Midwestern Route Identification Work Group

Work Group and TEC Topic Group Activities

Route ID Work Group Activities

- Represented by Illinois, Iowa, Missouri, Nebraska, and Ohio
- Primary task is to identify a regional suite of acceptable routes to Yucca Mountain
  - Task assigned in 2003
  - Regional process better than national process
  - Currently running routes from Midwestern reactors and points of entry on the Eastern and Southern borders of the region

Route ID Work Group Activities

- Route Comparison Factors
  - –Using same factors for truck and rail
  - –Factors take into consideration land use, population, length, traffic, accidents, but NOT time in transit
  - –Primary:
    - •Radiological exposure to the public during routine transportation
    - •Public health risk from the accidental release of radioactive materials
    - •Economic risk from the accidental release of radioactive materials
  - –Secondary
    - •Percentage of route that is urban
    - •Accident rate
    - •Track or road quality
    - •Traffic density

Route ID Work Group Activities

- Two conference calls since last committee meeting

- Attended a TRAGIS and RADTRAN training session in Oak Ridge in January

- Participated in TEC conference calls and attended the TEC meeting in Phoenix in April.

Route ID Work Group Schedule

- January-June 2005: Collect data and run initial analysis of truck and rail routes from Midwestern reactors.
- June 2005: Work group meeting in Lombard to go over initial analysis.
- July-August 2005: Consult with utilities and railroads. Run any additional routes or make changes to initial routes from Midwestern reactors. Run routes from entry points on Southern and Eastern borders of the region.
- September 2005: Hold a conference call with entire committee to discuss work group's recommended suite of routes.
- September 2005: Attend TEC meeting.
- October-November 2005: Make any alterations to routes based on committee recommendations.
- November 2005: Receive committee approval of suite of routes at Fall committee meeting.
- December 2005: Present suite of routes to DOE.

TEC Rail Topic Group Activities

- Five conference calls since last committee meeting
- Attended a TEC meeting in Phoenix in April.
- Submitted a list of alternative tasks for the Topic Group to take on instead of writing a paper on route comparison factors.

TEC Rail Topic Group Activities

- Topic Group tasks
  - –Rail planning process, protocols and guidance (including equipment for the purpose of escorting)
  - –Inspections (States, Tribes, and FRA)
  - –Tracking
    - •TRANSCOM
    - •Remote monitoring and sensing technology
    - •Security component (perhaps this should be assigned to the STG Information Security group)
  - –Safety Compliance Oversight Plan (SCOP) – comments to be provided to FRA
  - –Dedicated Trains
  - –Regulatory Requirements

TEC Rail Topic Group Schedule

–Monthly conference calls.

–Summer 2005: Begin work on task list.

–September 2005: TEC Meeting.

Midwestern Route Identification Work Group

Route Analysis Process

Primary Factors

1. Radiation exposure to the general public from normal transport

Measurement	Truck Formula	Rail Formula
Dose to inhabitants +	$((PL/v)*C_1)$ +	$((PL/v)*C_1)$ +
Dose to other vehicles +	$((LT/v^2)*C_2)$ + $((LT^2/v^3)*C_3)$ +	No other vehicles
Dose to people at truck stops/rail yards	(.2L/v)	(.2L/v)

Primary Factors

2. Public health risk from accidental release of radioactive materials

Measurement	Truck Formula	Rail Formula
Population / Length x Accident Rate	(POP/L)AR	(POP/L)AR

Primary Factors

3. Economic risk from accidental release of radioactive materials

Measurement	Truck Formula	Rail Formula
Land use type square mileage x multiplier / Length x Accident Rate	((Rural SqM x .002 + Single Family SqM x .1 + Multiple Family SqM x 2 + Commercial SqM x .2 + Parks & Pub SqM x .265) / L) x AR))	((Rural SqM x .002 + Single Family SqM x .1 + Multiple Family SqM x 2 + Commercial SqM x .2 + Parks & pub SqM x .265) / L) x AR))

