

NWTRB: Summer Board Meeting
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Golden CO



Planning for Transport of SNF/HLW in the U.S.

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Planning for Transport of SNF/HLW in the U.S.

- 1. Three Key Program Documents: Transportation Planning Limitations**
- 2. Consultation & Coordination in SNF Transportation Planning**
- 3. The Corridor Community: A Neglected SNF Transp. Planning Constituency?**
- 4. An Exploration: SNF Transport in a Program Whose First Current Purpose is Off-Site Storage.**

1. SNF/HLW Transportation: Limitations of 3 Key Documents

a) The Nuclear Waste Policy Act of 1982

b) National Academies of Science: Going the Distance? (2006)

c) The Blue Ribbon Commission (2012)

i. BRC: Limited Interpretation of the “WIPP Model” for SNF Transport

ii. BRC: Required to Ignore the Geography of Nuclear Waste in the U.S

1. SNF/HLW Transportation: Limitations of 3 Key Documents

a) The Nuclear Waste Policy Act of 1982

The NWPA barely mentions SNF transport

- Section 137(a1): Regulated by DOT (not self-regulated)
- Section 137(a2): Use private contractors.

- Section 180(a): Transportation in packages certified by NRC (no criteria).
- Section 180(b): Notify state & local governments in advance of shipments.
- Section 180(c): Train local officials for ER. (S.1240 improves)

No consideration of transportation as component of an integrated system, in which limitation of transport (and impacts) is a legitimate design objective.

Section 135(a3): In selecting methods of providing (1,900 MT) storage capacity, the Secretary shall.....seek to minimize the transportation of SNF, the public health and safety impacts, and the costs

1. SNF/HLW Transportation: Limitations of 3 Key Documents

b) National Academies of Science: Going the Distance? (2006)

- Found “**no fundamental technical barrier** to the safe transport of SNF...in the US”.
“wording. . . carefully and narrowly constructed” . . .
”focused on technical aspects”. . .
predicated on a set of 15 recommendations (adopted by the BRC). . . and
on “high degree of care” in technical tasks. (pg. 7-8)
- NAS also recognized and discussed “**social risks**” in SNF/HLW transport, which
“arise from social processes and human perceptions and which
can have **economic, institutional and psychological consequences**”.
But did not pursue implications for transp. system or program design.
- A key **limitation** of NAS from my current perspective is that it
Took SNF/HLW disposal at Yucca as a given (no off-site storage).
Did not examine the linkage between transport and (evolving) program purpose.

1. SNF/HLW Transportation: Limitations of 3 Key Documents

c) The Blue Ribbon Commission (2012)

i) Advocated WIPP as “a longstanding and highly successful model for partnering with states to achieve shared success in addressing issues relating to the transport of nuclear materials.” (pg. 85)

However, looked at the current legacy of the WIPP program, not the program context in which (or the process by which) the WIPP transportation model was crafted.

1.c.i. BRC: **Limited Interpretation of the “WIPP Model”** for SNF Transport

Based on my consultation with those who were involved. . . a few key elements:

- Program context:

- WIPP was a site for TRU waste *disposal*, not interim storage;
- The (long-lived) radiation content was trivial compared to SNF.
- Siting was (largely) consensual by 1993.
- **84% all shipments from western states to western repository**....a regional facility.
- **94% western state shipments generated by corridor or destination states** (ID, CO, NV, NM)corridor states had shared interest in removal.
- Routes (interstates) already agreed; full-scale testing of Type B cask complete.

- Process elements:

- **Negotiation** (not just “consultation-cooperation”) was **directed by DOE Sec. Watkins**.
- Western state negotiators represented Governors directly.
- Western state negotiators funded by DOE-EM.
- DOE negotiators had authority, skill, patience.

- 1981: “Stipulated Agreement” settles litigation and includes “consultation and cooperation” agreement.
- 1990: NM granted “mixed waste” authority by EPA. (NMED Haz. Waste Facility Permit issued Oct., 1999)
- 1992: WIPP Land Withdrawal Act.
- 1993: EPA radiation standards finalized

1.c.ii. BRC: Required to Ignore the Geography of Nuclear Waste in the U.S.

Directed by DOE “**not to serve as a siting body**” . . . as consequence:

- Report reads as if geography does not exist . . .
does not consider linkages between generation, storage & disposition
. . . or who is affected by those linkages.
- Following the BRC recommendations . . .
DOE Strategy document also ignores geography.

The Geography of Nuclear Waste in the U.S.

