# EPA STAR Grantees – Second Nanotechnology Conference

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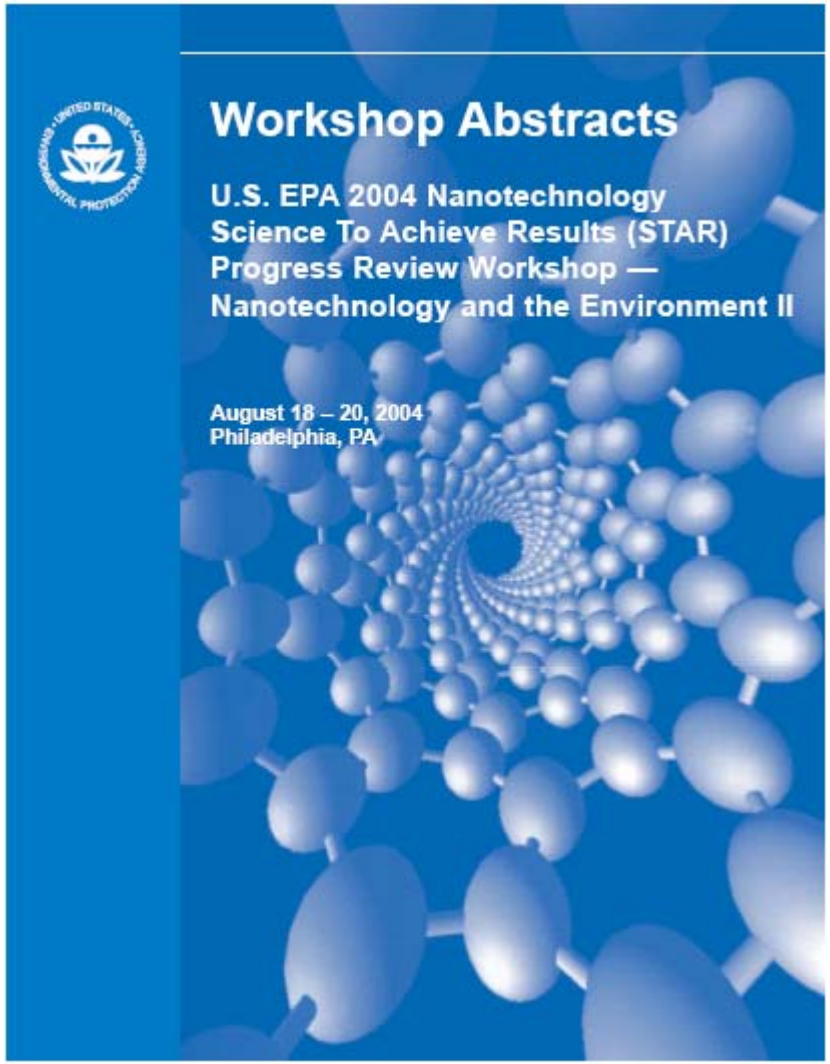
**Environmental Engineering Research Division**

