Freight
Hazardous Materials Response Roundtable

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Asst. Director Hazmat
Hazardous Materials

- Routing – Balancing Security v. Safety
- Tank Car Improvements
- Emergency Response
As common carriers, railroads are required under federal law to move hazardous materials

- Virtually all are shipped without an accident release (99.998%)
- Hazmat accident rates have declined by 90% since 1980 and nearly 50% since 1990
- Railroads incurred 16 fatalities in since 1989 while trucks average nearly 11 annually. BNSF had none.
Hazardous Materials Routing Regulation

- **Applicability**
  - Explosives 1.1, 1.2, 1.3 (greater than 5000 lbs)
  - Bulk quantities of TIH materials (over 119 gals)
    - Includes Anhydrous Ammonia
  - High level radioactive material shipments

- **Route Analysis**
  - Routes for analysis may be determined by rail carrier
  - Use data collected and Appendix D Routing Factors to analyze safety and security risks for current route
  - Seek relevant information from State, local, and tribal officials, as appropriate, regarding security risks to high-consequence targets along or in proximity to a route used by a railroad carrier to transport security-sensitive materials

- **Alternative Route Analysis**
  - Identify at least one “commercially practicable” alternative route and analyze safety and security risks
“Rail Risk Analysis Factors” for Route Analyses

- Volume of hazmat
- Rail traffic density
- Trip length
- Railroad facilities
- Track type and class
- Track grade and curvature
- Signals and train control systems
- Wayside detectors
- Number and types of grade crossings
- Single vs. double track
- Frequency and locations of track turnouts
- Proximity to iconic targets
- Env sensitive areas
- Population density

- Venues along route
- Emergency response capability along route
- Areas of high consequence
- Passenger traffic
- Speed of train operations
- Proximity to enroute storage or repair facilities
- Known threats (from TSA)
- Measures in place to address safety and security risks
- Availability of alternative routes
- Past incidents
- Overall time in transit
- Training and skill level of crews
- Impact on rail network traffic and operations
Example Routing Dilemma: Trade-offs Between Safety and Security”

Routing of TIH loads from Canadian origins via Everett to exit Washington to the I5 Corridor at Wishram
So, which route presents the “least overall safety and security risk”? 
Route Comparison: Everett to Wishram

<table>
<thead>
<tr>
<th>Category</th>
<th>Via VAW</th>
<th>Via YAK</th>
<th>Via SPO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage</td>
<td>303</td>
<td>411</td>
<td>576</td>
</tr>
<tr>
<td>Population (5 mi.)</td>
<td>2,531,504</td>
<td>1,731,062</td>
<td>857,348</td>
</tr>
<tr>
<td>HTUAs on route?</td>
<td>Yes = 2</td>
<td>Yes = 1</td>
<td>None</td>
</tr>
<tr>
<td>Hazmat loads (wtd.)</td>
<td>25,922</td>
<td>16,720</td>
<td>30,085</td>
</tr>
<tr>
<td>Psgr/com traffic (wtd.)</td>
<td>9.02</td>
<td>2.63</td>
<td>2.00</td>
</tr>
<tr>
<td>Signal sys (% signal)</td>
<td>100%</td>
<td>48%</td>
<td>100%</td>
</tr>
<tr>
<td>Avg detector spcg (mi)</td>
<td>19.2</td>
<td>24.9</td>
<td>24.3</td>
</tr>
<tr>
<td>Venues on route?</td>
<td>Yes = 1</td>
<td>Yes = 1</td>
<td>None</td>
</tr>
<tr>
<td>Critical infrastructure?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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### Route Comparison: Everett to Wishram (cont’d)

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<th>Via VAW</th>
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<tbody>
<tr>
<td>Trains used</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Overall transit time</td>
<td>13:15</td>
<td>43:20</td>
<td>74:00</td>
</tr>
<tr>
<td>Accident probability</td>
<td>4.83e-6</td>
<td>6.49e-6</td>
<td>9.15e-6</td>
</tr>
<tr>
<td>Grade Crossings (#)</td>
<td>224</td>
<td>230</td>
<td>320</td>
</tr>
<tr>
<td>(avg/mile)</td>
<td>0.74</td>
<td>0.56</td>
<td>0.56</td>
</tr>
<tr>
<td>Turnouts-fcg point (#)</td>
<td>119.5</td>
<td>111</td>
<td>123</td>
</tr>
<tr>
<td>(avg/mile)</td>
<td>0.39</td>
<td>0.27</td>
<td>0.21</td>
</tr>
<tr>
<td>Turnouts-trlg point (#)</td>
<td>134</td>
<td>116.5</td>
<td>124</td>
</tr>
<tr>
<td>(avg/mile)</td>
<td>0.44</td>
<td>0.28</td>
<td>0.22</td>
</tr>
<tr>
<td>Grade (miles&gt;1.8%)*</td>
<td>0.0</td>
<td>15.2</td>
<td>16.4</td>
</tr>
<tr>
<td>(% of route)</td>
<td>0</td>
<td>3.7</td>
<td>2.8</td>
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* BNSF “mountain grade” criteria
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<td>Trains per TSP</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>Overall transit time</td>
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* Presently is dependent on mileage and is not an independent variable.
Least overall safety?
Least overall security risk?
New TIH Tank Car Design

- Increases the crashworthiness of new TIH tank cars built after January 1, 2009
  - Requires fleet phase out of all old cars within 20 years
  - Imposes speed restrictions for all TIH loads to 50 MPH on signaled and non-signal territories

- Advanced Tank Car Collaborative Research Program
  - Sponsors: AAR, RSI, DOT, DHS/TSA, Transport Canada, Chemical Customers
  - Develop tank car designs for the greatest risk reduction Safety and Security

- “On-Board” Detection Equipment
  - GPS
  - Tamper Alarms
  - Chemical Release
  - Derailment Prevention
Emergency Response

- Improved Outreach Programs
  - Combined Private and Public Responders
  - Transportation Community Awareness and Emergency Response (www.transcaer.org)
  - Lessons Learned Symposium

- Evacuation/Shelter-in-Place
  - DOT’s Emergency Response Guidebook’s Isolation and Protective Action Distances
  - Air Modeling
  - Shelter-in-Place – awareness and training.