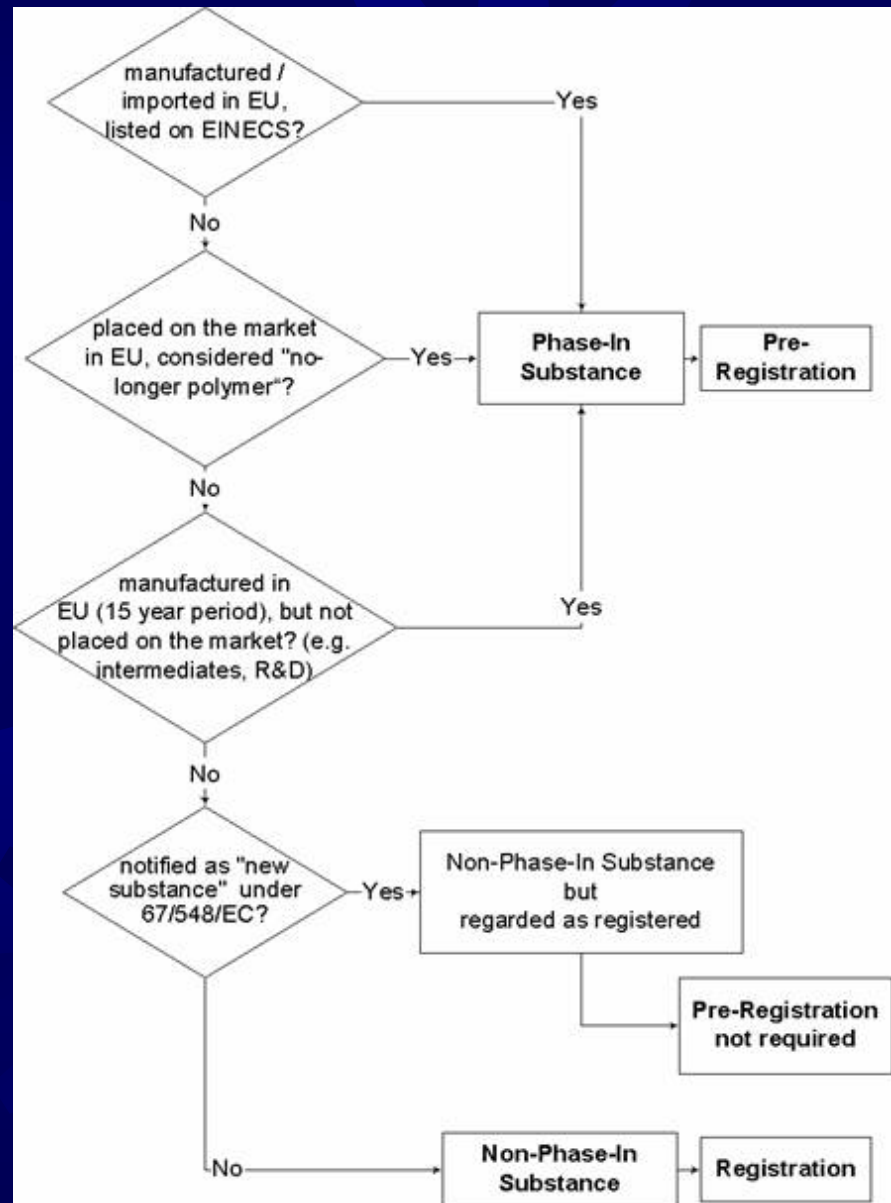
Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

- All chemicals of one metric ton (1000 kg) or more in volume that are manufactured or imported into the EU within a year are required to be:
 - Tested for health and safety
 - Registered with the European Chemicals Agency



Pre-Registration

- Period open from June 1 to Dec 1, 2008
- Will “buy” companies more time to test and fully register
- Allows product in market after Jan 2009 without a complex, full registration



