

A Joint Workshop 2012



eu-us
bridging nanoEHS research efforts

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Exposure through the Life Cycle COR – Work Group 1

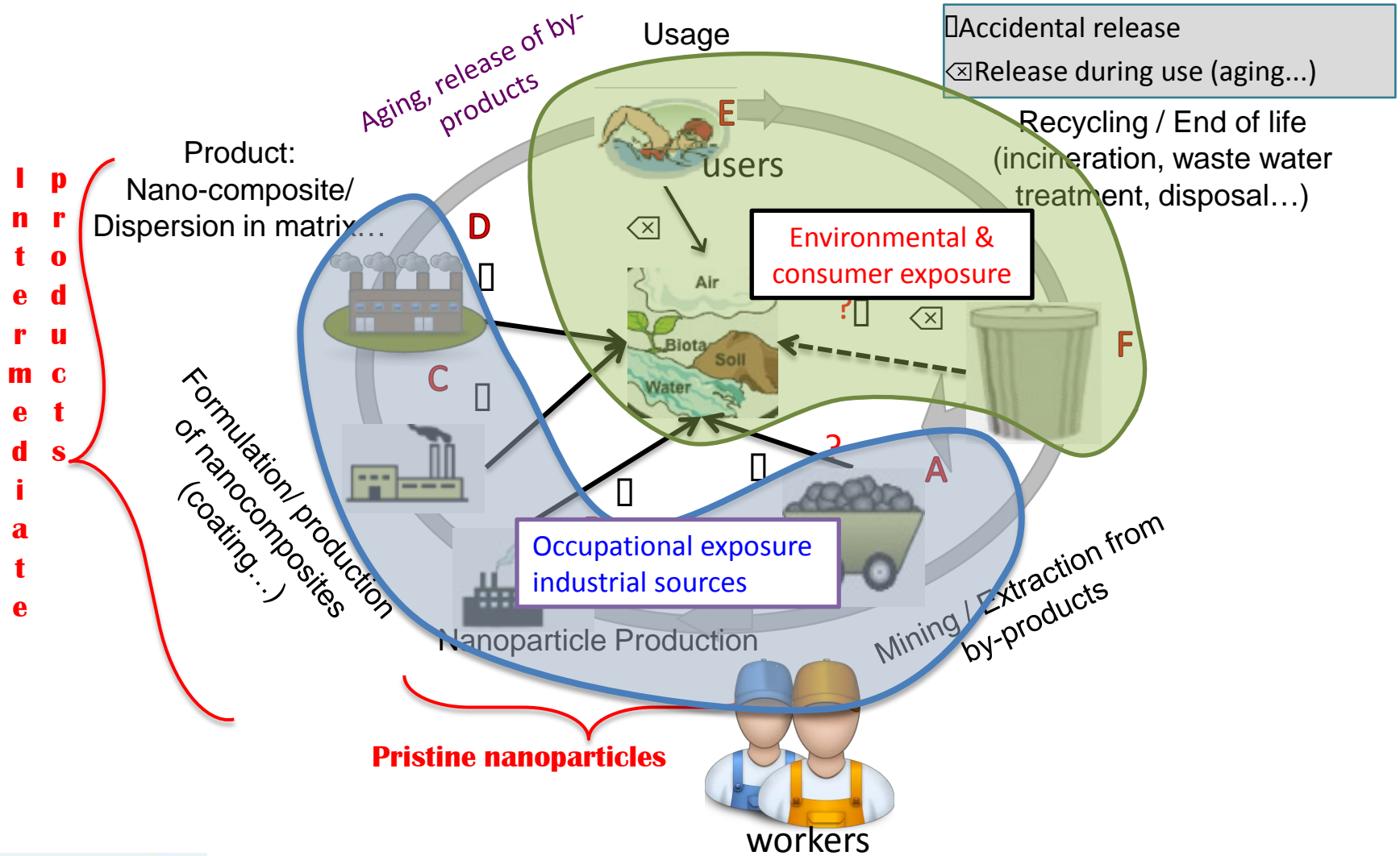
Developing a Resource Tool for Concepts and Methods to Analyze Engineered Nano Materials in Environmental Media Throughout their Life Cycle

