# TOXMAP: Environmental Health Maps Now Powered by ArcGIS Server

## 2011 ESRI Federal Users Conference

**January 20, 2011**

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**Aquilent, Inc.**

http://toxmap.nlm.nih.gov

**National Institutes of Health**
**U.S. Dept. of Health and Human Services**

# National Library of Medicine

## Overall Goals

- Organize and provide access to health-related information
- Encourage use of high-quality information by health professionals and the public
- Conduct and support informatics research

# TOXNET/TRI

**Latitude:** 29 degrees 53 minutes 6 seconds

**Longitude:** 95 degrees 24 minutes 42 seconds

Map it with TOXMAP

TRI2009

BENZENE

SPRAGUE SEARSPORT TERMINAL

SEARSPORT, ME

*For other data, click on the Table of Contents*

## On-site Releases of Chemical:

**Non-Point Air Emissions Estimates:**

| | |
|---|---|
| **Non-Point Air Release:** | 12 lbs./rep yr. 2009 |
| **Basis of Estimate:** | (E2)Site-specific Emission Factors |

**Point Air Emissions Estimates:**

**Point Air Release:** 2 lbs./rep yr. 2009

**Basis of Estimate:** (E2)Site-specific Emission Factors

Toxics Release Inventory

TRI2009

Next Item | Search Results | New Search | Details | Other Files | Download | Browse Index | Help

- FULL RECORD
- Facility Identification
- Substance Identificati
- On-site Releases of C
  - Non-Point Air Emis
  - Point Air Emissions
  - Total Air Release
  - Water Discharge Es
  - Total Water Releas
  - Releases to Underg
  - Underground Inject
  - Land Release Estim
  - Total Land Release
  - Total On-site Releas
- Off-Site Waste Trans
- Source Reduction and
- Waste Treatment
- Administrative Inform

U.S. National Library of Medicine,
8600 Rockville Pike, Bethesda,

Map it with TOXMAP

TRI2009

BENZENE

SPRAGUE SEARSPORT TERMINAL

SEARSPORT, ME

*For other data, click on the Table of Contents*

## Facility Identification:

**Facility Name/Address:**

SPRAGUE SEARSPORT TERMINAL

MACK'S POINT TRUNDY RD

SEARSPORT, (WALDO County) ME 04974

**EPA Facility Number:** 04974SPRGSMACKS

**EPA Region:** 1

**Federal Facility Status:** Commercial

# What is TOXMAP?

- http://toxmap.nlm.nih.gov
- Public-facing NLM resource since Fall, 2004
- Health-centric GIS for EPA TRI and Superfund data
- Links to NLM, EPA, and CDC
- Usable by and useful to a variety of users
- Overlay demographic data
  - cancer/disease mortality, US Census, income
- Focus on area of interest via reusable regions
- ArcGIS Server / Flex version in development

TRI State Fact Sheets [?]

Current State Air Quality [?]

## Search Results [Edit Search] [Save Results [?]: TRI]

## Benzene (RN: 71-43-2)

Start over

TRI - 771 on-site TRI releases reported nationwide in 2008. View in: Google maps Google earth

Print this map

### Map Other Data

- US Census Data [?]
- Income Data [?]
- Health Data [?]
- Reference Data [?]

### Information about this Chemical

**NLM Searches of [?]**

- Toxicology Databases
- Human Health Effects
- Manufacturing/Use Info
- Env. Fate / Exposure
- Occupational Exposure
- MedlinePlus®

**CDC Searches of [?]**

- Toxicology FAQ
- Health Assessments
- All CDC Documents

- More Information

### Health Risk Information [?]

- CDC ToxFAQs
- NJ Hazardous Substance Fact Sheets
- California Proposition 65 Chemicals

### Toxicology References for this Chemical and Map

Search NLM TOXLINE® [?]

List of TRI chemicals

[?] What TRI chemicals are mapped in TOXMAP?

[?] Does TOXMAP show all sources of

ZOOM TO

Zoom to a place

Switch to small map

### MAP DETAILS

Hide TRI facilities list

Other sources of chemicals

**Facilities reporting to TRI [?]**

Page 1 of 75

Go to page

(744 releases total, sorted by on-site release amount)

1. BP PRODUCTS NORTH AMERICA INC TEXAS CITY REFINERY
2. LYONDELL CHEMICAL CO
3. USS - CLAIRTON WORKS
4. HOLCIM (US) INC. - DUNDEE PLAN T
5. CITGO PETROLEUM CORP
6. GEORGIA-PACIFIC BIG ISLAND MILL
7. CHEMICAL WASTE MANAGEMENT
8. SUNOCO, INC. (R&M) PHILADELPHIA REFINERY
9. UNITED STATES SUGAR CORP CLEWISTON MILL
10. ARCELORMITTAL BURNS HARBOR LLC

### MAP CONTROLS

**TRI [?] [Save results]**

- None
- Facilities : 2008
- Releases : 2008
- Trends

**Superfund [?]**

- None
- All NPL
- NPL Final
- NPL Deleted
- NPL Proposed

**Demographic [?]**

- None
- Population Density - 2000

Apply other demographics

**Search chemical | Define a combo map | Start over**

**Legend** [hide values | show values]

Lowest — On-site Release Amount — Highest

Show legend values

# Old GIS Architecture

- ArcIMS 9.3, no ArcSDE
  - No $$$ for Oracle or SQL Server license
- Data in shapefile or MySQL database
  - ~680 MB
- Construct maps via
  - hide/show shapefile layers
  - MySQL query, then acetate layer
  - SpatialFilter on shapefile layer
  - truncate acetate-based queries at 5,000
- One mortality layer dynamically updated

