HAZMAT ROUTING SAFETY & SECURITY RISK ANALYSIS

William Quade

Associate Administrator for Enforcement and Program Delivery

U.S. Department of Transportation

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Concerns About Hazmat Routing

- Motor Carriers – Want Safe, Direct Routes
- States – Need to provide Public Safety/Security
- All – Need a reliable, objective way to determine safety/security of routes

U.S. Routing Requirements

- Safety – Must Consider
  - Population Density
  - Types of Highways
  - Type/Quantity of Hazmat
  - Emergency Response Capabilities
  - Continuity of Routes
  - Stakeholder Input

- Security – No Requirement

Security Considerations

- Is there a credible terrorist threat?
  - Population Centers
  - Iconic Structures
  - Critical Infrastructure
- Are measures in place to protect potential targets?
  - Barriers
  - Proximity of police

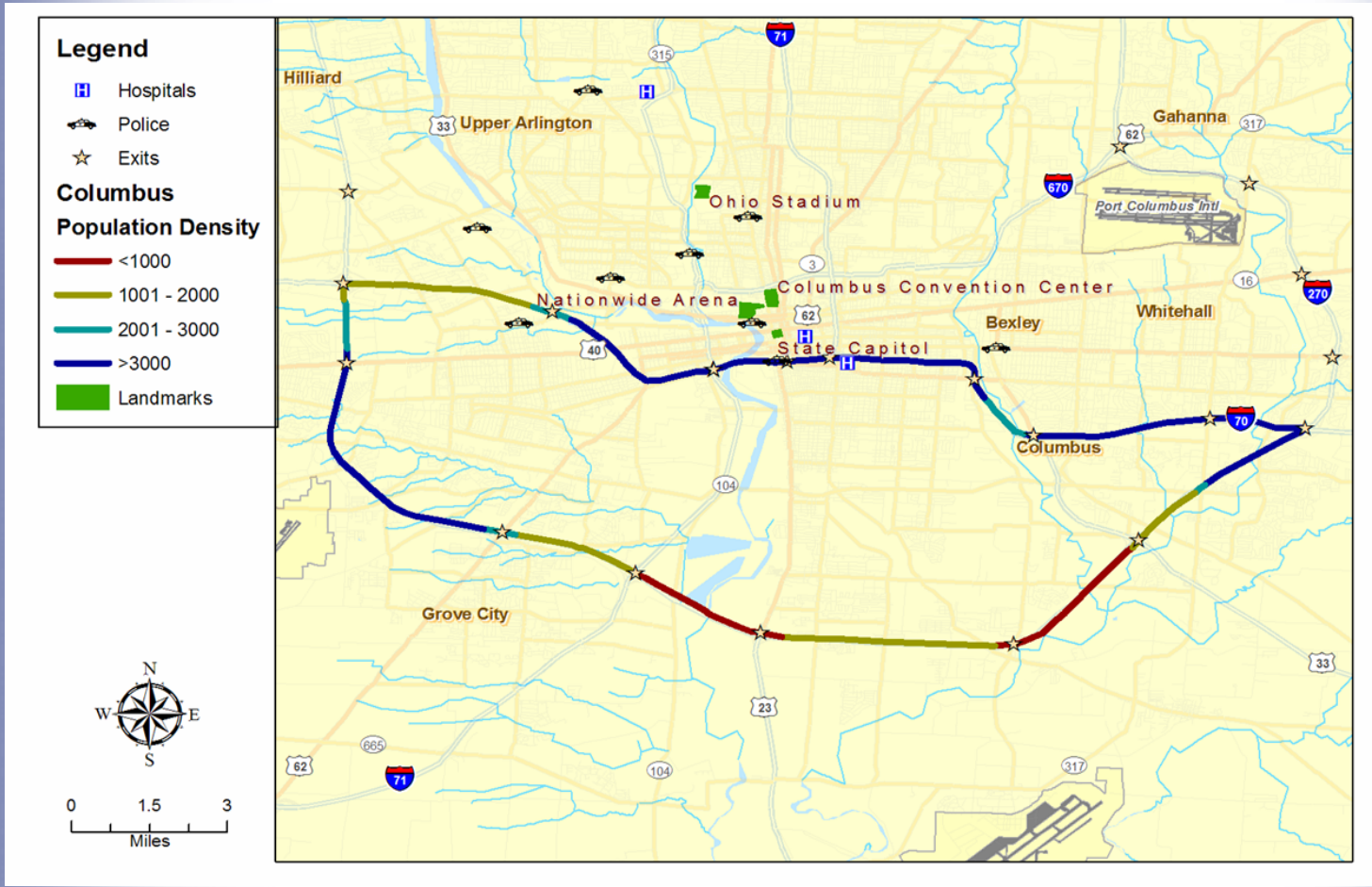
Selecting Routes Based on Security Considerations