BEFORE WE START... Definitions

- Substances of Very High Concern = SVHC
- CMR = Carcinogenic, Mutagenic, or toxic to Reproduction
 - M = may produce hereditary genetic defects
 - R = may produce or increase the frequency of non-hereditary harmful effects in offspring or damage reproductive capacities or functions
- CMR category 1 and 2
 - (1) known; (2) strongly believed; (3) possible
- PBT = persistent, bioaccumulative and toxic
- vPvB = very persistent and very bioaccumulative
- R50/53 = Risk phrase: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Registration:

Substances on their own or in preparations

“... any manufacturer or importer of a substance, either on its own or in one of more preparation(s), in quantities of one tonne or more per year shall submit a registration to the Agency.” Article 6.1

- Information to be submitted depending on tonnage
 - ≥ 1 metric ton / yr (Technical Dossier)
 - ≥ 10 metric tons / yr (Dossier + Chemical safety report)
 - ...
 - ≥ 1000 metric tons / yr (+ ... + proposals for testing)

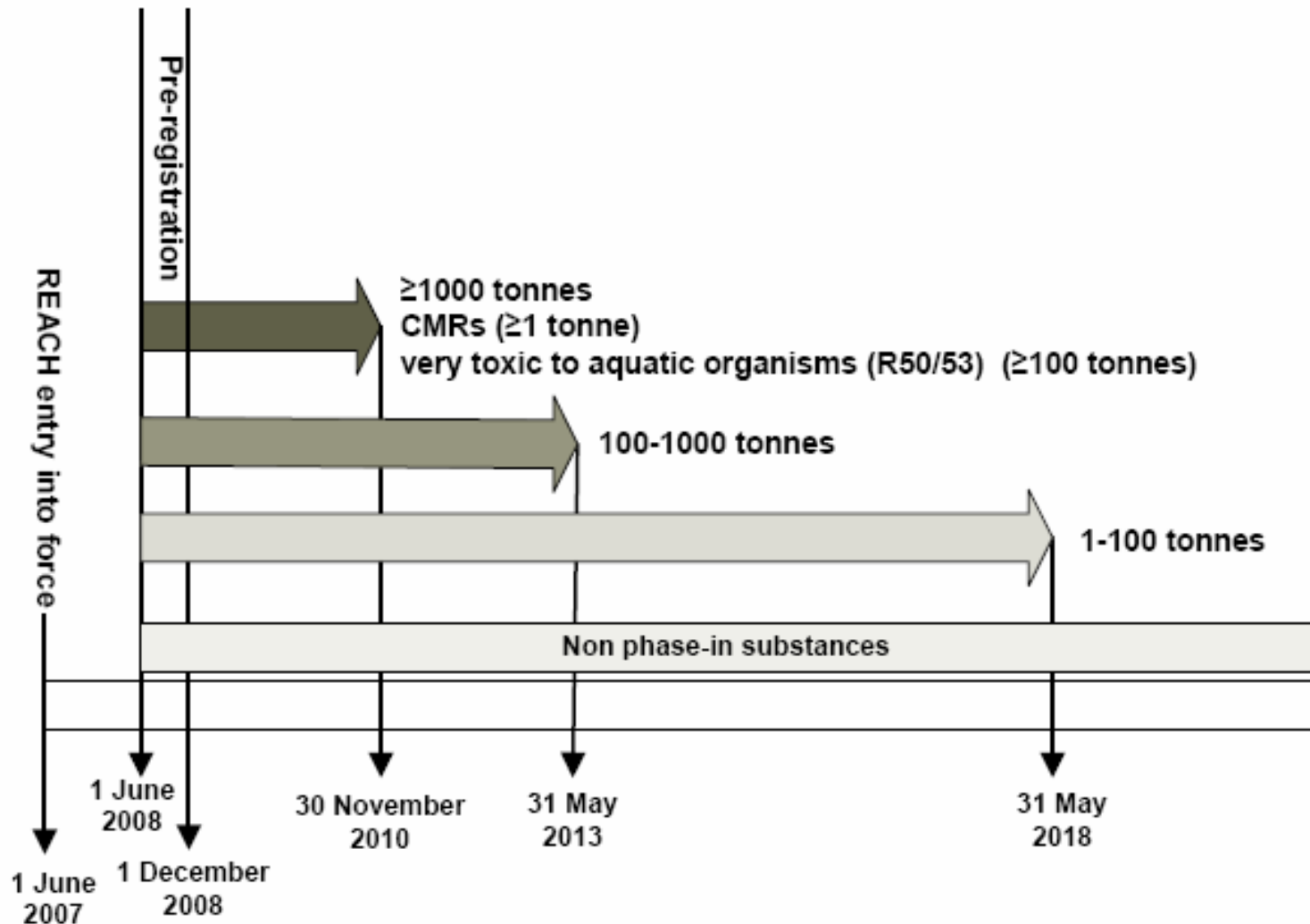
SVHC = Substances of Very High Concern

Registration and Notification: Substances in articles

- Conditions to be met to register:
 - Substance is present in articles totaling ≥ 1 metric ton / yr
 - Substance is intended to be released
- Conditions to be met to register **AND** notify:
 - SVHC substance is present in articles totaling ≥ 1 metric ton / yr
 - Substance is present in article above 0.1 % weight by weight (1000 ppm)

SVHC = Substances of Very High Concern

Registration Deadlines



Evaluation

- Will lead authorities to potential actions under authorization or restrictions procedures
- Two types of evaluation
 - Dossier evaluation: Agency will do a quality check on registration dossiers
 - Compliance
 - Testing proposals
 - Substance evaluation: Agency + Member States will clarify suspicions of risks

Authorization

- Substances of Very High Concern (SVHC) will require an authorization for their use and their placing on the market