# Justification for Update

- The technology has evolved
  - In 2004, "interactive maps on the Internet" (e.g., ArcIMS) was a novelty
  - ESRI ArcGIS Server and related client APIs (e.g., Flex, Silverlight)
- User expectations have evolved
  - the "Google Maps Effect"
- Current architecture doesn't easily support new datasets and other growth
- Unify search implementations

# Challenges

- *Re-thinking* TOXMAP, not just *re-implementing*
- Deciding on a technology (Java Web ADF, JavaScript, Flex, Silverlight)
- No Flash, Flex, or geodatabase experience
- Technology moving under our feet (FlexViewer)
- Searching 1.9+ million records (TRI releases)
  - Sorting, color-coding, results page
- Only have an ArcView license
  - Use command line for geodatabase creation & editing
- Supporting both old and new versions
  - Requires two separate servers
- Decreased funding

# Demo

# Pre-release

- Revise Quick Search algorithm
- Refine pop-ups facility details
- Install & test on ArcGIS Server 10
- Develop intro screen
- Add cancer/disease mortality layers
- Add TRI 2009 data
- Fix bugs, glitches, snafus

# Full Release

- Conduct formal usability testing
- Incorporate feedback
- Update FAQ and other static content
- Add place finding and place history
- Add "some" advanced search
- Improve printing options
- Conduct all varieties of testing
- Fix bugs, glitches, snafus

# Beyond the initial release

- Regional filters (by state, county, shape)
- Add more advanced search capabilities
- Browse by facility, total releases, top chemicals (via clustering)
- Time-series release data
- Save search results
- Download TRI and Superfund data
- Fix bugs, glitches, snafus

# For More Information


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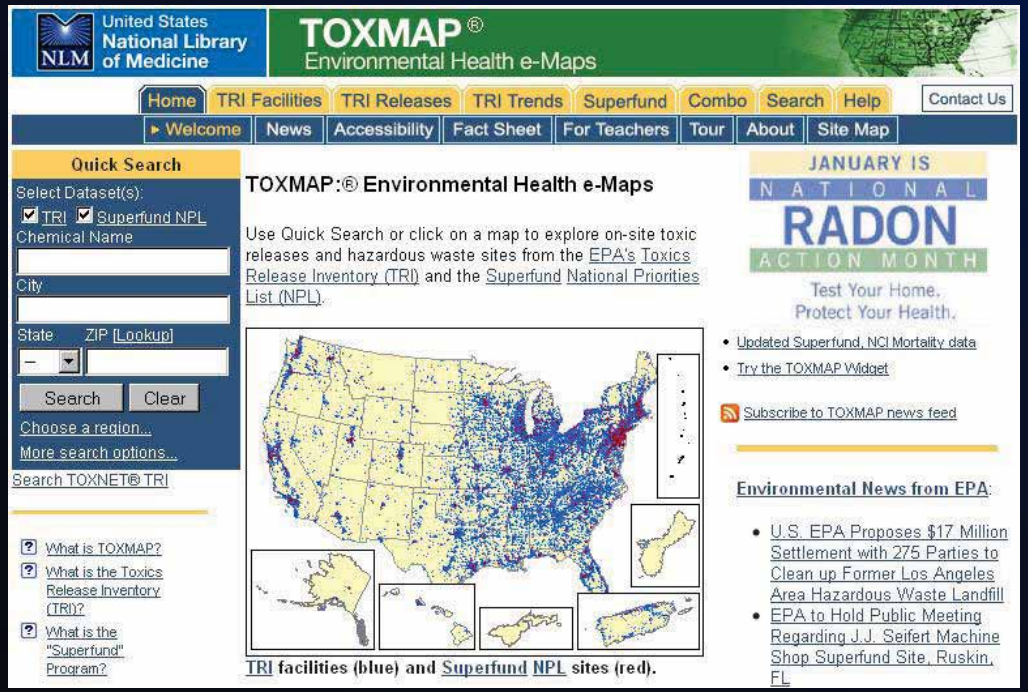
General Questions
tehip@teh.nlm.nih.gov


**http://toxmap.nlm.nih.gov**




NATIONAL LIBRARY OF MEDICINE

# Geographic Regions

**Quick Search**

Select Dataset(s):

☑ TRI ☐ Superfund NPL

Chemical Name

Benzene

City

State ZIP [Lookup]

TX

Search Clear

Choose a region...

More search options...

