

An Integrated Information-Assessment Resource for Consultative SNF Transportation System Design - 9568

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ABSTRACT

SNF transportation system design is complex on, not just one, but several dimensions. While the DOE Office of Logistics Management is responsible for SNF transportation systems design, recent processes and products leave many questions and options unaddressed, providing a cumbersome resource for issue consideration and resolution. DOE funded the development of valuable assessment tools such as TRAGIS and RADTRAN, but over the past two decades, a revolution in geographic information systems has created new resources and capabilities not yet systematically applied to the challenge of consultative SNF transportation systems design. Focusing on IRRIS (by GeoDecisions) as the integrative tool, WIEB has explored the application of current resources and capabilities, and has developed a concept for an integrated information-assessment resource for consultative SNF transportation systems design. This resource integrates DOE-developed models and DOT assessment concepts with the rich information and data processing-management-visualization-sharing capability of IRRIS. It could be developed (desirably in a consultative process) over 2-3 years, and applied in all phases of SNF transportation systems design.

The Complexities of SNF Transportation System Design

SNF transportation system is complex on, not just one, but several dimensions:

- Shipments have 75 origins, each with different fuel inventories, different Standard Contract rankings for SNF acceptance and removal,¹ different reactor capabilities for fuel loading, and different near-site infrastructure and community environs.
- Given a permanent or centralized storage destination (and a choice of mode), transport routing from each origin would be distinctive. For origins without direct rail access, intermodal options could affect the origin for cross-country shipment. Near origins, many routes are affected by limited numbers of shipments. Later, routes combine to more continually affect fewer corridors with larger numbers of shipments.
- At different times and in different ways, the campaign would affect thousands of route segments in scores of states and hundreds of communities. While the overall campaign might extend over 30 years or more, the phasing of removal from particular sites could vary dramatically. From some sites, removal could occur in a short series of shipments; from others, removal could be more sporadic and/or more continuous over a longer period.
- The capacity of the system to remove SNF is also a variable—dependent on the amount and type of equipment DOE acquires, and on the effectiveness of its deployment.

¹ See: “The Question of Queue: Implications for “Best Practice” in Cross-Country Transport of Commercial Spent Nuclear Fuel”

- Conditions along routes used for SNF transport and in their environs are constantly changing. The “affected environment” for SNF transportation has and will change over time. Generally in the U.S., the demands on transportation infrastructure are increasing more rapidly than capacity; thus, spent fuel shipment faces changing congestion, maintenance, and accident conditions over time. At a finer grain, specific vulnerabilities and capabilities along routes are also subject to change—in some cases on a temporary (e.g. stadium event) rather than a semi-permanent basis (e.g. new residential or commercial development).
- A major complication is that the goals for transportation system design are not yet clear or agreed—either generally or on a site-by-site basis. It is not determined, for example, whether DOE should fully implement its dedicated train decision, whether it should remove older rather than younger fuel, whether it should prioritize removal from certain sites (e.g. those with shutdown reactors; those owned by utilities to whom the federal government has larger liability obligations) over others; whether it should concentrate removal so as to maximize the focused attention of the diversity of entities that must coordinate in intermodal transfer.

All these choices have “systems effects,” making them significant for those who may be indirectly affected (e.g. those “downstream”) as well as those directly affected.

- Systematic assessment of the options is needed, not just as a basis for choice (site-by-site or system-wide), but also as a basis for the policies and authorities needed in implementation.
- A still further complication is that DOE has committed to a consultative process in SNF transportation system design. It has done this, not because consultation is quick or easy (It is neither!), but because full consultation is the only credible path to success. Effective consultation requires that a diversity of participants, each with their own geographic or subject matter expertise, engage the system both from an individual perspective and with a systems view.

