Introduction to EPA’s Risk-Screening Environmental Indicators Model

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• RSEI Overview
• Highlights of RSEI Enhancements
• Appropriate and Inappropriate Uses
• Status
• Questions
Overview: RSEI Timeline

- 1986 – EPCRA, SARA Title III
- 1989 – EPA’s Relative Risk Screening Guidance for TRI
- 1992 – RSEI development initiated
- 1999 – Public Release of RSEI 1.0
- 2014 – Customer Service Survey
- 2015 – RSEI 2.3.4, public release of EasyRSEI and 3 years of Geographic Microdata
- 2016 – RSEI 2.3.5, public release of 27 years of microdata
Overview: So What is RSEI?

- A screening-level model for assessing the potential chronic human health impacts of certain TRI releases and transfers.
  - Air and water releases from TRI reporting facilities
  - Transfers to publicly-owned treatment works (POTWs) and off-site incineration.

- Primary Datasets
  - Toxics Release Inventory data
  - Chemical toxicity data
  - Locations of human populations and facilities.

- RSEI Results
  - RSEI produces different kinds of metrics (RSEI Score, RSEI Hazard, toxicity-weighted concentration)
  - Results can be examined at different levels of aggregation (e.g., facility, chemical, industry sector, zip code, county, state)
Overview: Types of Data

• Facility-level results (distributed in EasyRSEI, Envirofacts)
  – Impacts are aggregated and rolled back to the originating facility
  – Queries by geography pick up facilities within area, impacts may occur somewhere else.
  – Useful for screening and prioritizing facilities, industries, chemicals for further analysis

• Geographic Microdata
  – Not aggregated by facility or release- files are very large.
  – Calculated values for each release and each potentially affected grid cell.
  – Chemical concentration, toxicity-weighted concentration, RSEI Score and population.
  – Condensed version of Microdata sums all chemicals for each 810m x 810m grid cell.
  – Useful for looking at local geographic areas, environmental justice analyses.
Overview: RSEI Flow Chart

- RSEI Grid
  Stream Network
  Populations

- TRI Release Data

- Parameter Data (e.g., Facility location, Chemical toxicity)

- Modeling

- Calculated metrics by grid cell and stream segment

- Geographic Microdata
  (available for public download)

- Sum by release

- Facility-Level Results

- User-Facing Applications (EasyRSEI, Envirofacts, etc.)
Overview: So What is a RSEI Score?

• RSEI Score is a unitless value accounting for:
  – The size of the chemical release
  – The fate and transport of the chemical through the environment
  – The size and location of the exposed population
  – The chemical's toxicity

• Score calculation
  – Toxicity weight * exposed population * estimated dose.

• Since it is unitless, a RSEI Score can only be compared with other RSEI Scores.
Overview: How is RSEI Unique?

• RSEI is a multi-year, multi-media, national-level model
  – Each refresh updates all data years (currently 27 years), for a fully consistent and comparable time series
  – Multi-media (RSEI models releases to both air and water)
  – RSEI models entire U.S. and territories. Results can be aggregated nationally or examined locally

• RSEI Geographic Microdata provide high-resolution data with a linked source-receptor relationship
  – In 2016, a 27-year Microdata time series was released to the public for the first time (TRI data years 1988-2014)

• RSEI’s methodology is well-documented and based on standard EPA models and data sources
Overview: What Doesn’t RSEI Do?

• RSEI does not model other TRI-reported management activities, such as land application or underground injection, or transfers other than those to POTWs and incineration

• RSEI is not a stand-alone source of information

• RSEI does not produce a risk assessment

• RSEI Scores do not describe a level of risk (such as the number of excess cancer cases), and should not be used to draw conclusions about risk
Better Input Data
• Vastly improved locations for facilities and drinking water intakes
• Better weather data

Better Modeling
• Upgraded air modeling to AERMOD, expanded modeling around each facility
• Currently upgrading water pathway hydrography to NHDPlus Version 2

Expanded Outputs
• Separate Cancer/Noncancer Score and Hazard
• Publicly downloadable Geographic Microdata
Appropriate Uses of RSEI

• RSEI can be used, in conjunction with other data and information, to help establish priorities for further investigation and to look at changes in potential human health impacts over time.

• Looking at trends in RSEI Score over time and across sectors, chemicals, facilities and locations.

• Ranking and prioritizing chemicals, industry sectors, and locations for strategic planning that will involve exploration of additional data sets and related information.

• Highlight situations with higher relative RSEI Scores that may warrant further investigation to better assess potential chronic human health risks.

• Screening for facilities that may benefit from pollution prevention programs.
Inappropriate Uses of RSEI

• Determining whether a facility is in compliance with federal or state regulations.

• Making conclusions or decisions about the risk posed by any particular facility or release.

• Making conclusions or decisions about individual risk or generating quantitative risk estimates.

• Making conclusions or decisions without consideration (or in isolation) of other data or related information.
RSEI website has been revised with improved text and videos to enhance access, understanding and use. It is available at https://www.epa.gov/rsei

Anticipating release of RSEI refresh including TRI data for 2015 this December.

Results will be available in the TRI National Analysis and in EasyRSEI.

Limited technical support is available to help users navigate and understand the RSEI results.


Questions?