- Minimize Travel Through Population Centers (+3,000 per mi^2)
- Proximity to iconic targets
  - Weighted
    - x3 for National
    - x2 for Regional
    - x1 for Local
- Proximity to Critical Infrastructure

Web- Based Routing Tool

- Placed on a GIS Platform with
  - Routes
  - Population Density
  - Location of iconic structures
  - Location of critical infrastructure
  - Crash Information (Required input)
- Performs Safety Comparisons
  - Crashes/mile, Population, Distance
- Performs Security Comparisons
  - Population Density
  - Iconic Structures

Example - Columbus Ohio



Example – Columbus OH

Accident Rate Comparison

Route	AADTT	Distance	Serious Truck Crashes (4 years)	Truck Crash Rate / million miles
I-270	12,334	20	37	0.103
I-70	14,498	15	104	0.328

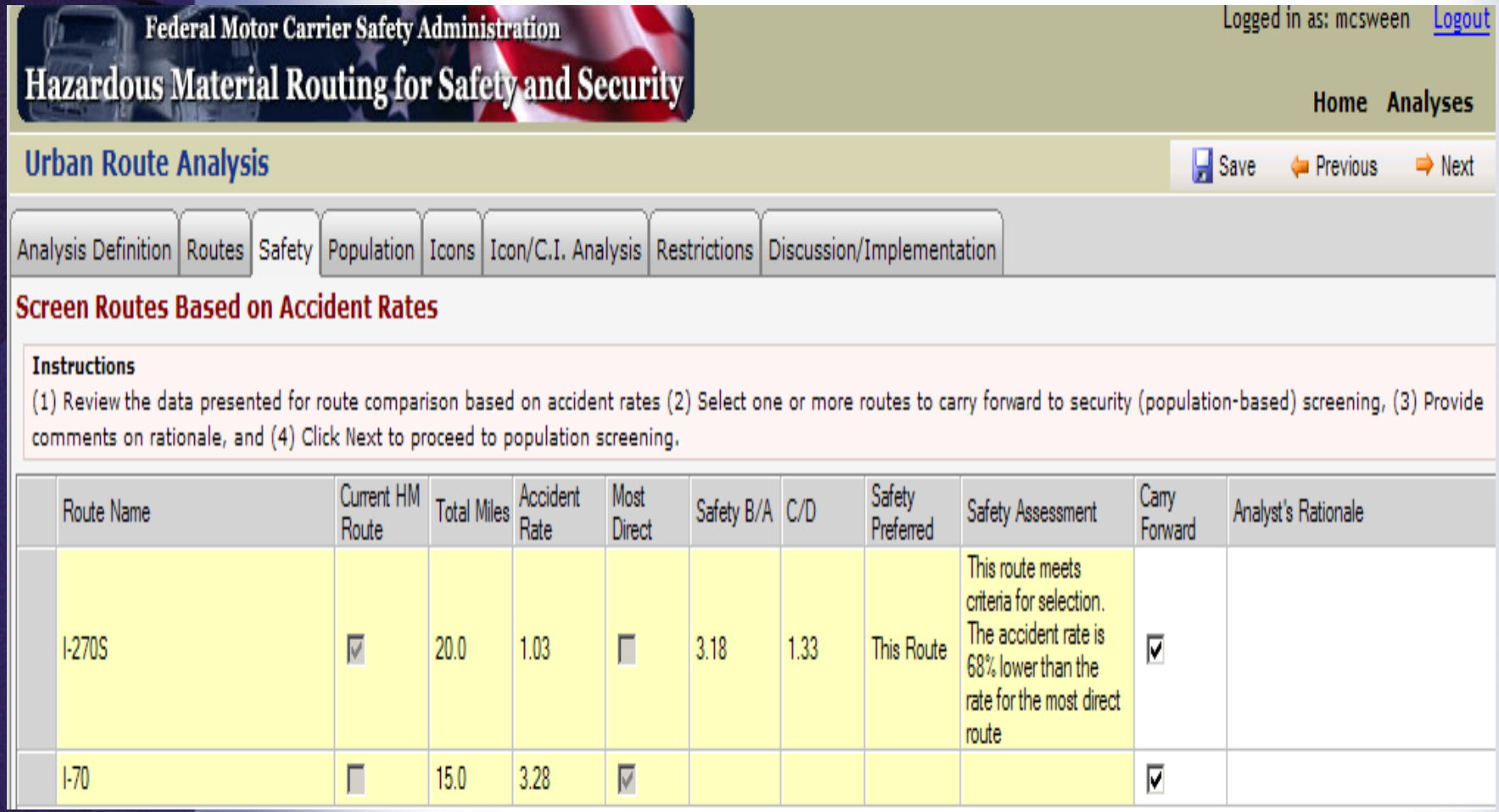
Example – Columbus OH

Safety Comparison

Route	Truck Crash Rate / million miles	Distance	Adjacent Population	Safety Risk
I-270	0.103	20	34,301	0.071
I-70	0.328	15	45,935	0.226

Ratio = 0.226/0.071 = 3.2 > 1.5

Safety Comparison Screen Shot



Route Name	Current HM Route	Total Miles	Accident Rate	Most Direct	Safety B/A	C/D	Safety Preferred	Safety Assessment	Carry Forward	Analyst's Rationale
I-270S	☑	20.0	1.03	☐	3.18	1.33	This Route	This route meets criteria for selection. The accident rate is 68% lower than the rate for the most direct route	☑	
I-70	☐	15.0	3.28	☑					☑	

Columbus, OH
Security Comparison

Population Density

Route	Urban Miles	Total Miles	Security B/A	Security C/D
I-270	A=3	C=20	3.0	1.33
I-70	B=9	D=15		