OCRWM/OLM Resources for Consultative Transportation System Design

The DOE OCRWM Office of Logistics Management is responsible for SNF transportation systems design, but is ill-equipped to effectively address the task in its full systems complexity. While some of OLM’s challenges are institutional,² some are technical—involving the tools needed to support such a process. Beginning two decades ago, DOE funded the development of tools such as TRAGIS,³ for highway and rail routing, RADTRAN, for estimating radiological risk (incident-free and in accidents) in transportation, and TRANSCOM, for tracking the location of shipments. Each was a substantial effort to provide a capability that did not then exist elsewhere. While complimentary, each was developed as a stand-alone capability.

DOE uses TRAGIS and RADTRAN in its own analyses, hiring contractors to identify routes (based on a set of mode, sequence and other assumptions), to apply RADTRAN (using its current accident rate and residential and non-residential land use data) to estimate radiological risk, and then to assemble the results in a hefty document for stakeholder review. Taking the “Draft SEIS for a Geologic Repository”⁴ as a case example:

² See: “Federal-State Consultation in SNF Transportation System Design: The Continuing Challenges”

³ Originally “HIGHWAY” and “INTERLINE.”

⁴ DOE/EIS-0250F-SID, October 2007.

- Routes are presented by state, with very limited information about route conditions or route environs.⁵
- Shipments (rail and truck) are aggregated for the entire multi-year campaign. They are not allocated to the several rail or highway routes within a state, or to route segments, or to phases within the 25-30 year campaign.
- Radiation dose is estimated for the entire residential population within a state, without breakdown for specific urban, suburban and rural areas.⁶
- Property damage and clean-up/recovery costs in the event of an accident with radiological release is not presented. Non-residential (retail, manufacturing, wholesale, office, government) information needed for such estimates is not yet well-developed in RADTRAN.
- There is no information on route hazards—areas subject to high winds, icy conditions, drifting snow, flooding. There is no information on steep grades or sharp curves that might contribute to accidents, and no information on congested areas or on routes for evacuation should that be necessary.
- There is no information on the capabilities within the route environs—the fire, police, ambulance and other such facilities, and their equipment, staffing and staff training.
- It is not clear to the reviewer in, say, Missouri whether shipments through his/her state originate in nearby Illinois (e.g. Byron, Quad Cities, LaSalle, Clinton) or in more distant New York (Indian Point) or New Jersey (Oyster Creek), or North Carolina (McGuire). It is not clear how impacts in Missouri reflect choices (mode, sequence, fuel type, routing) at various origins.
- The reviewer cannot evaluate options. How much would a policy to ship fuel averaging at least 20 years after discharge reduce incident-free exposure in my state's main urban area? How much would full implementation of DOE's dedicated train policy reduce the number of shipments through my state, or, say, on Interstate-70 in my state? The reviewer does not have an analytic basis for his/her support for such policies.
- The analysis does not reflect changing conditions—of the routes themselves or in their environs. To reflect new information (e.g. the 2010 census, a new stadium, a new shopping mall, etc.) requires an expensive and time consuming re-work of the entire procedure, the results of which would soon have the same limitations.
- The analysis is presented, reviewed and critiqued in hard-copy documents in which DOE controls the analysis, the alternatives and the presentation. It then receives critique from many directions, leaving it again up to DOE to determine whether and how to respond. Since the information gathering and assessment process is cumbersome, DOE is understandably disinclined to conduct ad hoc assessment of specific assumptions or options. Since the review-critique process is so distributed and disjointed, stakeholders agree only at the broadest levels, and not with the specificity needed to aggregate support for policy needed to do the transportation job right, origin site-by-site.

The Geographic Information Systems Revolution

⁵ See Figures G-3 through G-47.

⁶ See Tables G-22-G-66.

What one might call “the geographic systems revolution” has occurred largely since DOE developed TRAGIS, RADTRAN and TRANSCOM. Beginning with a capability to link data to points, lines or polygons, GIS has found a rapidly growing array of applications in land use planning, emergency response, marketing, shipping and delivery services, transportation, and many other fields.