RESEARCH & DEVELOPMENT

*Building a scientific foundation for sound environmental decisions*



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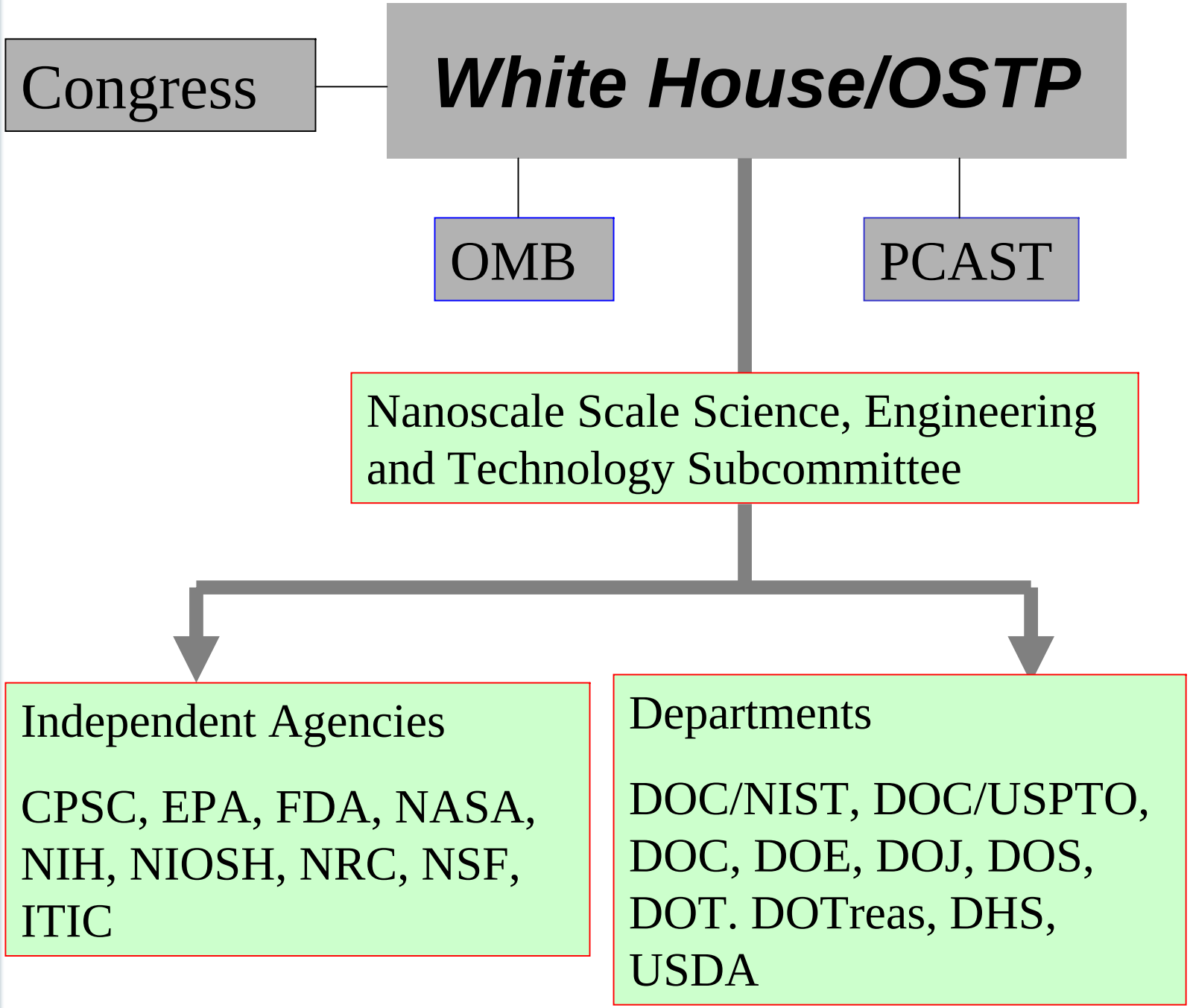
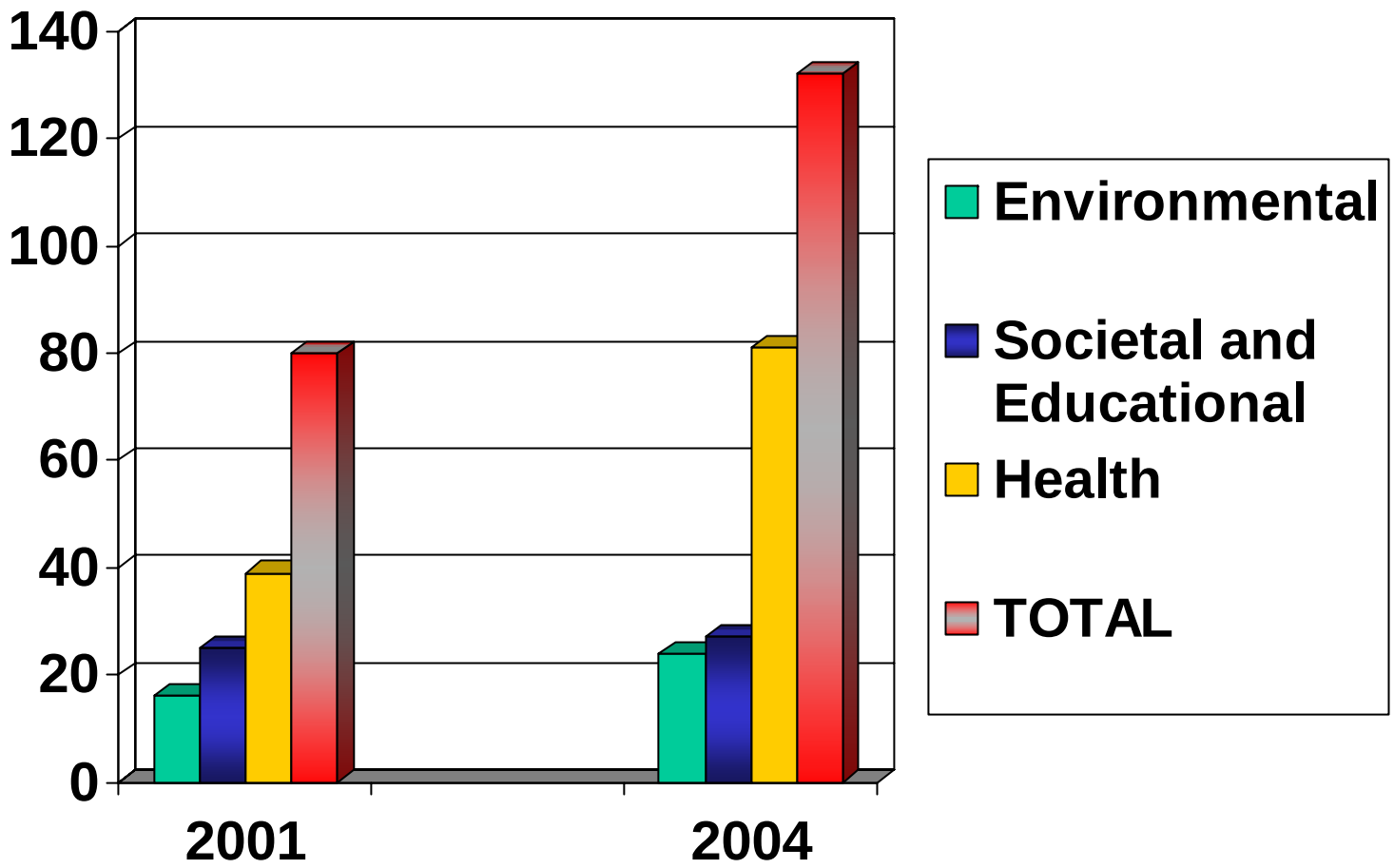


