HOT TIME IN THE CITY: WHICH SHIPMENT MODE FOR HIGH LEVEL RADIOACTIVE WASTE, AFFECTS URBAN AREAS MOST?

Fred Dilger PhD (fcd5@cox.net)
Black Mountain Research
Henderson, NV 81012

Robert J. Halstead (bearhalstead@aol.com)
State of Nevada Agency for Nuclear Projects
Carson City, NV 80906
Urban Form in the US is Changing

• Rise of “Edge Cities”
  – Accessibility
  – Affordability
  – Density

• Edge Cities perform all of the functions of traditional cities
Determining Impacts of Modal Choice

The calculation of route miles, and the significance of route miles as a measure of transportation risk and impact on highly populated areas (HPA), has been a major topic in recent discussions by State Regional Groups regarding Section 180c state allocation formulae for truck and rail shipments.

The railroad point of view is that rail routing guidelines based on avoiding HPAs are inherently inefficient, because mainline railroads are constructed by design to link major urban areas, the best maintained (and safest routes) are the mainlines that connect major cities, and the major carrier interchanges are located in urban areas.

We decided to test this hypothesis: Does the mostly Rail preference impact cities adversely?
<table>
<thead>
<tr>
<th>Land Use Type</th>
<th>Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>more than 3326</td>
</tr>
<tr>
<td>Suburban</td>
<td>139 to 3326</td>
</tr>
<tr>
<td>Rural</td>
<td>0 to 139</td>
</tr>
</tbody>
</table>
## Proxies for Land Use Type

<table>
<thead>
<tr>
<th>Land Use Type</th>
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</thead>
<tbody>
<tr>
<td>Urban (Central Business District)</td>
</tr>
<tr>
<td>Suburban (Census Place)</td>
</tr>
<tr>
<td>Rural (Remainder)</td>
</tr>
</tbody>
</table>
Implications for HLW Transportation in the US

• The mainline rail network was designed to link, not avoid, major urban areas, and therefore traverses suburban and urban population zones.

• There are no Federal (USDOT) routing regulations for Yucca Mountain shipments that require rail routes to avoid highly populated areas.

• The Interstate highway system is constructed to allow truck shipments to either access or bypass major urban areas, and bypasses typically suburban affect both and rural population zones.

• Federal (USDOT) routing regulations (HM-164) require Yucca Mountain shipments to use interstate routes generally, and to use interstate bypass routes to avoid highly populated areas.
1. Assign shipment numbers to each route

2. Combine all shipment routes to determine the sum of all shipments on The network.

3. Overlay routes on each land use polygon

4. Sum the length of the shipment through each land use.
1. Files representing both the streets and rail routes are assigned shipment volumes based on the Final EIS.

2. The shipment numbers in the route files are assigned to polygons containing each land use type.

3. The land uses are then filled into the street and rail routes by overlaying the land uses with the line layers. This yields route segments that have data that shows land use type and shipment numbers.

4. In the final step the land uses and shipment numbers are aggregated into the street and rail layers. This enables accurate calculation of shipment miles.
Urban Suburban and Rural Areas
Commercial Rail Routes
## Modal Choice Land Use effects

<table>
<thead>
<tr>
<th></th>
<th>FEIS Mostly Truck Scenario Route Miles</th>
<th>FEIS Mostly Rail Scenario Route Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Business District</td>
<td>110</td>
<td>187</td>
</tr>
<tr>
<td>Suburban and Urban</td>
<td>3634</td>
<td>4276</td>
</tr>
<tr>
<td>Rural Miles</td>
<td>15074</td>
<td>16557</td>
</tr>
</tbody>
</table>
Conclusions

• As expected, rail shipments impact urban areas most.
• Most important, enough information and adequate tools are available to deliver concrete answers about the HLW transportation program.
• Additional analyses will offer new insight into the impacts of the modal choice.