Data Needed and Sources (pt1)

P	People per square mile	Population (**POP**) along the route is determined by TRAGIS. To get **P**, we divide the population by the square mileage, which is determined by multiplying the length (**L**) by the band width (2500m or 1.6 miles on either side). **P** = **POP** / (**L** x 3.2)
L	Length in miles	**L** is determined by TRAGIS
T	Average traffic count in vehicles per hour	Average daily traffic obtained from data from the Federal Highway Administration, Office of Highway Policy Information. **T** is determined by dividing the average daily traffic by 24.
v	Average speed in mph	**v** is the posted speed limit for the segment (i.e. the maximum speed the truck could travel). Speed limits are standard by state (Insurance Institute for Highway Safety) If a segment is predominantly rural, the rural speed limit is assigned, if the segment is predominantly urban, the urban speed limit is assigned. **v** for rail is determined by the track class of the segment. Each track class has a maximum allowable speed:

Data Needed and Sources (pt2)

C1	Constant 1	.000068
C2	Constant 2	To determine $\mathbf{C_2}$, we need the median width and the lane width. To determine the length between opposing lanes of traffic we measure from the center of one lane to the center of the other, thus we add median width and lane width. Median width and lane width are determined from data from the FHWA, OHPI.
C3	Constant 3	To determine $\mathbf{C_3}$ we need the average vehicle separation. To determine average vehicle separation we use the following formula: (**v** x 5280) / **T**
AR	Accident rate	The individual accident rate (**AR**) for a given highway segment (i.e. I80 from Clinton to Des Moines) is not available. Instead, each State DOT provided accident counts for each interstate highway in each county for 2003. The accidents in the counties along the segment were added, and divided by 365 and then the length to get accidents per mile per day. **AR** for rail is determined using the FRA online safety data. Accident counts within each county along the segment and specific to the rail company are added together and divided by 365 and then the length of the segment to accidents per mile per day.
SqM	Land use sq. mileage	Land use square mileage is determined by analyzing the route and the National Land Cover Dataset in ArcView.

Secondary Factors

1. % of route that is urban
2. Accident rate
3. Track/road quality
   - Truck: Lane width rating + median width rating + pavement rating
   - Rail: Track class rating + % dual track rating
4. Traffic density