- Visualization has been greatly enhanced by integration with resources such as GoogleEarth.
- The need to manage massive amounts of data has driven quantum development of data processing and storage capabilities, which in turn has enabled further GIS applications.
- The GIS “demand-for-data” has required more coordinated data collection and more consistent formatting and geo-referencing. The result is a growing array of information available (sometimes with conditions, sometimes requiring fees) on a national basis.
- The “demand-for-application” has required development of capabilities to “call” assessment tools (e.g. RADTRAN), apply them (e.g. to assess the radiological risk of a particular type of shipment in each segment of a route from a specified origin to a specified destination), and then manage the rather massive data results.
- These applications require consistent application of assessment tools to information drawn from various sources. They also require distribution in useful formats to users spread throughout a commercial enterprise (e.g. FedEx), government agency (e.g. FEMA), or other user group.
- The combination of these capabilities is called a “multi-user geodata base,” generally built on a relational database management system (RDBMS) platform with versioning, replication, archiving, and multiple user editing functions.⁷

SNF Transportation System Design: A Recent Initiative

In 2008, the Western Interstate Energy Board, operating under a cooperative agreement with DOE/OCRWM and teaming with Black Mountain Research and GeoDecisions (creator of the IRRIS integrative geospatial system), initiated an exploration of the potential application of these new capabilities to SNF transportation systems design. Several features of IRRIS recommended it for the inquiry:

- **“Web-based” user access:** Users access base data and modeling results through Internet Explorer. Special programs (with their multiple learning curves, each creating potential “priesthoods” and “fiefdoms”) are not required to access IRRIS data or its modeling results. (There is, of course, a learning curve in dealing with IRRIS, but this need not be imposed on each potential user in his/her own agency.)
- **DOD information resources and security:** IRRIS was originally developed by the U.S. Dept. of Defense (to DOD specifications) to assist military personnel in accessing timely information on factors (e.g. road conditions, construction, incidents, weather) that might interfere with military shipments. The implications include: a) Portions of the monitoring, tracking, and information distribution capabilities developed for DOD are now available to others; and b) The security processes developed for DOD⁸ are also now available to others.

⁷ See “ArcNews,” Winter 2008/2009, “The Geodatabase: A Comprehensive Approach to Modeling and Managing Spatial Data.”

⁸ Users are “role-based,” receiving specified types at appropriate times for authorized purposes.

- **“Open” system architecture:** Information from various sources (e.g. TEPP⁹ needs assessments) can be incorporated, with appropriate protections for the providers.¹⁰ Also, modeling capabilities (e.g. DOE’s RISKIND) could be incorporated and applied (to the IRRIS information resource), with results distributed to users as required.
- **Geo-referenced data:** Among IRRIS resources are ESRI GIS, Global positioning, and earth imaging (e.g. GoogleEarth): The first implication is that most, if not all IRRIS information is “geo-referenced,” and IRRIS has processes for incorporation of additional geo-referenced information. For any route segment of concern to a particular user for a particular purpose, it’s possible to receive a map showing, for example, the location of the bridge (and its condition), the school (and its enrollment), the fire station (its major equipment; its staffing and training levels), the nearby refinery and environmentally-sensitive areas, etc. Also, if an inspector notices a dangerous condition, it’s possible (via GPS) to incorporate that into the system-wide database.

The Inquiry Process

With SNF transportation system design always in mind, the exploration took several paths:

- What existing IRRIS data resources (developed via contracts with DOD and FEMA) could be accessed and applied? To what extent might these meet state-local needs in SNF route assessment, readiness review, and Section 180c needs assessment?
- If existing IRRIS data resources fall short of the potential need, what are the enhancement options? In some cases, an additional fee might provide, on a nationwide basis, portions of a data resource not incorporated in DOD or FEMA applications.
- How might IRRIS data on route environs be validated by the state-local official who “really know”? Might it be possible to allow the local fire chief access to IRRIS data on facilities in his district, and then annotate and update to the point that he is satisfied that IRRIS fairly describes his capability as he understands it?
- Given a SNF origin and destination, could IRRIS “call” a routing tool such as TRAGIS, specify routing criteria and constraints, then receive the routing results and segment it in a way useful for subsequent assessment?
- Could a recommended route (e.g. one provided by AAR/RRF using confidential parameters and procedures) be assessed with TRAGIS, to determine the set of TRAGIS criteria and constraints that produce a similar route?
- Could IRRIS “call” RADTRAN, apply it to each segment of a route, and then manage the radiological assessment results?
- Could current limitations in RADTRAN resource data (e.g. non-residential land use: the basis for estimates of daytime population and property valuation) be remedied while retaining the tool?—e.g. by accessing non-residential land use data from census or other sources and adapting it for application in the RADTRAN model.