# NNI NANOTECHNOLOGY FUNDING



# Efforts of NNI on Nanotechnology - Health and the Environment

- **EPA & NSF Research Grants on Health and Environmental Applications and Implications**
- **NIH Research on Effects of Nanoscale Materials in Body**
- **National Toxicology Program**
  - **Qnanotubes, quantum dots, titanium dioxide**
- **NSF, DOE Research Centers**

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# *Environmental Protection Agency Mission*

To Protect Human Health and Safeguard the Natural Environment

**Accordingly, EPA's Research Targets:**

- **Pollution Prevention**
- **Detection & Remediation**
- **Effects of Various Substances/Compounds**
- **Potential Routes and Extent of Exposure**
- **Risk Assessment and Management**

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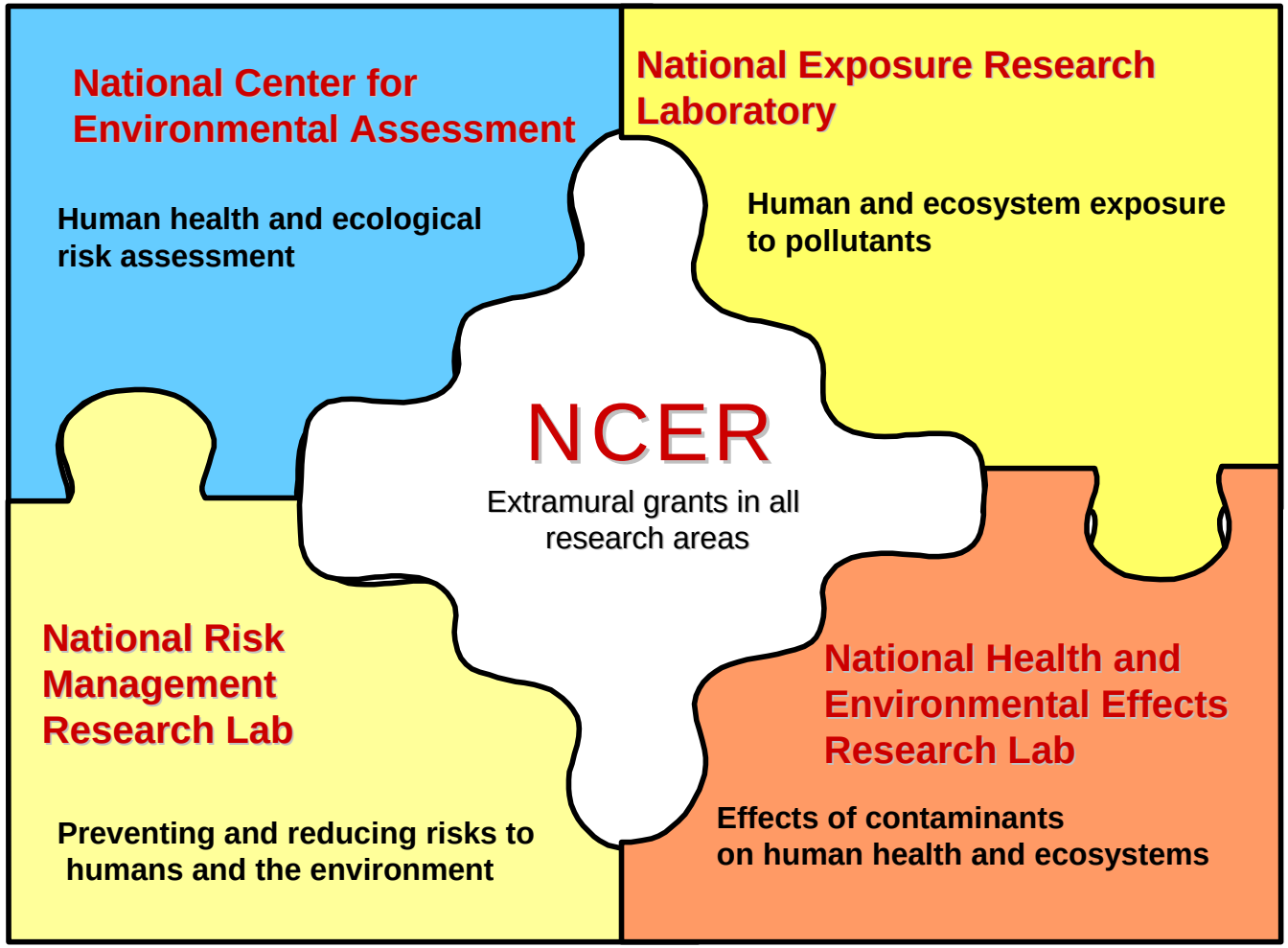
# *Office of Research and Development Labs and Centers*



# *NCER's Role in ORD*

- **ORD provides the leadership in science and conducts most of EPA's research and development**
- **NCER is one of two Centers that, together with three National Laboratories, comprise the Office of Research and Development**
- **ORD is the principal scientific and research arm of the EPA and fosters the use of science and technology in fulfillment of EPA's mission**
- **NCER is ORD's extramural research arm**
- **ORD's research budget is approximately $550 million**
- **NCER's research budget is approximately $80 million for competitive extramural grants and fellowships – Science To Achieve Results (STAR), plus 2.5% for Small Business Innovation Research (SBIR) contracts**

# NCER High Priority Research Areas

- **Science To Achieve Results (STAR)**
  - *Pollution Prevention and New Technologies*
  - *Nanotechnology*
  - *Economics and Decision Sciences*
  - *Particulate Matter*
  - *Drinking Water*
  - *Global Change*
  - *Ecological Risk*
  - *Human Health/Children's Health*
  - *Endocrine Disruptors*
- **Small Business Innovation Research (SBIR)**