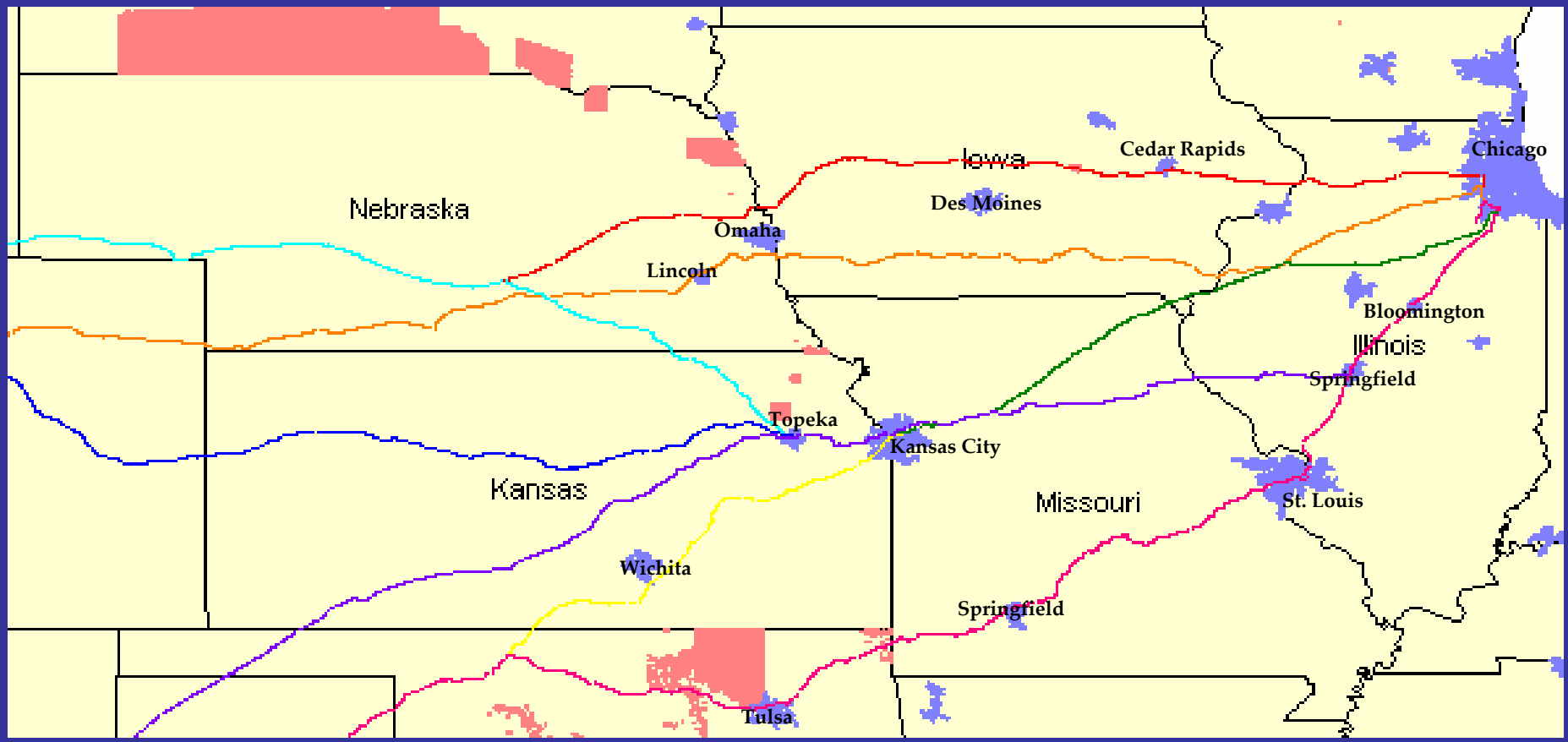
Data Needed and Sources (pt4)

Urban %	TRAGIS gives the % of square mileage that is urban for each segment. To determine the overall % of square mileage that is urban we will add together the urban square mileage of each segment and then divide the result by the total square mileage.
AR	See previous slides to see where accident rate data is obtained. The total route accident rate will be determined by adding the count of accidents for each segment together and then dividing the result by 365 and then by the length to get accidents per mile per day.
Lane width	Lane width is determined from data from the FHWA, OHPI .
Median width	Median width is determined from data from the FHWA, OHPI .

Data Needed and Sources (pt3)

Pavement condition	Pavement condition is determined from data from the FHWA, OHPI data. A rating for will be determined for each segment by adding the lane width rating, median width rating and pavement condition rating. The ratings for the route's segments will be multiplied by the segments % of the length of the total route and then added together. The segment ratings cannot be added because routes have varying numbers of segments.
Track class	Provided by TRAGIS
Dual track %	Provided by TRAGIS. A rating will be determined for each segment by adding the track class rating and the dual track % rating. The ratings for the route's segments will be averaged to determine the overall route rating. The segment ratings cannot be added because routes have varying numbers of segments.
Traffic density	Truck traffic density is determined from data from the FHWA, OHPI . Train traffic density is determined from data from TRAGIS.

