

Chemical Supply Chain and Resilience Project

FY 2010 Workshop

Analysis Tools

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July 12, 2011

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**U.S. Department of Homeland Security
Science and Technology Directorate**



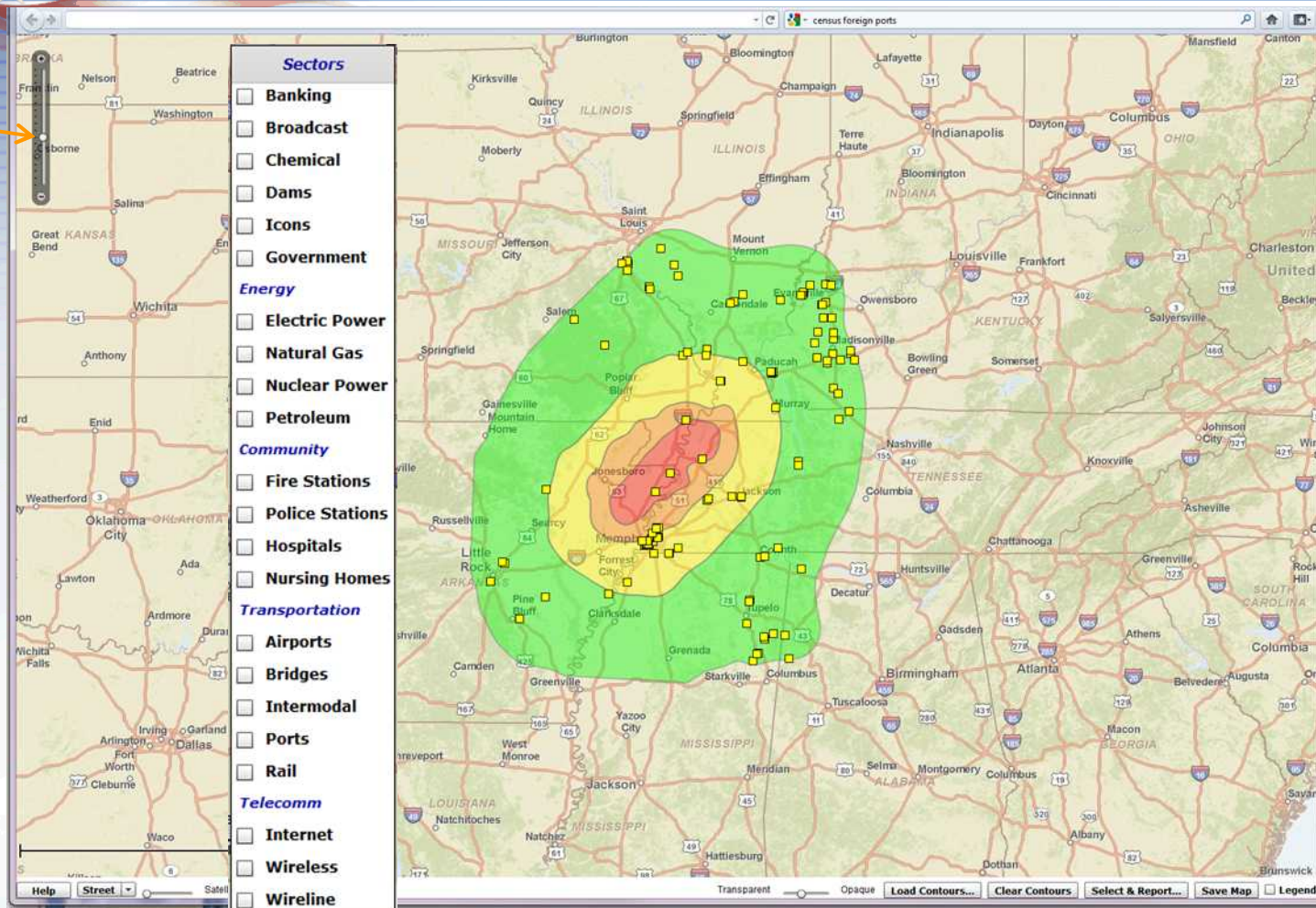
Provide complementary views and analysis of data in CDM

- **FASTMap: GIS-based representation of damage area and impacted chemical-related infrastructures**
- **Loki: Simulates downstream impacts caused by disruption**
- **Chemical Data Review (CDR): Graphical database querying system**
- **N-ABLE™**