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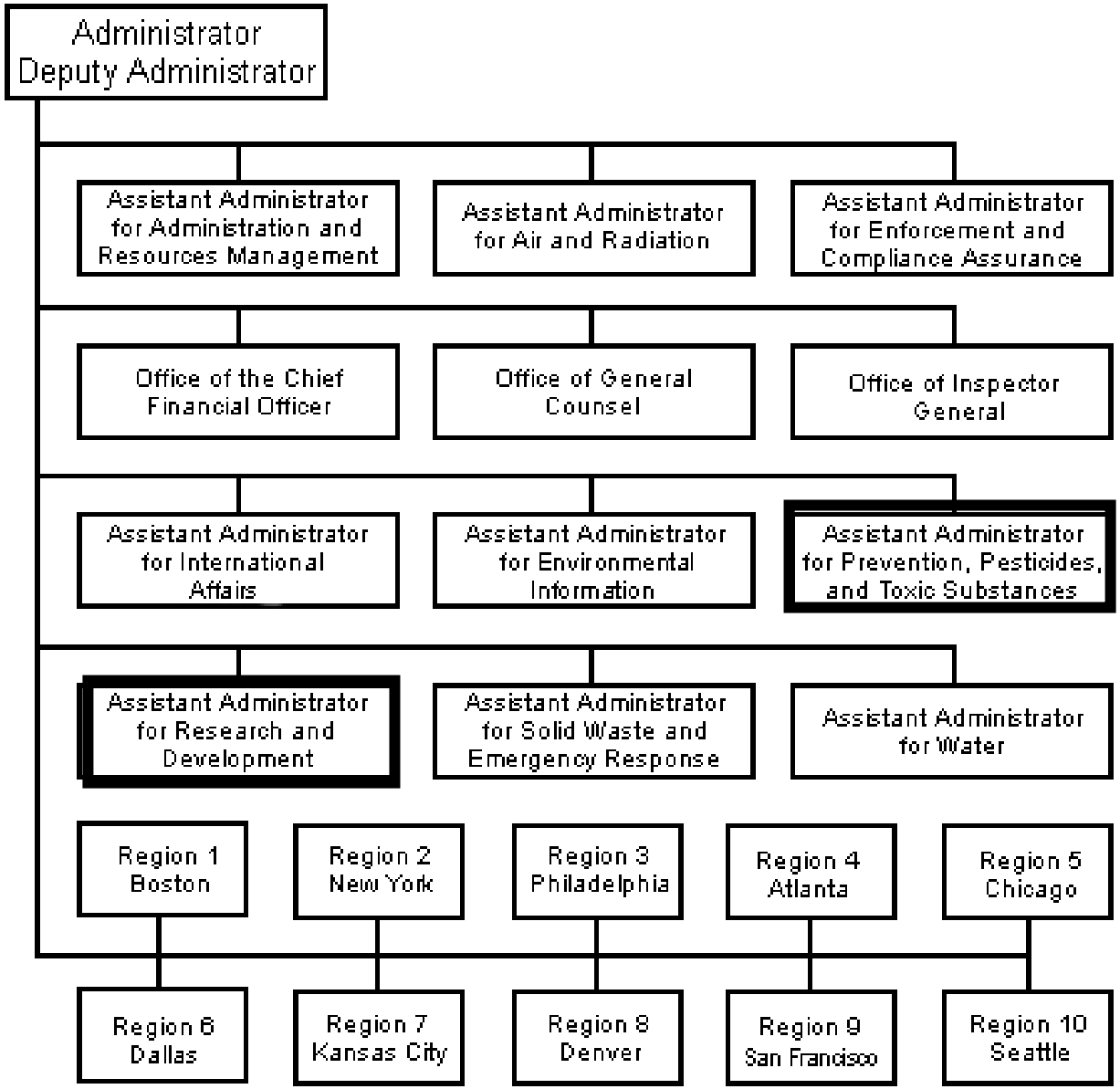
# EPA Organization



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# *EPA's Regulatory Responsibility*

## The Toxic Substances Control Act (TSCA) of 1976

(15 U.S.Code, Chapter 53)

Gives EPA the ability to list industrial chemicals currently produced or imported into the United States. There are currently over 81,000 chemical substances on the TSCA Inventory. Based on available data for these chemicals EPA may:

A. Take no action if unable to make a risk or exposure based finding regarding a chemical's effect on the environment or human health

B. Require reporting or testing of those that may pose an environmental or human-health hazard

C. Ban or limit the manufacture and import of those chemicals that pose an unreasonable risk.

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# *EPA's Regulatory Responsibility*

## The Toxic Substances Control Act (TSCA) of 1976

(15 U.S.Code, Chapter 53)

- TSCA Inventory is available in paper form as well as on computer tape, diskettes, or CD-ROM.
- TSCA Inventory in paper form last updated in 1990, additions to the Inventory since then not reflected.
- Electronic Inventories updated every 6 months.
- Many public & corporate libraries have copies. Inventory is also available at federal depository libraries.
- Available online at the Cornell University website:

  http://msds.pdc.cornell.edu/tscasrch.asp

# *EPA's Regulatory Responsibility*

## The Toxic Substances Control Act (TSCA) of 1976

(15 U.S.Code, chapter 53)