Presenter: Gabriele Windgasse, California Department of Public Health

Contributors: Richard Canady, Theresa Fernandes, Patrick Hole,
Thomas Kuhlbusch, Hildo Krop, Jerome Rose, Claus Svendsen,
Jenny Tao

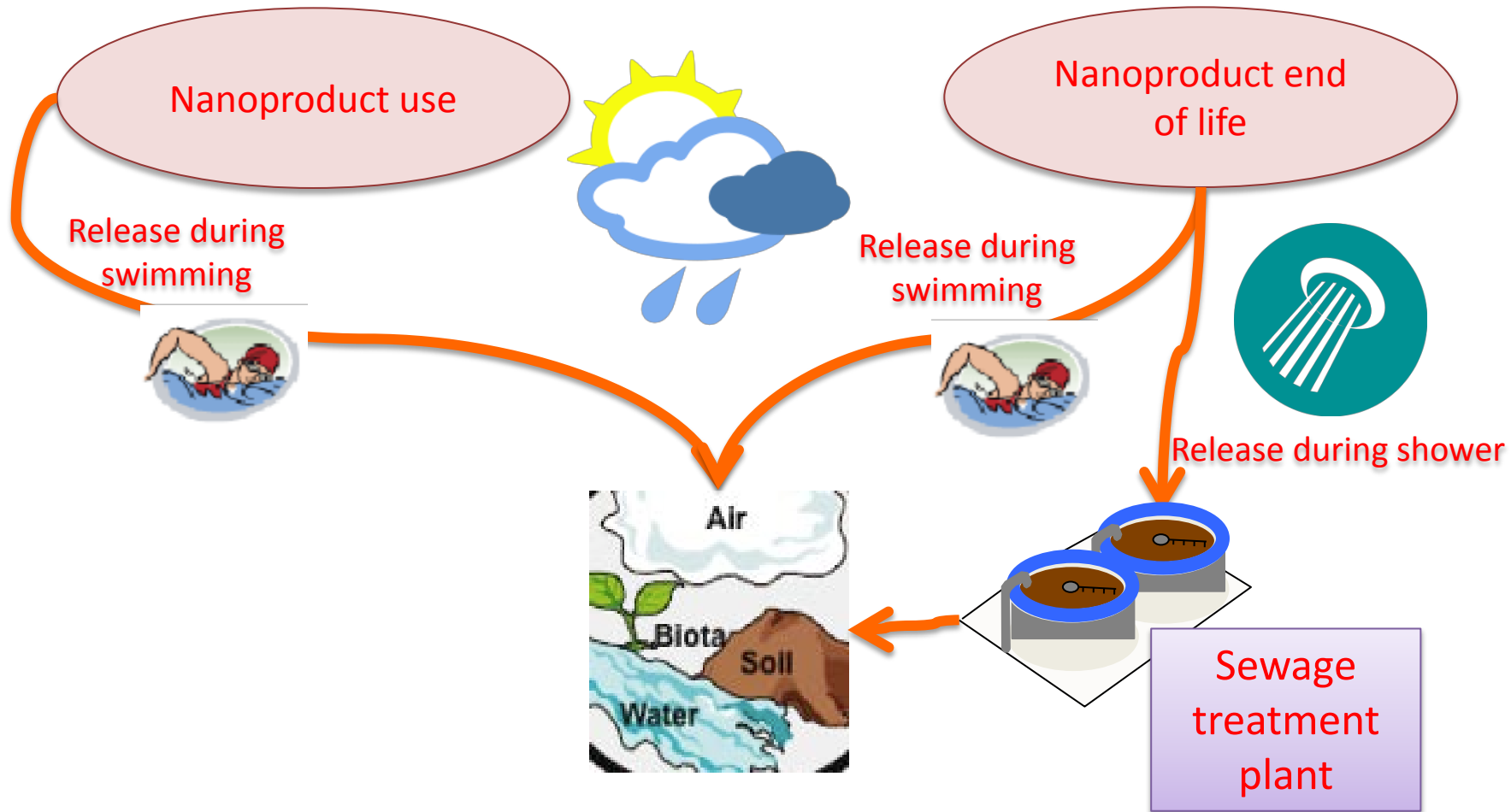
Disclaimer: This is not a presentation from the California Department of Public Health or
the Agency for Toxic Substances and Disease Registry

Exposures Through the Life Cycle



Releases and Exposures during the Life Cycle

Late stages: diffuse sources, exposure of general population nano-TiO₂ in Sunscreen