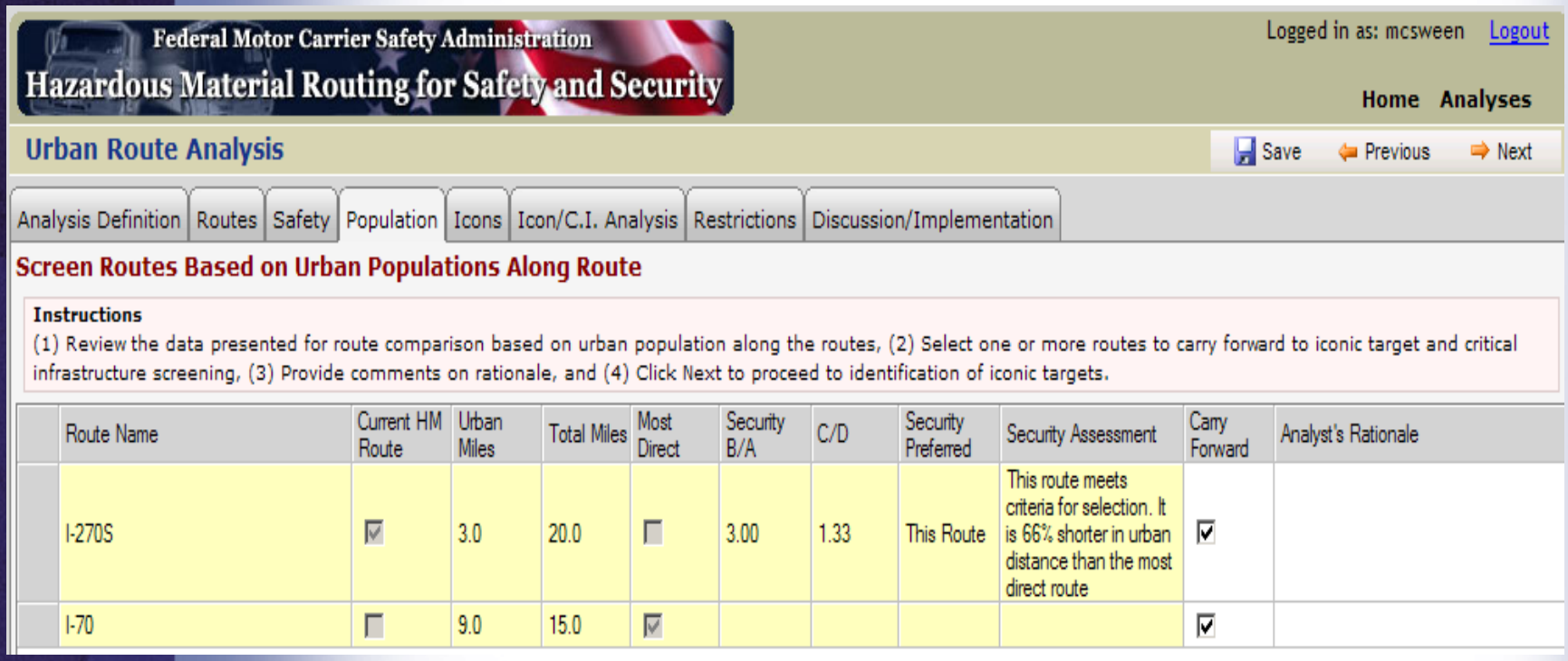
B/A > 1.5 - Use Alternate Route

1.0 < B/A < 1.5 – Use Distance factor

C/D < 1.25 - Use Alternative Route unless C-D > 25 Miles

B/A < 1.0 – Use Direct Route

Urban Route Security Comparison Screen Shot



Federal Motor Carrier Safety Administration
Hazardous Material Routing for Safety and Security

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Home Analyses

Urban Route Analysis

Save Previous Next

Analysis Definition | Routes | Safety | Population | Icons | Icon/C.I. Analysis | Restrictions | Discussion/Implementation

Screen Routes Based on Urban Populations Along Route

Instructions
(1) Review the data presented for route comparison based on urban population along the routes, (2) Select one or more routes to carry forward to iconic target and critical infrastructure screening, (3) Provide comments on rationale, and (4) Click Next to proceed to identification of iconic targets.

Route Name	Current HM Route	Urban Miles	Total Miles	Most Direct	Security B/A	C/D	Security Preferred	Security Assessment	Carry Forward	Analyst's Rationale
I-270S	☑	3.0	20.0	☐	3.00	1.33	This Route	This route meets criteria for selection. It is 66% shorter in urban distance than the most direct route	☑	
I-70	☐	9.0	15.0	☑					☑	