***Filter***

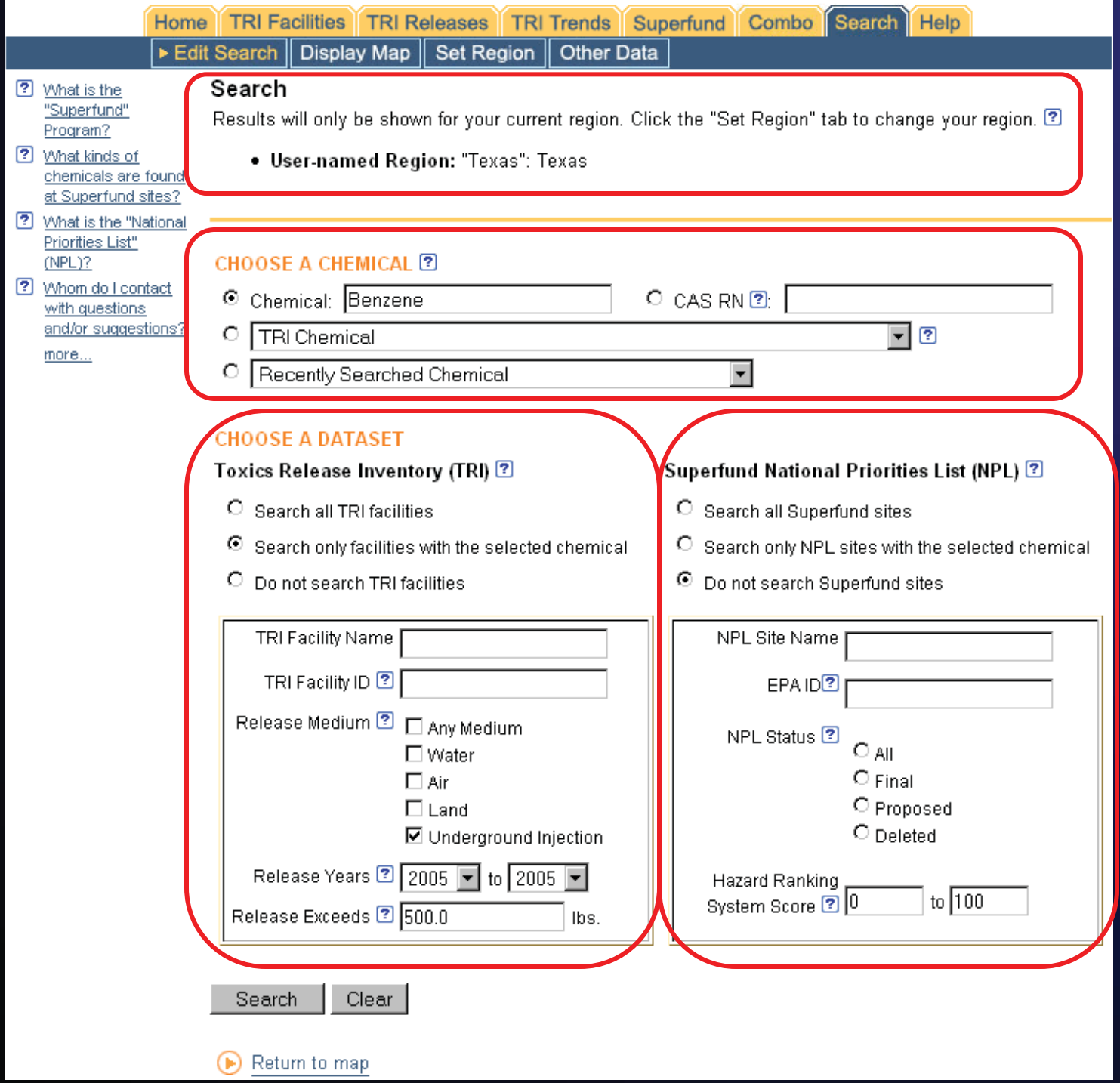
**Search Results** [Edit Search]