Releases and Exposures during the Life Cycle

Early stages: point sources, occupational exposure; incidental releases

National Registries

France

Mandatory reporting of ENM in 2013
(manufacturing, import, distribution, research)

Netherlands

Planned exposure registry and health monitoring for workers

Denmark

Database under construction for safety evaluation. Registration of manufacturers and importers

UK

Voluntary Reporting Scheme
2006 -2008: 13 submissions to VRS

US

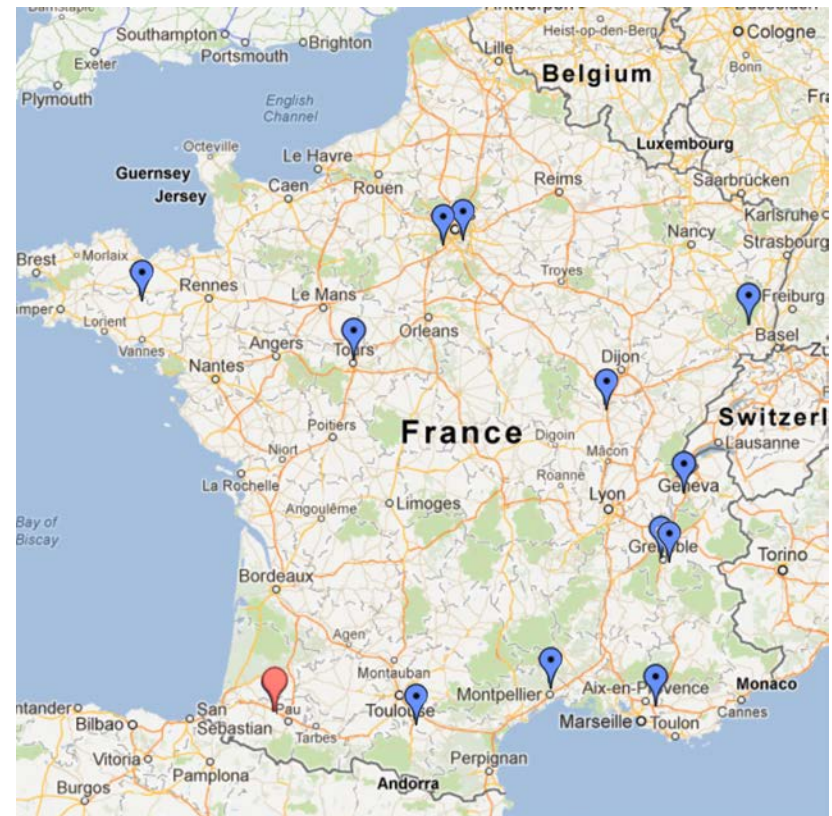
ENM not covered under Right-To-Know or Toxic Release Inventory.
TSCA: some ENM covered under Significant New Use Rules; FIFRA

Example:

Location of Potential Industrial Sources in France

Manufacturing ENM in France:
Voluntary declaration by French
companies (ANSES 2004/2005)