- EPA classifies chemical substances as either "existing" chemicals or "new" chemicals
- New chemicals are those not listed on TSCA Inventory
- New chemicals can be added to the Inventory after completion of PMN review

# *EPA's Regulatory Responsibility*

## The Toxic Substances Control Act (TSCA) of 1976

(15 U.S.Code, chapter 53)

- If a substance is "new", it can be manufactured* for a commercial purpose only if it has completed Premanufacture Notice (PMN) review, is subject to an exemption from PMN reporting (i.e., low volume (<10,000Kg/yr), or a TSCA reporting exclusion (naturally-occurring or R&D material)
- In considering use of an existing chemical, need to determine whether the substance is subject to other rules under TSCA.

*manufactured includes imported for purposes of requirement

# *Pre-Manufacture Notice (PMN) TSCA*

Required before a new chemical may be added
To the TSCA Inventory

A. Notice sent from manufacturer to EPA
B. Screen at EPA:
   Structure-activity review - Assessment of physical and chemical properties (likelihood of toxicity)
   Exposure assessment - Review of exposure during manufacture, processing, or use
C. Response to manufacturer within 90 days
D. Most notices contain confidential business information

# *Currently*

***EPA is discussing internally:***

- ***How nanomaterials should be approached under existing regulations***
- ***Whether new regulations are needed***

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# Nanotechnology - Potential Environmental Benefits

- Improved monitoring & detection capabilities
- **Ultra-Green** manufacturing and chemical processing - atom-by-atom construction
- Waste-minimization via designed-in pollution prevention at the source - less material to dispose of
- Reduced energy usage
- Commercially-viable alternative clean energy sources (fuel cells, solar)
- Inexpensive, rapid remediation and treatment technologies

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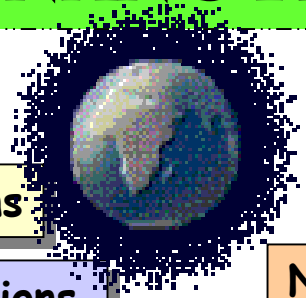
# Nanotechnology - Possibility for Environmental Harm

## Human health & Ecosystem Implications:

- Potential toxicity of novel materials
- Harm to the environment and/or ecosystem through use, manufacture, and/or disposal
- Unknown transport, transformation and fate information of nanomaterials
- Potential bioaccumulation and biotransformation issues

# *EPA Nanotechnology Activities*

## BUILDING A GREEN NANOTECH COMMUNITY



### STAR

- 2001 RFA – Environmental Applications
- 2002 RFA – Applications and Implications
- 2003 & 2004 RFA – Health & Ecosystem Effects of Manufactured Nanomaterials

### SBIR

- Annual – Nanomaterials & Clean Technologies

### Symposia

- ACS – Nano and Environment 2003, 2004 & 2005

### Meetings

- NSET, Internal EPA, Woodrow Wilson Center

### Workshops

- NNI Nanotechnology Grand Challenge in the Environment – May 8-10, 2003
- EPA Grantees' Workshop I, August 28-29, 2002
- Interagency: Applications and Implications Conference w/ DOC, DOD, DOE, DOT, FDA, NIH, NSF, & USDA – September 15-16, 2003
- Societal Implications II – December 2003
- EPA Grantees' Workshop II – August 18-20, 2004

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# *Nanotechnology Symposium*
# *ACS 228th Annual Meeting*
## *March 13 – 17, 2005 San Diego, CA*

- **Toxicology and Biointeractions of Nanomaterials**
- **Nanocatalysis for Greener Technologies**
- **Environmentally Benign Nanocomposites**
- **Natural Biogeochemical Nanoprocesses**
- **Nanotech-Enabled Green Energy**
- **Nanotech-Enabled Sensors for Substances of Environmental Interest**
- **Treatment/Remediation using Nanotechnology**
- **Nomenclature, Measurement, and Standards for Nanosized Materials**
- **Fate/Transport of Nanostructured Materials**
- **Environmentally Benign Nanomanufacturing**

# *Sunday, March 13, 2005*

Panel featuring representatives from several NGOs, including:

- ETC
- Environmental Defense
- Greenpeace
- World Wildlife Fund

Thanks for your attention!