**User-named region: "Texas"**

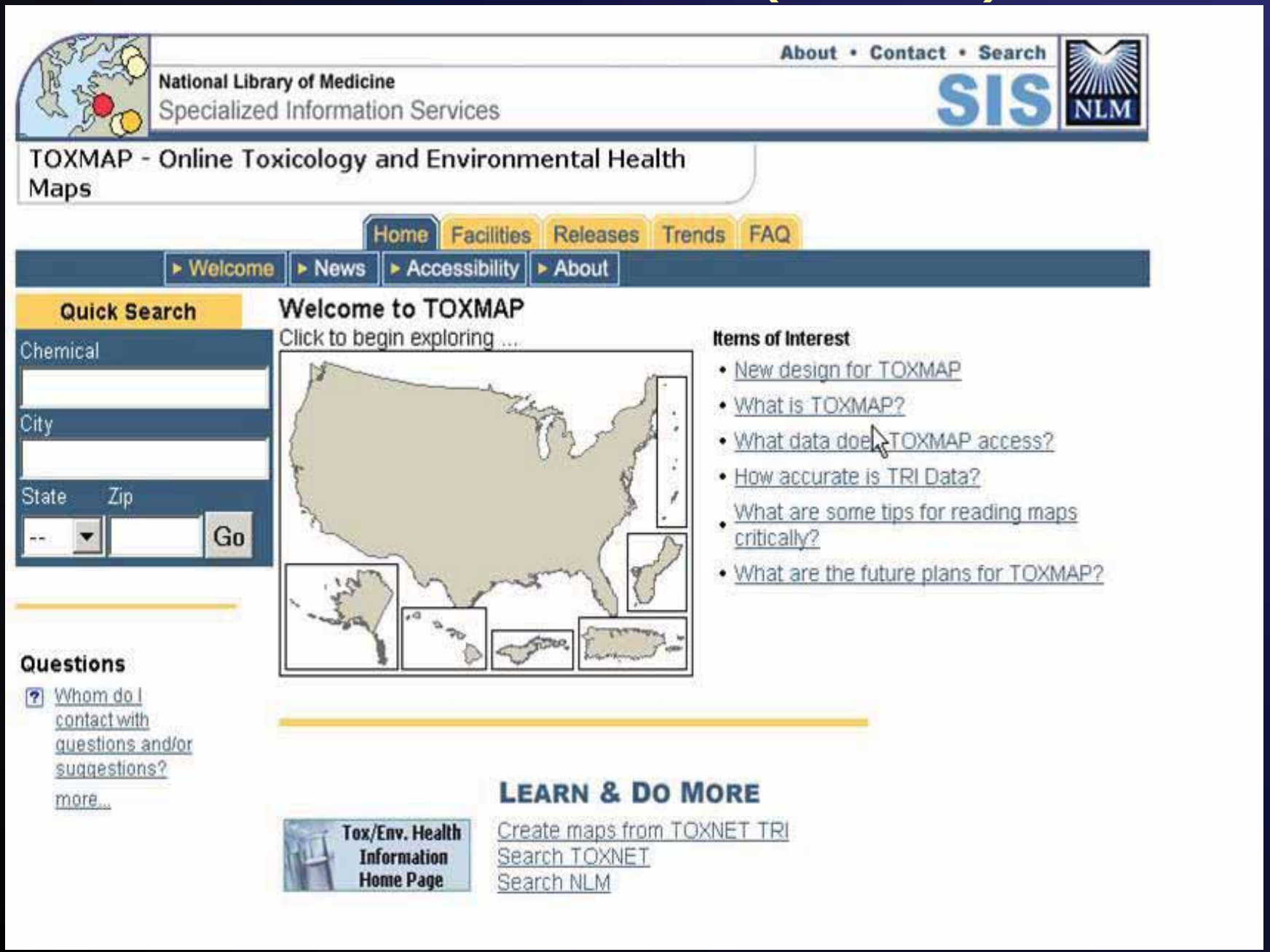
- **Region [** Set **][** Regional TRI Summary **]:** Texas

**Benzene (71-43-2)**

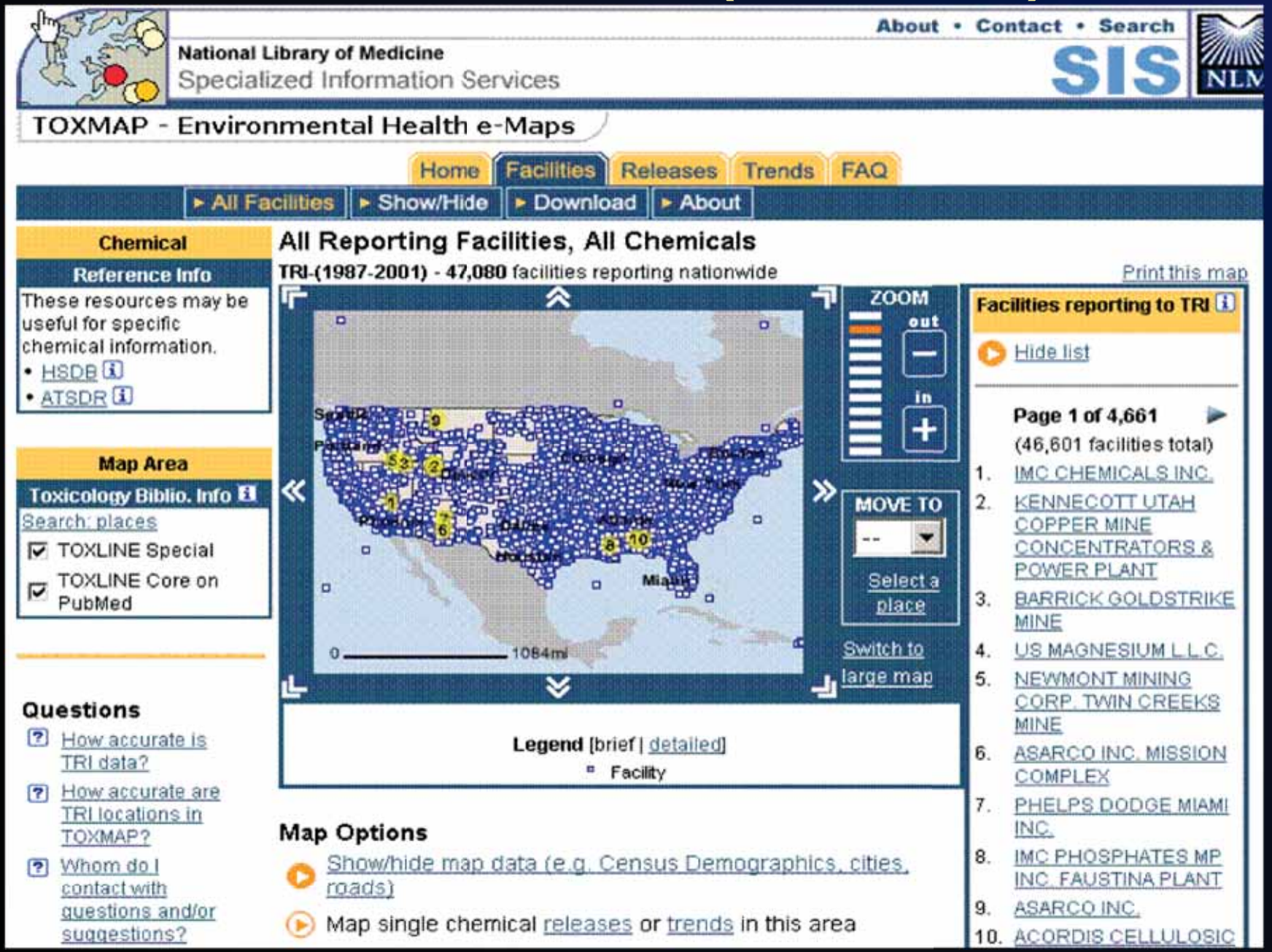
TRI - Map shows **144** of **144** on-site TRI releases reported in this region in 2005