Geospatial Analysis Using FASTMap

zoom

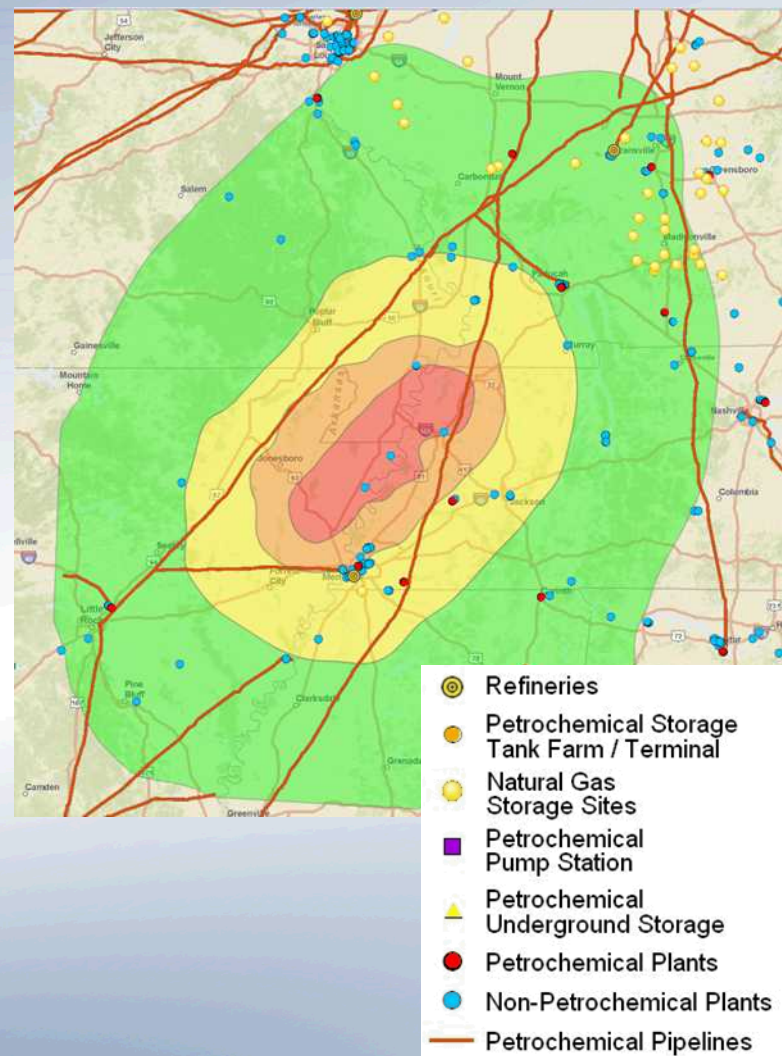


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Geospatial Analysis Using FASTMap

- FASTMap provides rapid situational awareness, including
 - Publication-quality maps
 - Automated symbol generation and labeling
 - Statistics: Sums, Counts, Lists, Complex collocations
- FASTMap is used to identify assets at risk
 - Electric power outages
 - Surge waters
 - Generic, user-specified areas
- FASTMap provides lists of at-risk assets that can be used to focus subsequent analysis



Loki Workbench

- Identifies chemicals directly and indirectly impacted and the lost production capacity
- Static Analysis; no time variable
- All facilities in contour assumed to be impacted

Simulation And Analysis Workbench (Development Server)

Welcome mpepple

SA Workbench

- Home
- Simulation
- New Simulation
- Quick Analysis
- Info
- About
- User's Guide
- Resources
- Data Viewer
- Analysis
- Chemical
- REAcct
- Admin
- User Profile
- Event Type
- Event
- Analysis Basis
- Causation
- Causation Layer
- Contact
- Email

Data Viewer

Data Options

- ☒ Damage Contours
- ☐ NOAA Wind Contours
- ☐ NOAA River Observed
- ☐ NOAA River Forecasted

NMSZ Days 1 - 3 EP Outage

Note: There are 0 Simulations associated with this damage contour

Report Options

Report Type: Air Transportation Network

Report: Air Transportation Report

Format: PDF

SA Workbench Google Earth Viewer

Graphical Display of Contour

Quick Stats

Infrastructure	Total Assets
CDM Facilities	266
CHEM DCP PLANTS	653
CHEM Petrochem Pipeline Facilities	191
CHEM Petrochem Pipelines	832
CHEM World Petro Facilities	118
DM Dams	12995
EMER Hospitals	949
EP Generation Plants	755
EP Substations	6091
NG Compressor Stations	460
NG LNG Storage	6
NG Pipelines	8830
NG Processing Plants	49
POL Refineries	23
TL US Wire Center Regions	3394
TL US Wire Centers	3604
TR Amtrak Stations	73
TR Rail Yards	13
TR Railroads	58909



Loki Workbench

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Quick Analysis

Filter

Search

Include NOAA Contours ☐

Quick Analysis

Causation Layer NMSZ Days 1 - 3 EP Outage

Models

- ☒ REAcct
- ☒ Chemical Network
- ☒ Rail Network Report
- ☒ FastMap Reports
- ☒ CDM Facility Report