 - CMR category 1 and 2
 - Carcinogenic, Mutagenic, or toxic to Reproduction
 - (1) known; (2) strongly believed; (3) possible
 - PBT - persistent, bioaccumulative and toxic
 - vPvB - very persistent and very bioaccumulative
 - Others (e.g. endocrine disruptors)
- Analysis of possible substitutes and relevant R&D will be required to users of these substances

Restrictions

- Member States and Agency will submit the proposals for restrictions
- Existing restrictions in Directive 76/769/EEC will carry over
 - Ban on asbestos
 - Restriction on uses of azo-dyes

Concerns regarding REACH

- Original registrar gets a monopoly on the animal tests on vertebrates of a substance.
- Polymers are exempt from registration, however, monomers used to make the polymer are required to be registered.
- A group of nations, including US, India and Brazil claim that bill may hamper global trade.
- Estimated cost of compliance is around 5 billion EUR * over 11 years.



* Currency conversion Feb 2008: 7.6 billion USD



Region III Success Stories with RoHS

Advances in Lead Free Solder



RoHS Directive: Lead-Free Solder

- General Electric – Fanuc
 - Substituted leaded solder with tin/copper and tin/antimony alloy solder
 - Reduction of over 126K lb of lead waste
- K & L Microwave
 - Reduced lead use from 400 pounds in 2003 to 91 pounds in 2005
 - Attained a level below the threshold for lead reporting via Form R under EPCRA requirements.
- Tobyhanna Army Depot
 - Substituted leaded solders with lead-free
 - From 245 lb in 2002 to <1 lb in 2007
 - Substituting cadmium with aluminum in vapor deposition technology in some plating operations
 - From 350 lb in 2002 to 150 lb in 2009



Michael L. Parrent, Pollution Prevention
Program Manager of Tobyhanna Army Depot

The background is a dark blue field filled with various shades of blue gears of different sizes, some overlapping. On the left side, there is a vertical strip of a colorful, textured image showing a close-up of interlocking gears in shades of orange, yellow, and brown.