Home
TRI Facilities
TRI Releases
TRI Trends
Superfund
Combo
Search
Help
Edit Search
Display Map
Set Region
Other Data
What is the "Superfund" Program?
What kinds of chemicals are found at Superfund sites?
What is the "National Priorities List" (NPL)?
Whom do I contact with questions and/or suggestions?
more...
Search
Results will only be shown for your current region. Click the "Set Region" tab to change your region.
User-named Region: "Texas": Texas
CHOOSE A CHEMICAL
Chemical: Benzene
CAS RN:
TRI Chemical
Recently Searched Chemical
CHOOSE A DATASET
Toxics Release Inventory (TRI)
Search all TRI facilities
Search only facilities with the selected chemical
Do not search TRI facilities
TRI Facility Name
TRI Facility ID
Release Medium
Any Medium
Water
Air
Land
Underground Injection
Release Years 2005 to 2005
Release Exceeds 500.0 lbs.
Superfund National Priorities List (NPL)
Search all Superfund sites
Search only NPL sites with the selected chemical
Do not search Superfund sites
NPL Site Name
EPA ID
NPL Status
All
Final
Proposed
Deleted
Hazard Ranking System Score 0 to 100
Search
Clear
Return to map

# TOXMAP 2004 (Home)



# TOXMAP 2004 (Facilities)



# TOXMAP 2004 (Releases)

# TOXMAP 2010 (Home)

United States National Library of Medicine

**TOXMAP®**
Environmental Health e-Maps

Home | TRI Facilities | TRI Releases | TRI Trends | Superfund | Combo | Search | Help | Contact Us

▸ Welcome | News | Accessibility | Fact Sheet | For Teachers | Tour | About | Site Map

**Quick Search**

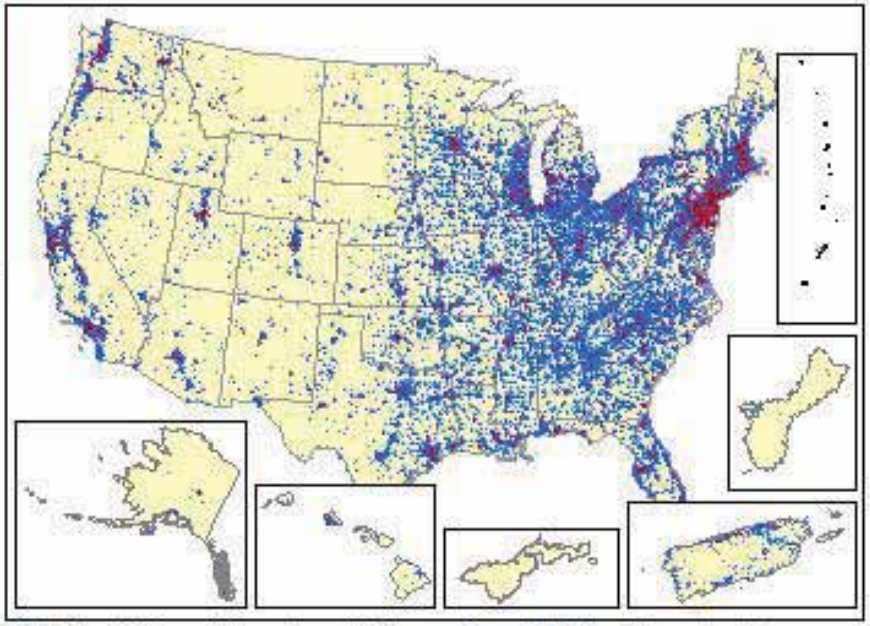
Select Dataset(s):
☑ TRI ☑ Superfund NPL
Chemical Name
City
State ZIP [Lookup]
Search Clear
Choose a region...
More search options...

Search TOXNET® TRI

- What is TOXMAP?
- What is the Toxics Release Inventory (TRI)?
- What is the "Superfund" Program?

## TOXMAP:® Environmental Health e-Maps

Use Quick Search or click on a map to explore on-site toxic releases and hazardous waste sites from the EPA's Toxics Release Inventory (TRI) and the Superfund National Priorities List (NPL).



**TRI facilities (blue) and Superfund NPL sites (red).**

JANUARY IS
NATIONAL
RADON
ACTION MONTH
Test Your Home.
Protect Your Health.