⁹ The DOE Transportation Emergency Preparedness Program.

¹⁰ The pilot study has already incorporated information on nuclear plant locations, shipment origins without direct rail access, and potential railheads accessible from such origins.

- Could IRRIS “geofencing” and other GIS tools be applied to produce comparable assessment of capabilities and vulnerabilities in urban, suburban and rural segments of routes with various projected shipment volumes?
- Could the “HM-164 guidelines”¹¹ be adapted for application in IRRIS to the full extent of cross-country rail and highway routes?
- Could IRRIS resources (current or developed) be applied to generate more nationally consistent, updated information on rail risk factors #12-#17¹² specified in the DOT interim final rule for enhancing rail transportation safety and security for hazardous materials shipments? If so, might this be of considerable value to the American Association of Railroads and the rail industry, by dramatically reducing the cost of collecting and updating such information, and by assuring stakeholders that the AAR/RRF model incorporates valid information on rail route environs?
- Could IRRIS information provide a basis for more detailed assessment of near-site infrastructure? Could this then be combined with IRRIS information on route environs, to provide a resource for intermodal mode-route decisions—a resource useful to state-local officials, the origin site utility, and contract carriers as well as DOE?¹³

Systems Concept: An Information-Assessment Resource

Inquires of the types described above led to the development of a system concept for an integrated information-assessment resource for consultative SNF transportation system design. The resource uses a tool such as IRRIS to integrate existing models (e.g. TRAGIS, RADTRAN) with current GIS information and assessment capabilities. The system concept, depicted in Figure 1, can be depicted as series of steps that generate (and update) a rich information-assessment resource for every phase of SNF transportation system design:

¹¹ “Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials,” August 1992, US DOT: Research and Special Programs Administration, DOT/RSPA/HMS/92-02.

¹² #12: Proximity to iconic targets;
#13: Environmentally-sensitive areas;
#14: Population density along routes (daytime, nighttime);
#15: Venues along routes (stations, events, places of congregation);
#16: Emergency response capabilities along the route;
#17: Areas of high consequence along the route.

¹³ See: “Shoreham Nuclear Fuel Shipping Campaign: Lessons Learned Report, Part I: Preshipping Activities; Part II: Shipping and Post-Shipping Activities (August 1994), Robert H. Jones, Consultant PE.