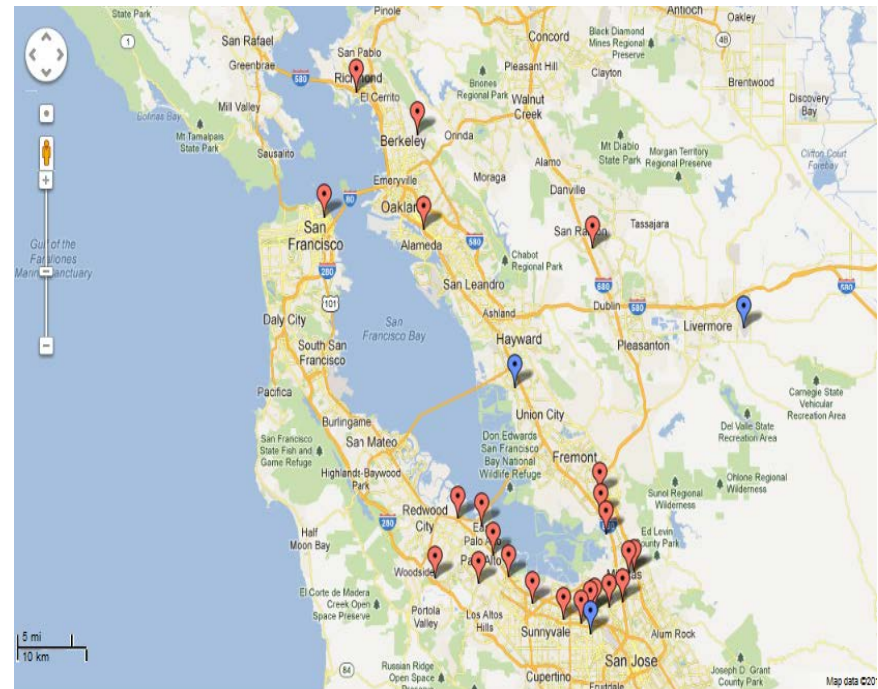
www.nanomateriaux.org/VisiteurFrancais



Example: Location of Potential Industrial Sources in California

**Example from California:
no RtK, no TRI,
but CA Assembly Bill 289 (2006)**

- Department of Toxic Substances Control, requested information from manufacturers: 7 research institutions responded
- Silicon Valley Toxics Coalition (NGO): 2008 survey of 129 Bay Area companies
- City of Berkeley: community “right-to-know” law for manufacturers/users of ENM (2006)



How to measure ENM in different media/compartments?

Challenges

- Identification and quantification in air, water, soil, food, biological samples
- Multitude of diverse ENM
- Changes throughout their lifecycle
- Distinction between natural and engineered NM

Goals

- Provide a current and relevant resource tool for ENM community
- Proposal for a wiki-based / crowd-sourced relational database
- Database includes analytical concepts and methods
- Many different users

Proposed Relational Database

Mission

Relational Database for Analytical Concepts and Methods for ENM in environmental media

Requirements

- Easy query for analytical procedures in various media, ENM, instrumentation
- Easy data-entry; crowd-sourced/wiki-based
- Development of new analytical concepts
- Connected to other nano-databases
- ...

Proposal for Database Structure

Examples of tables/files:

1. Analytical methods
2. Analytical concepts
3. Lookup Table (definitions)
4. ...

How are tables related?

One to many: One definition in the lookup table will be connected to many rows in the analytical methods table

Many to many: one analytical method may be used in many analytical concepts; one analytical concept may use many analytical methods (resolve with linking table)

Columns/Fields to include in Table “Analytical Methods”

- a) “Primary key” – unique ID for each record
- b) Environmental Medium/compartment
- c) ENM analyzed
- d) Physical-chemical characteristics:
 - 1) Size Distribution
 - 2) Surface area/g
 - 3) Chemical composition
 - 4) Aggregation states
 - 5) Shape
 - 6)
- e) Instrumentation used
- f) Sample preparation method
- g) Images at various magnifications
- h) Citation/source
- i) Date published
- j) Type of publication:
 - 1) Regulation (Country, State; Organization)
 - 2) Bibliography
 - 3) Research article
 - 4) Industry/Commercial (using, manufacturing ENM)
 - 5) Industry/Commercial selling analytical method/technique
 - 6) Industry/Commercial selling analytical services
- k) ...

Challenges

- Designing a flow chart for analyzing an unknown ENM in any given compartment
- Use multiple analytical techniques to identify and quantify ENM during their life cycle
- Use the unique and specific characteristics to develop new analytical concepts
- Find data gaps
- Define Standard Operating Procedures
- Connect to other existing nano-databases (NHECD, Nanomaterial Registry)

Next Steps/Questions

- How to handle impurities
- How to handle mixtures
- Who would develop/maintain this database?
- Cooperation with other CORs and existing databases will be critical

Your questions and input are greatly appreciated!

Contact: Gabriele.Windgasse@cdph.ca.gov

LifeCycleCOR members:

Pedro	Alvarez
Jacques	Bouillad
Derk	Brouwer
Holly	Campbell
Richard	Canady
Dik	van de Meent
Francesco	Dondero
Teresa	Fernandes
Luana	Golanski
Stacey	Harper
Mark	Hoover
Hildo	Krop
Thomas	Kuhlbusch
Michael	Riediker
Jerome	Rose
Blanca	Suarez
Claus	Svensden
Jenny J.	Tao
Gabriele	Windgasse
Grigory	Yarygin
Vytautas	Reipa
Geert	Cornelis