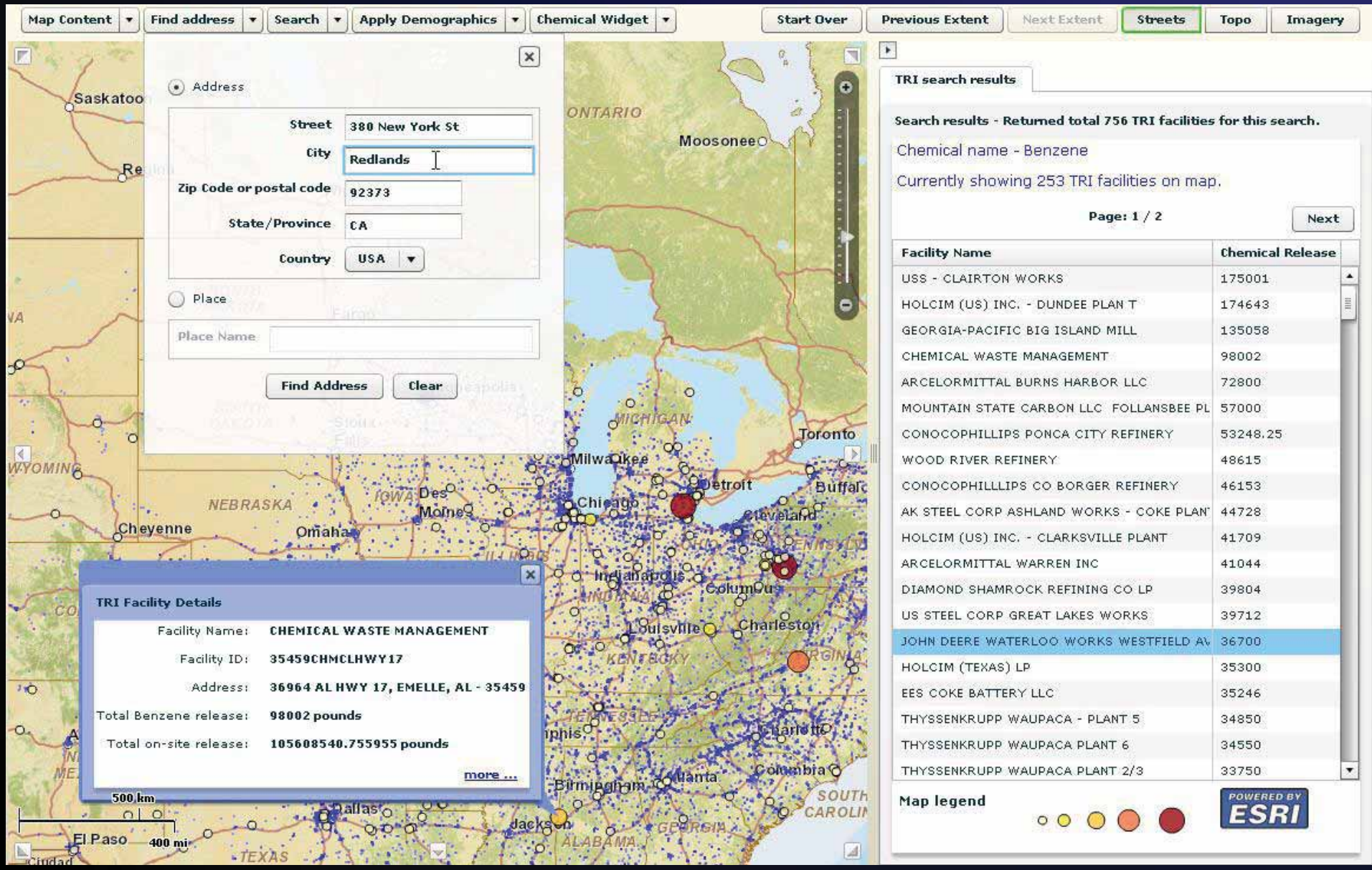
- Updated Superfund, NCI Mortality data
- Try the TOXMAP Widget