Email Results ☒

SA Workbench Google Earth Viewer

United States

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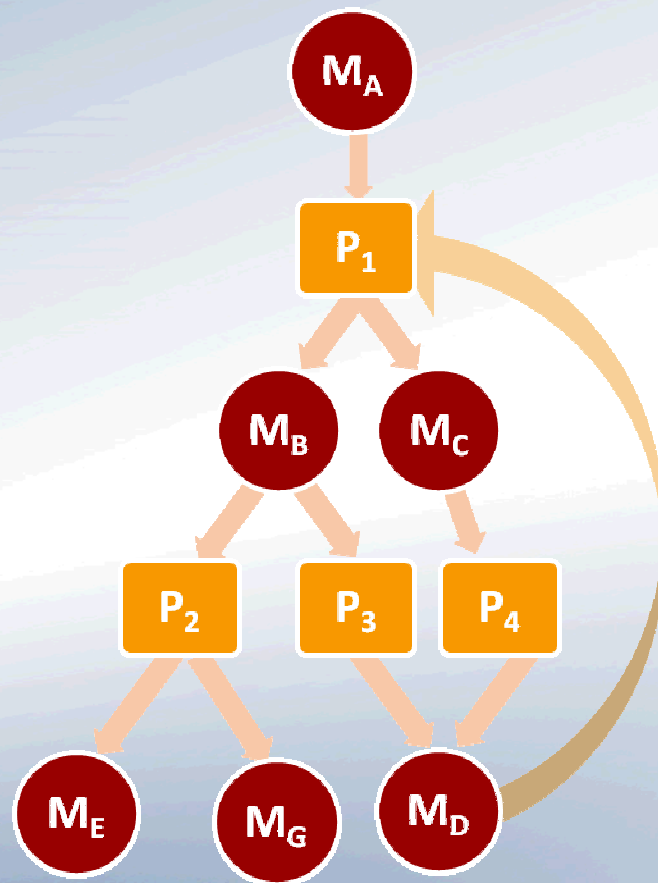
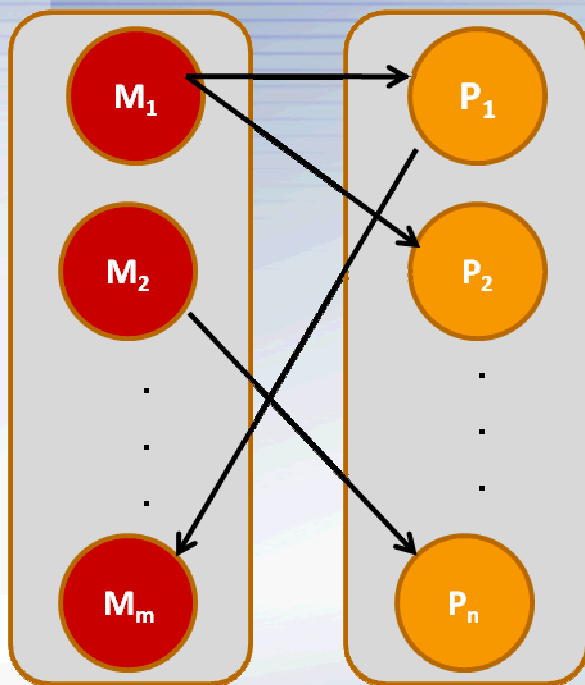
Google

Select Models



Loki Structure

- Downstream impacts from reduced availability of materials and/or loss of processes



Loki Chemical Network Model

- Lists chemicals impacted
- Total domestic capacity
- Lost capacity

Chemical Network Model Results

NMSZ PGA Damage

Chemical	Total Capacity	Fraction Lost	Capacity Lost (MT)
POLYBUTYLENE TEREPHTHALATE (PBT)	186,000	56.45%	105,000
TITANIUM DIOXIDE	1,589,000	39.02%	620,000
POLYCARBONATE RESINS	889,000	27.56%	245,000
BISPHENOL - A	1,143,000	23.18%	265,000
EPOXY RESINS (BASIC)	518,462	23.18%	120,203
CAPROLACTAM	400,000	22.34%	89,356
PHENOL	1,521,000	22.34%	339,777
AMMONIUM SULFATE	1,904,000	20.8%	396,046
TETRAHYDROFURAN	174,000	20.69%	36,000
ACETONE	660,000	20.22%	133,512
	Total Capacity	Fraction Lost	Capacity Lost (MT)
PHENOL	186,000	56.45%	105,000
METHACRYLATES	1,589,000	39.02%	620,000
NYLON	889,000	27.56%	245,000
ACETONE	1,143,000	23.18%	265,000