Columbus, OH Security Comparison

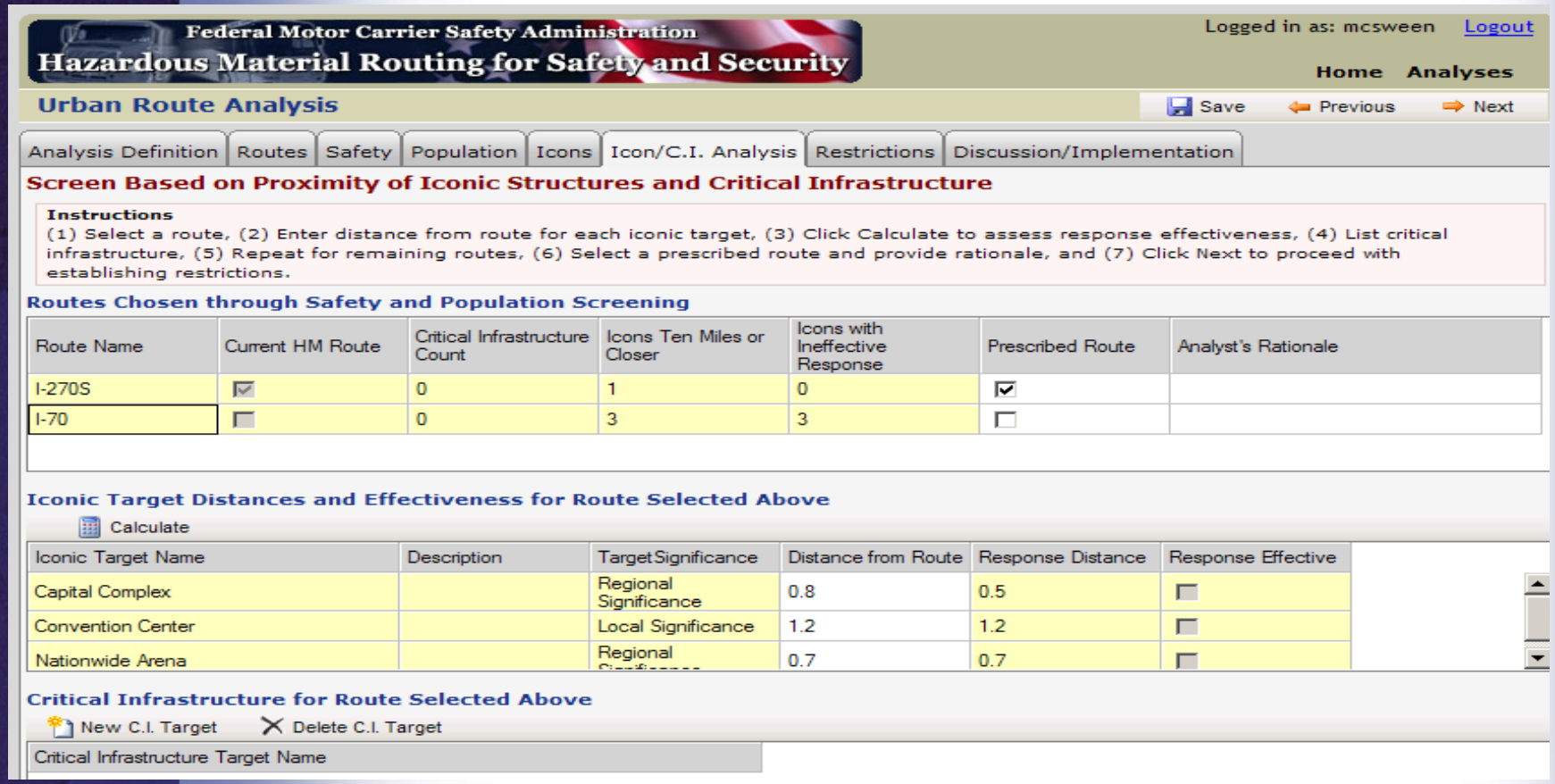
Iconic Structures

Name	Significance	Distance from Route	Response Distance
State Capital	Regional	0.8	0.5
Convention Center	Local	1.2	1.2
Nationwide Arena	Regional	0.7	0.7

State Capital $0.8/2 = 0.4 < 0.5$ 

Convention Center $0.7/1 = 0.7 = 0.7$ 

Iconic Structures Comparison Screen Shot



Baltimore, MD
Critical Infrastructure

Baltimore

Summary

- Safety of routing options can be compared using safety data
- Security of routing options can be compared looking at population, iconic structures, and critical infrastructure
- A web-based GIS routing tool can provide safety and security analysis of routes being considered for transportation of radioactive materials.

QUESTIONS???

Bill Quade
William.quade@dot.gov