Figure 1: Integrated System Concept, Basic Workflow

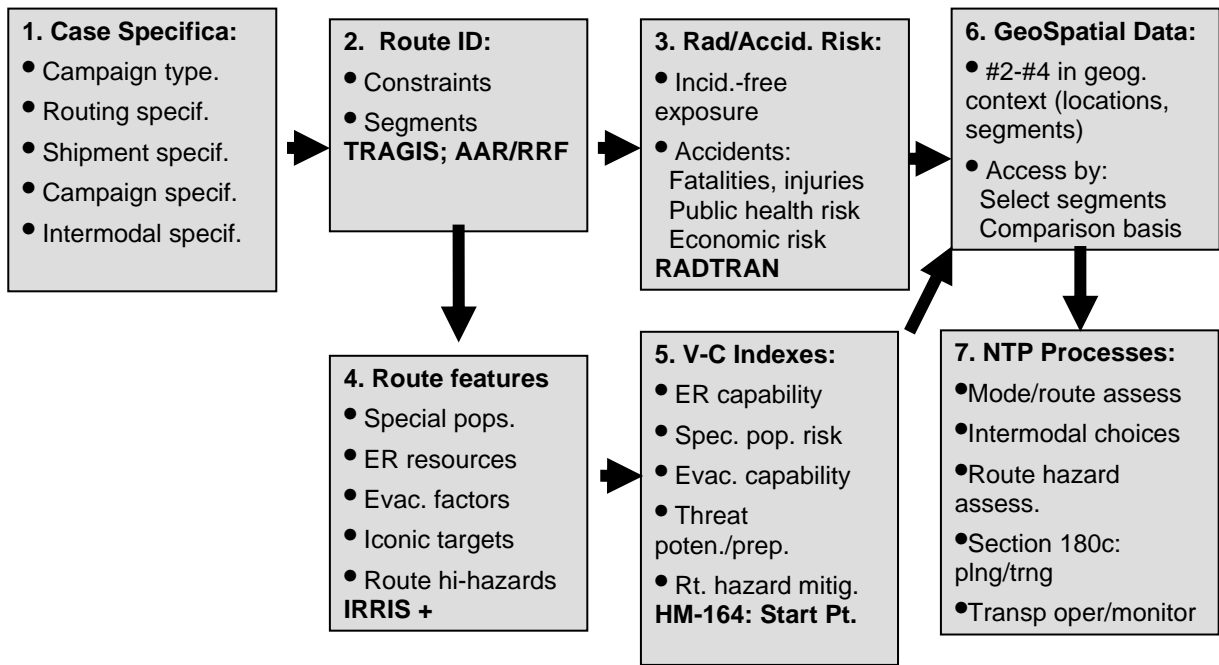
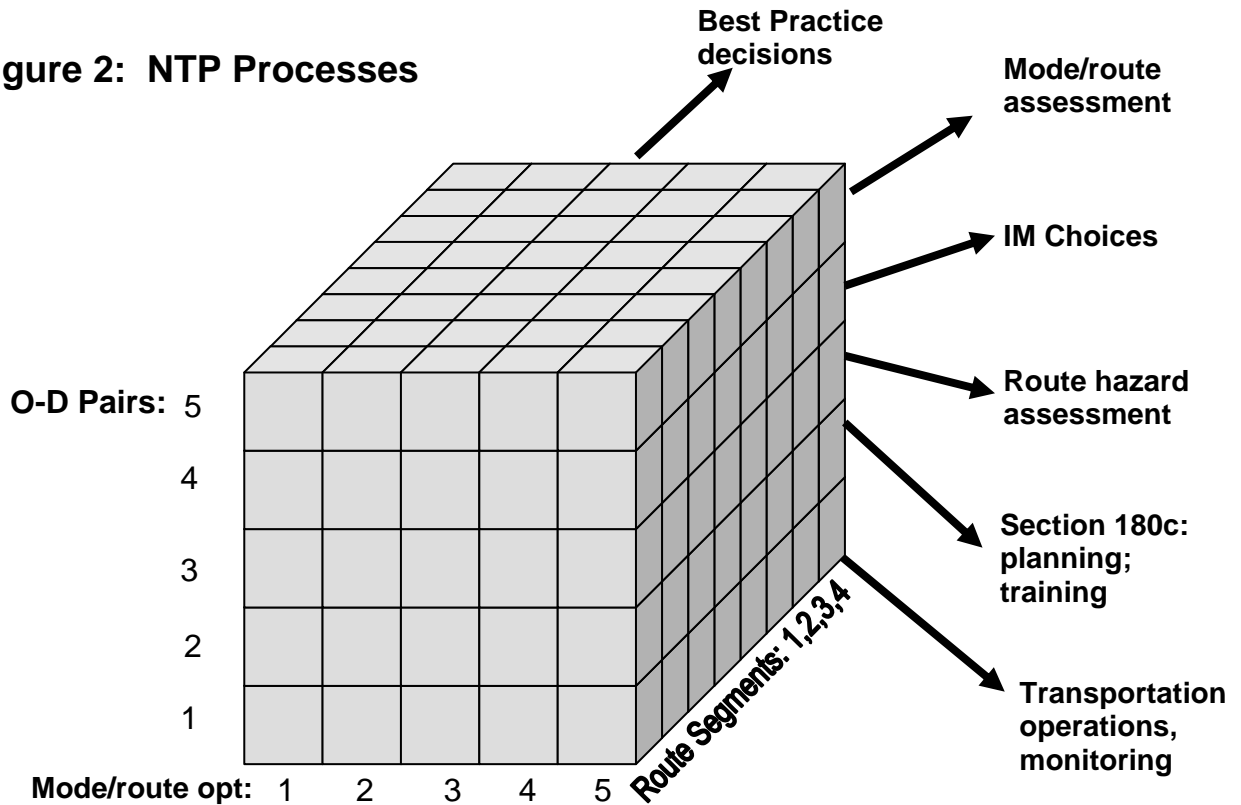