Chemical Data Review (CDR)

■ Graphical User Interface (GUI) for searching and editing the CDM

Fields for chemical name, technology, and facility

Search CDM by chemical name, plant name, state, city, country

The screenshot displays the Chemical Data Review (CDR) GUI. On the left is a sidebar with a tree view under 'Chemicals' containing: Status, EPlan Aliases, EPlan Names, Chemical Names, Chemical Families, Synonym Groups, EPlan Facilities, DCP Facilities, WP Facilities, User Facilities, Technologies, Facilities Matching, and Matched Facilities. The main area is divided into four sections: EPlan, DCP, WP, and User. Each section has search filters (CHEMICAL_ALIAS, COMPANYNAME, CHEMICAL_NAME, COUNTRY, UNIT_NAME) and a 'Query' button. The DCP section is active, showing a table of results for 'polybutylene terephthalate%'. The table has columns: ID, Plant Name, City, State, Country, Chemical Name, QTY, and Units. The results are as follows:

ID	Plant Name	City	State	Country	Chemical Name	QTY	Units
1	AC			United States	Polybutylene terephthalate resins	88	mlbs
2	YY			United States	Polybutylene terephthalate-based resins (0	
3	3			United States	Polybutylene terephthalate resins	230	mlbs
4	4			United States	Polybutylene terephthalate resins	90	mlbs

Chemicals Data Review - [File] [Tools] [Help]

Chemicals

- Chemicals
- Status
- EPlan Aliases
- EPlan Names
- Chemical Names
- Chemical Families
- Synonym Groups
- EPlan Facilities
- DCP Facilities
- WP Facilities
- User Facilities
- Technologies
- Facilities Matching
- Matched Facilities

EPlan

CHEMICAL_ALIAS

COMPANYNAME

Show Unmatched Only

Query

Clear

DCP

polybutylene terephthalate%

CHEMICAL_NAME

And

COUNTRY

Show Unmatched Only

Query

Clear

WP

CHEMICALNAME

COMPANYNAME

Show Unmatched Only

Query

Clear

User

CHEMICAL_NAME

UNIT_NAME

Show Unmatched Only

Query

Clear

Define Match

Company Name

Fac. ID

Facility Name

City

State

CHEM

Chemical

Alias

Alias

AVGD

ID

Plant Name

City

State

Country

Chemical Name

QTY

Units

United States

Polybutylene terephthalate resins

88

mlbs

United States

Polybutylene terephthalate-based resins (

0

United States

Polybutylene terephthalate resins

230

mlbs

United States

Polybutylene terephthalate resins

90

mlbs

Plant ID

Unit ID

Company Name

Plant Name

City

Country

Chem

Chemical

Qty

ID

Unit Name

City

State

Country

CHEM

Chemical Name

QTY

Units



Loki Facility Reports

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Chemical Analysis

Analysis

- Plant Analysis**
- Technology Analysis

Chemical Plant Analysis

CDM Plant ID

Input Plant ID

Select Chemical Facility Report

Report Options

Report: Chemical Network Model

Format: PDF

Generate

Info

SA Workbench News

- You can now create custom REAcct runs by going to the [REAcct Analysis](#) page.
- New [User Profile](#) page so you can set your own preferences.

SA Workbench Hints

- Search for Simulations on the [Home Page](#) by clicking on the 'recent' drop down and changing the selection to 'search'. Then type and either click 'go' or press the enter key.
- The [User's Guide](#) is a great place to learn about the SA Workbench.

Chemical Facilities Report

CDM Facilities Report

Facility capacities and fraction of total domestic capacity for each chemical

Damage Zone: null

Plant ID	Facility Name	City	State	Lat	Lon	Chemical	Production (MT)	Contribution
#####	#####	#####	TEXAS	#####	#####	EPICHLOROHYDRIN	365,146	79.31 %
#####	#####	#####	TEXAS	#####	#####	SODIUM CHLORIDE	1,450,000	68.66 %
#####	#####	#####	TEXAS	#####	#####	VINYLDENE CHLORIDE MONOMER	70,000	66.67 %
#####	#####	#####	TEXAS	#####	#####	CHLORINE	2,939,328	34.77 %
#####	#####	#####	TEXAS	#####	#####	SODIUM HYDROXIDE	3,174,474	34.77 %
#####	#####	#####	TEXAS	#####	#####	PROPYLENE OXIDE	725,000	29.97 %
#####	#####	#####	TEXAS	#####	#####	METHYLENE CHLORIDE	84,630	29.93 %
#####	#####	#####	TEXAS	#####	#####	POLYETHER POLYOLS	452,000	25.42 %



■ Detailed supply chain analysis with N-ABLE™