Subscribe to TOXMAP news feed

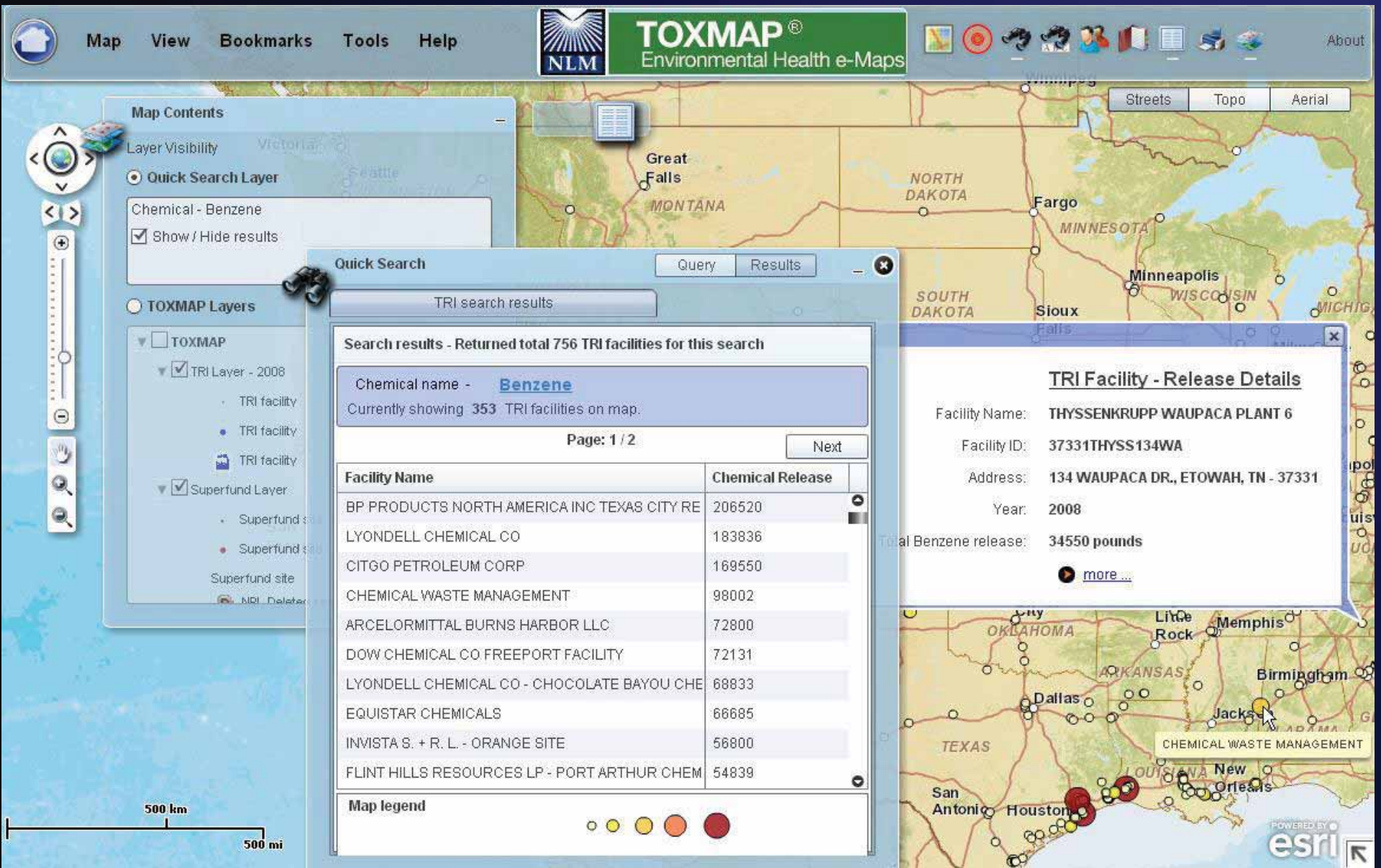
**Environmental News from EPA:**

- U.S. EPA Proposes $17 Million Settlement with 275 Parties to Clean up Former Los Angeles Area Hazardous Waste Landfill
- EPA to Hold Public Meeting Regarding J.J. Seifert Machine Shop Superfund Site, Ruskin, FL