Figure 2: NTP Processes



- **Case Specifications:** In step #1, users specify key shipment characteristics with implications for effects in transport: Shipment specifications include: a) Cask type (e.g. TAD), Cross-country mode (e.g. dedicated train); c) Fuel age (e.g. 20+ years after discharge); d) Fuel amount (e.g. 84 PWR assemblies; 38 MTU). Routing specifications include: a) Shipment origin (e.g. Salem NP); b) IM destination, if applicable (e.g. Port of Wilmington); c) Cross-country destination (e.g. Yucca Mountain); d) Routing criteria-constraints.
- **Route Identification:** Step #2 identifies the route segments used in an origin-destination pair, and the estimated time spent along each segment. User options include: a) Call TRAGIS and apply the routing criteria-constraints specified in Step #1; b) Apply IRRIS routing models;¹⁴ or c) Accept a rail route received from AAR/RRF.¹⁵ For options “a” and “b”, users specify (as indicated, in Step 1) a set of routing criteria-constraints. For option “c,” users may want to apply TRAGIS to determine a set of criteria and constraints that produce a similar rail route.

This step also segments routes for subsequent assessment steps. Users might adopt a general segmenting protocol for cross-country routes. For example, segments could differentiate among route environs (e.g. central city, urban, suburban, rural) and among states (e.g. portions of Kansas City in Missouri and Kansas).

- **Radiological Risk.** In step #3, RADTRAN is “called” to assess the radiological risk (incident-free and in an accident) associated with the transport of the shipment specified in Step #1 along each segment specified in Step #2. The resulting estimates could then be aggregated as required—by state, by region, by urban or rural area within a state, etc.
- **Route Conditions and Features.** With reference to each route segment identified in Step #2, Step #4 assembles information on route conditions and features. As mentioned, much of the information—on fire stations, schools, hospitals, stadiums, etc.—is already available in IRRIS, by virtue of GeoDecisions contracts with DOD and FEMA, and an arrangement to make specified information available for other application. In a tool such as IRRIS, this information is geo-referenced; routes and features of route environs can be viewed in their community contexts.
- **Vulnerability-Capability Indexes.** A challenge in consultative SNF transportation system design is the comparison of capabilities and vulnerabilities across an incredible diversity of route contexts, each differently affected in different phases of a 25-30 year shipment campaign. Is “my” segment of concern more vulnerable because it will receive more shipments, or because it is more prone to congestion, or because it is closer to an elementary school, or because it has greater density of resident or workday population? Is emergency response capability along “my” segment of concern less adequate because the fire station is farther from the route, or because its staff is smaller or less fully trained, or because evacuation routes are less numerous, or because alternative routes are less available or adequate?

Routing guidelines developed by DOT seventeen years ago¹⁶ suggested indexes for assessing such questions—assuming that states could and would collect the needed information ad hoc to address localized routing issues and options. By adapting such indexes for automated application to the much richer IRRIS information resource, and applying GIS tools such as geofencing, it is possible to make

¹⁴ Currently highway routing only.