REACH + NPEP

NPEP Strategy with EU Directives

- Identify potential partners using TRI & BR
- Research companies with web search engines
 - SME (small- and medium- sized enterprise)
 - Public or private
 - Extent of business outside of US
- Learn new technologies
 - Lead anode substitutes in electroplating processes
 - Domenic Calabro, Region 10
 - David Langston, Region 4
 - Tim Townsend, Region 6

16 Priority Chemicals in REACH's Annex I

- **1,2,4-Trichlorobenzene**
 - Used as a die carrier, to make herbicides and other organic chemicals
 - Production exceeding 1 million pounds annually in US
 - MCL = 0.07 ppm
- **2,4,5-Trichlorophenol**
 - Herbicide manufacturing plant caused Seveso Disaster in Italy (1976)
 - Used to make rubber, dyes, and wood preservatives
- **Hexachlorobenzene**
 - Used as a fungicide in 1945; banned in US in 1966
 - MCL = 1 ppb
- **Pentachlorobenzene**
 - Used to make fungicides and as a fire retardant

16 Priority Chemicals in REACH (cont.)

- **Pentachlorophenol**
 - Used as a wood preservative (fungicide) for utility poles and railroad ties
 - Though once widely used as an herbicide, banned in 1987
 - MCL = 1 ppb
- **Trifluralin**
 - Herbicide used to control many annual grasses and broadleaf weeds
- **6 PACs** (as defined in TRI)
 - Formed as a result of incomplete combustion of organic materials
- **Naphthalene**
 - Used as a household fumigant, such as mothballs
 - Main industrial use as a solvent in organic coatings
- **Quintozene**
 - Used as soil and grain seeds fungicide and slime inhibitor in industrial waters
- **Mercury**
- **Lead**
- **Cadmium**

Dirty Dozen in the Stockholm Convention on Persistent Organic Pollutants (POPs)

- **Furans**
 - Produced due to incomplete combustion, as well as during the manufacture of certain pesticides and other chemicals
 - Metal recycling and pulp & paper bleaching can release furans
 - Found in commercial mixtures of PCBs
- **Polychlorinated Biphenyls (PCBs)**
 - Formerly used as hydraulic fluids, plasticizers, adhesives, fire retardants, inks, lubricants, heat transfer systems, and carbonless paper
 - “No one may manufacture, process, or distribute in commerce or use any polychlorinated biphenyl in any manner other than in a totally enclosed manner.” 15 USC 2605(e)
 - MCL = 0.5 ppb

Dirty Dozen POPs (cont.)

- **Lindane (pending addition to POP list)**
 - Neurotoxic organochloride, used as an insecticide
 - The FDA supports public health uses of pharmaceutical lindane
 - EPA has approved the use of lindane stockpiles through 2009
 - California banned its use in 2002
 - MCL = 0.2 ppb
- **Heptachlor**
 - Permitted commercial use for (1) fire ant control in buried, pad-mounted electric power transformers, and (2) in underground cable TV and telephone boxes
 - Has also been used more widely to kill malaria-carrying mosquitoes

NPEP and REACH

- **1,2,4-Trichlorobenzene**
 - SLOSS INDUSTRIES (Region 4)
 - PPG INDUSTRIES (Partner Region 3 & 6)
- **2,4,5-Trichlorophenol**
 - DUPONT CHAMBERS WORKS (Region 2)
- **Heptachlor**
 - RHODIA, SYNGENTA (Region 6)
 - VELSICOL CHEMICAL CORP (Region 4)
- **Hexachlorobenzene**
 - DOW CHEMICALS (Region 9)
 - SUN CHEMICAL CORP (Region 5)
- **Quintozene**
 - AMVAC CHEMICAL CORP (Region 9)

Thank you !

**Christine Guitar
Jim Kohler
Newman Smith**



**Peter, Noah, Dave,
Donna & Wayne**



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