Rail Routing Example: Dresden



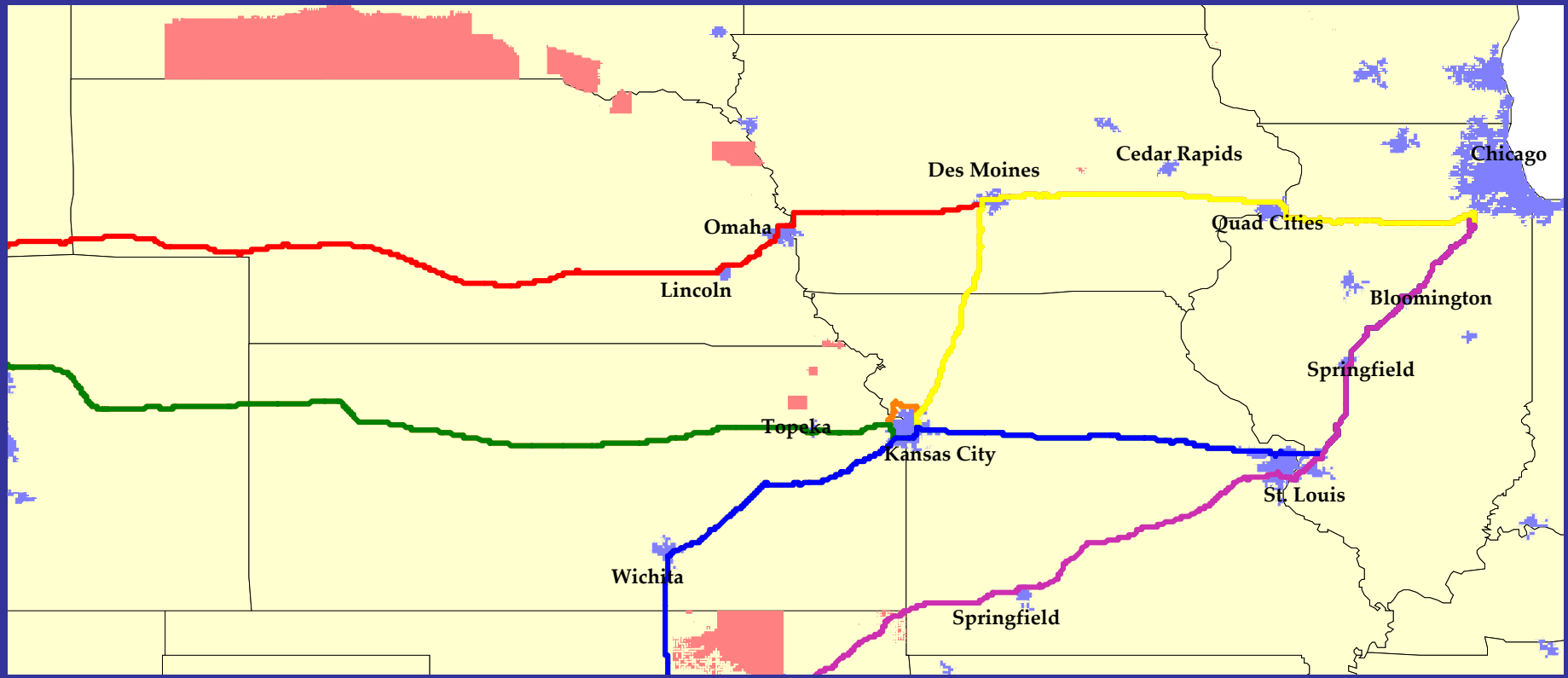
Dresden Rail Routes

Reservations

Metro Areas

Route Key:
Red: Dresden 1 (continues along light blue route)
Orange: Dresden 2
Yellow: Dresden 3 (begins along green route)
Green: Dresden 4 (continues along dark blue route)
Lt Blue: Dresden 5 (begins along pink and then purple route)
Dark Blue: Dresden 6 (begins along pink and then purple route)
Purple: Dresden 7
Pink: Dresden 8

Highway Routing Example: Dresden



Dresden Highway Routes

Reservations

Metro Areas

Route Key:
Red: Dresden 1 (begins along yellow route)
Orange: Dresden 2 (begins along yellow route, continues along green route)
Yellow: Dresden 3 (continues along blue route)
Green: Dresden 4 (begins along yellow route)
Blue: Dresden 5 (begins along purple route)
Purple: Dresden 6