¹⁵ A rail industry recommended route between class 1 railheads.

¹⁶ Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials,” August 1992, US DOT: Research and Special Programs Administration, DOT/RSPA/HMS/92-02.

more systematic comparison of the vulnerabilities and capabilities along diverse and differently affected urban, suburban and rural route segments, and thus provide a more standardized basis for needs assessment and Section 180(c) planning.

- **The Multi-User Geospatial Database.** In Step #6, the results of the previous steps are assembled in a multi-user geospatial database, managed so as to facilitate the combination of results in any way needed to address questions posed in consultative transportation system design: e.g. shipments by phase, by region of origin, by mode option, by age of fuel shipped; effects in urban or suburban areas, in corridor state “X” or shipping state “Y”; incident-free or accident risk in central cities or rural areas; portions with relatively high emergency response capability and/or relatively high vulnerability, etc.

Step 6 also assembles the assessment results for shipments with the same case and route specifications given updated route characteristics or route environment conditions. This “versioning” capability keeps the assessment current.

Resource Development and Application

Step 7 is the development of the information-assessment system concept, and its application in consultative transportation system design. The research team recommends a consultative 2-3 year process of system development, in which key stakeholders participate in setting priorities for system design and development, and in planning for its application in phased review-decision processes. (See Figure #2.) Thus, to describe in detail how the information-assessment resource should be developed or applied is at this juncture premature. Not premature, however, is to suggest the types of questions that might arise in consultative transportation system design—questions which should guide development of the information-assessment resource:

Best Practice Choices

- From the Dresden nuclear plant, do dedicated trains (with state-of-the-art railcars and equipment) running at standard freight speeds reduce incident-free accident risk? If so, by how much?
- Shipping 3400 MTU/year, how much does shipping older fuel (20+ years after discharge) reduce incident-free accident risk?
- Does concentrated shipment from the Point Beach nuclear plant (e.g. one shipment per week for 12 weeks) have greater radiological risk than occasional shipment (one per quarter for 3 years)?
- Does intermodal and cross-country shipment from the Ginna nuclear plant have greater or lesser radiological risk than overweight truck shipment of the same material?
- Does the origin shipping community (utility, shortline rail/barge companies, state highway department, state policy agencies, local governments, and marshalling yard operators) prefer concentrated over occasional dedicated train shipment? (See Point Beach example above.)
- Is a mechanism in place that facilitates the make-up of dedicated trains, and (if desirable) concentrated shipment of same?
- What is the difference in DOE equipment (and transportation operations) costs between on-call response to discharge priorities and concentrated shipment of dedicated trains?

Intermodal Choices

- From the Ginna nuclear plant, compare radiological risks and other capabilities/vulnerabilities of heavy-haul shipment on highway A to marshalling yard A to overweight truck shipment to the destination.

- For the Ginna origin-destination pair (combining IM options with AAR¹⁷ cross-country routes), is it better to ship from on highway A to marshalling yard A versus shortline rail B to marshalling yard B?
- Considering the capabilities and vulnerabilities of the route environs, is intermodal shipment to marshalling yard A better using highway route A or shortline rail A?
- Does marshalling yard A have capability to receive 4 heavy haul shipments over 4 days as needed to make-up a dedicated train? Does marshalling yard B have greater capability?
- Is marshalling yard A located and accessed so that it could receive intermodal shipments from several origins? If so, which origins and intermodal options are involved?