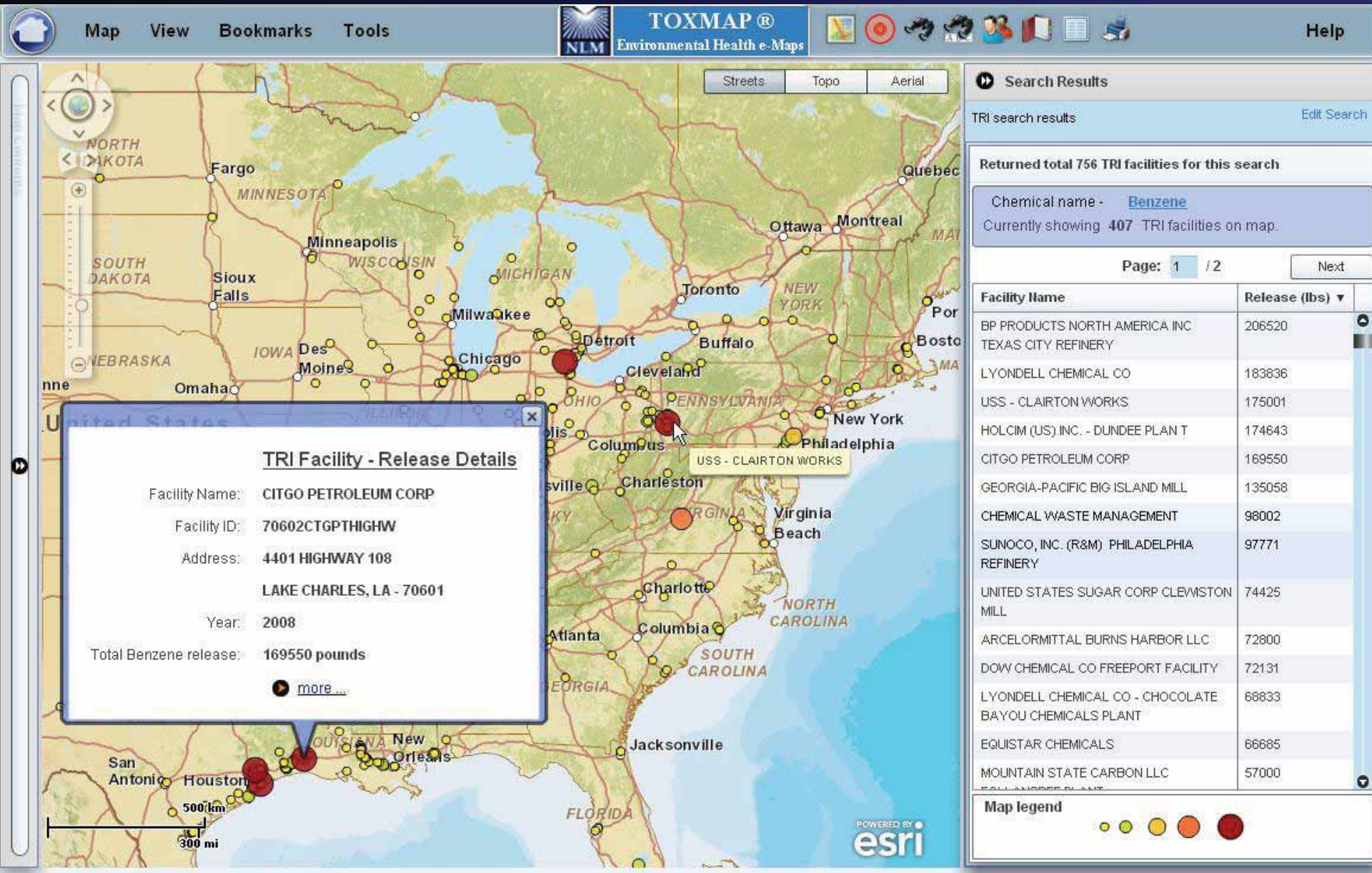
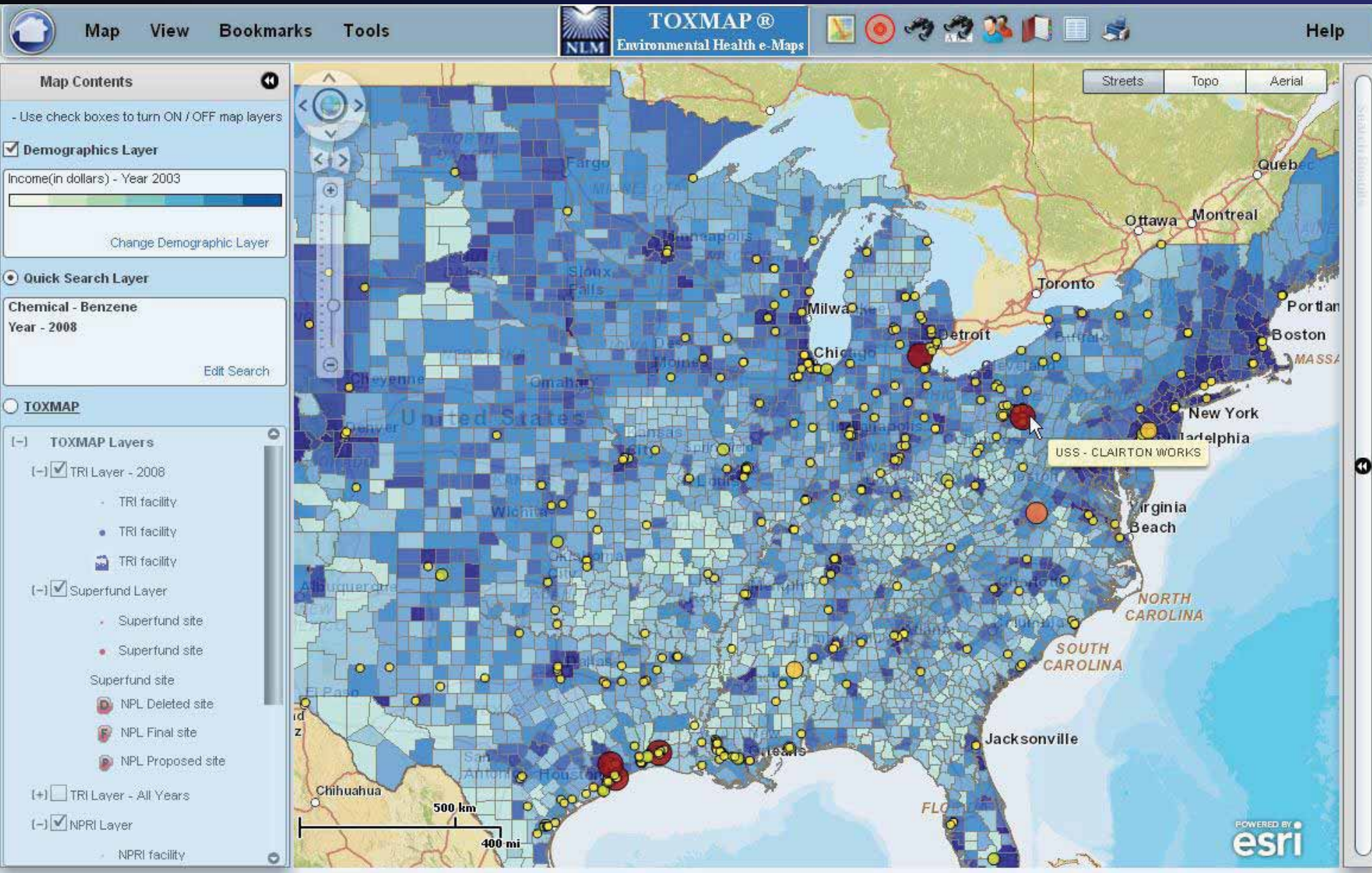
# First Full Flex Version



# Migrate to FlexViewer



# Latest Version: Search Results



# Latest Version: TOC and Overlay