NATIONAL TRANSPORTATION FUELS MODEL

MODEL OVERVIEW
The National Infrastructure Simulation and Analysis Center (NISAC) developed a unique network-based dynamic model of the U.S. transportation fuel infrastructure to inform analyses of the availability of transportation fuels in the event the fuel supply chain is disrupted. The network model spans from oil fields to fuel distribution terminals. Disruption of individual components of this system (e.g., crude oil import terminals, refineries, transmission pipelines, tank farms) can be simulated. Estimating locations, timing, and severity of the impacts of these disruptions depends on accurately simulating the capability of the fuel infrastructure to respond dynamically.

MODEL CHARACTERISTICS
- Model networks consist of locations and capacities of tank farms, refineries, and terminals (network nodes), and the pipelines, rail lines, and waterways that connect the nodes (network links).
- Model algorithms calculate flows of crude oil and refined products on the network links and storage levels at tank farms, assuming adaptive responses:
  - Rerouting of shipments
  - Drawdown of inventories
  - Use of surge capacity in transportation, refining, and imports to mitigate fuel shortages

MODEL APPLICATIONS
- Emergency planning for major earthquakes.
- Potential impacts of refinery closures.
- Impact analyses of scenario hurricanes.
- Impact analyses of scenario earthquakes, hurricanes, port closures, and refinery closures in support of the 2015 Quadrennial Energy Review.

ABOUT OCIA
The Department of Homeland Security, National Protection and Programs Directorate’s (NPPD) Office of Cyber and Infrastructure Analysis (OCIA) manages NISAC, which is a Congressionally mandated center of excellence in modeling, simulation, and analysis of critical infrastructure.

QUESTIONS ADDRESSED
This capability is designed to assist decision makers in understanding how the fuel supply chain responds to disruption by addressing questions such as:
- Which regions of the United States would experience shortages of transportation fuel after a specific disruption to one or more components of the fuel infrastructure?
- What would be the duration and magnitude of the shortages?

CONTACTS
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