Route Assessment

- Compare the radiological risks and other capabilities-vulnerabilities of the AAR route from Perry with an alternative identified (using TRAGIS, or local judgment) by the CSG-MW¹⁸?
- What is the above comparison for Lake County, the State of Ohio, the Midwest region, or the (say) 600-mile downstream portion?
- What TRAGIS routing criteria reproduce the AAR route from Perry? Does CSG-MW generally agree with those criteria? If CSG-MW suggests alternative criteria, what's the alternative route?
- How does the AAR compare with the CSG-MW alternative in radiological risks, route environment capabilities-vulnerabilities, and other considerations?
- What staff effort is needed (in 2010 or 2011) to update the 2005 CSG-MW route identification assessment?
- What are the additional effects of shipments from eastern and southern origins in the Midwest?
- Assuming DOE proposes AAR rail routes, does CSG-MW suggest alternatives? If so, on what basis? Lesser radiological/accident risk? Lesser route environ vulnerability? Greater route environ capability? Better for the Midwest? Better also for downstream states?
- What are the downstream effects of the AAR/DOE routes and the CSG-MW alternatives?

Section 180(c): Emergency Response Assessment and Training

- What is the current emergency response capability along route X in my state?
- How do I contact the managers? Have they conducted the TEPP¹⁹ needs self-assessment? If so, how recently?
- Were there a serious accident on I-24 in Nashville (or Quad Cities, or Omaha), what schools might need to be evacuated? How might we contact those schools? What is their enrollment?
- Does the school district have sufficient buses and drivers to perform an evacuation?
- Were there an accident on I-24 in Quad Cities, what fire and EMS centers are available (within 5 miles) to respond?
- How many are within 2 miles of the route? Does this reflect the difficulty that a fire station on the east side of I-24 might have in response to an accident on the west side?
- Has the Quad Cities Emergency Response Agency considered response to radiological accidents along its section of I-24? If so, how recently? What were the findings-conclusions?
- If there were a very serious accident in Omaha, what is the likely plume? What's the daytime population in that area? What's the value of non-residential real estate in that area?
- Is the vulnerable population along O-D route A greater or less than the vulnerable population along alternative B for the same O-D pair?

¹⁷ American Association of Railroads and its Railroad Research Foundation.

¹⁸ Council of State Governments-Midwest.

¹⁹ DOE Transportation Emergency Preparedness Program.

- What are the congestion areas and times along route A and route B? To what extent do they reduce traffic flow? Are the differences sufficient to choose route B over route A when shipments approach those areas in those times?

State-Local Needs Assessment (Comparative, using capability-vulnerability indexes)

- Is ER capability more adequate in urban areas in Pennsylvania than in urban areas in Ohio, or Missouri, or Kansas, or Colorado?
- Is ER capability more adequate in suburban areas in Pennsylvania than in urban areas in Ohio, or Missouri, or Kansas, or Colorado?
- Is ER capability more adequate in rural areas in Pennsylvania than in urban areas in Ohio, or Missouri, or Kansas, or Colorado?
- What are the projected shipment numbers in these areas in year one, year two, etc.?
- What are the priorities regarding ER capability in the initial years of the projected campaign?
- Are vulnerable populations greater along route A than route B? Greater in urban (or suburban or rural) areas along route A than route B? Greater in state or locality A than in state or locality B?
- What are the above comparisons on a per MTU shipped basis?
- What is the condition rating of the bridges along (say) the DOE/EM SNF Transfer “Black Route”? These include bridges across the Tennessee River in Chattanooga, the Cumberland River in Nashville, the Ohio River in Paducah, the Illinois River in Peoria, the Mississippi River in Quad Cities, and the Missouri River in Omaha.
- Where are the “congestion pockets” along this or other routes? When (during the workweek or during scheduled events) do these occur? What is their effect on normal traffic flow?
- What’s the effect of a “congestion pocket” on radiological risk, incident free and in accidents?
- Are these effects sufficient to warrant alternative routes?

Transportation Tracking and Monitoring (real time)

- Shipment X is approaching the state A-B line. How will its arrival be affected by congestion pocket Z?
- Shipment X will pass iconic targets A-D in state Y. Does the tracking system used by the escort team locate and identify these, provide current assessments of their vulnerabilities, and identify on-ground resources for information and response?
- Shipment X is 50 miles east of a route that has been closed. What are the re-routing or safe parking options?