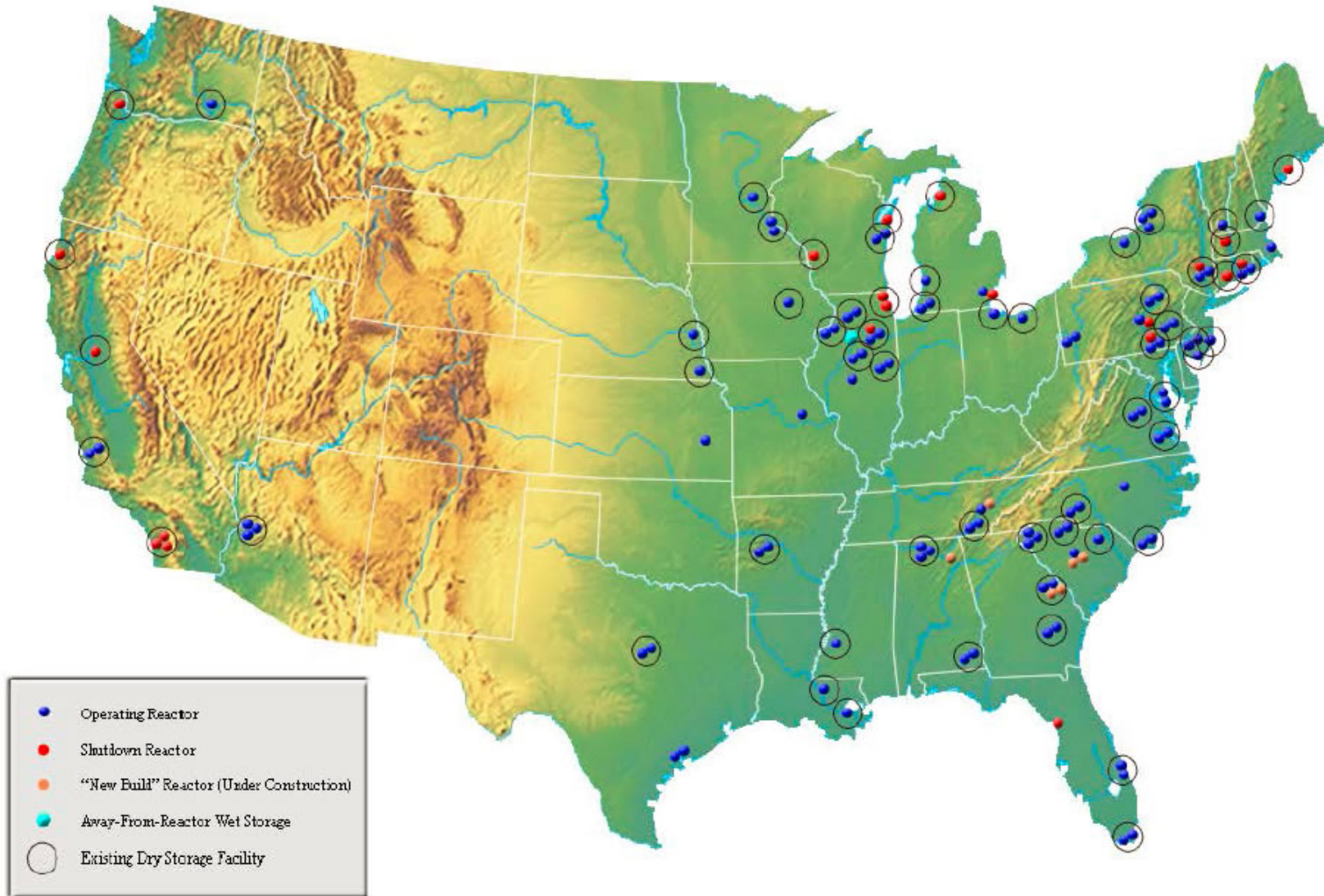


Figure 1-1. Commercial Nuclear Power Reactor Sites Currently Storing Commercial UNF

2. Consultation-Coordination and in SNF Transportation Planning

BRC: “The Commission believes that state, tribal and local officials should be extensively involved in transportation planning and should be given the resources necessary to discharge their roles and obligations in this arena”. (pg. xiii)

a. Barriers to “extensive involvement”

i) . . . at DOE-NFST

ii) . . . among SRGs (also tribes)

b. “Levels” of SNF Transportation Planning

c. “Barriers” x “Levels”: A Resolution?

2. Consultation-Coordination in SNF Transportation Planning

a.i) Barriers to “extensive involvement”at DOE-NFST

- A new NFST team at DOE, responding to March 24 Moniz initiative
- NFST team new to many transportation topics.....learning themselves.
- Contractors provide background knowledge, but not free to work with “outsiders”.
- NFST is responsible for several aspects of SNF transportation, but *not responsible* for transp. as a subsystem in an “integrated SNF/HLW program”.
- DOE-GC review inhibits info exchange for policy discussion/development.
- FACA: Constrains policy discussion with “outsiders”.
- FFY’15 NFST budget cut.....staff spread thin.

2. Consultation-Coordination and in SNF Transportation Planning

a.ii) Barriers to “extensive involvement”among SRGs (also tribes)

- SRG Committees include a single appointee from each state.
- Appointees have full-time jobs (often with operations mgt. responsibilities).
- Appointees are not (cannot be) the “state gov. expert” on every topic.
- Coop. agreements do not support members’ time.....SRG work an addl. commitment.
- Until March 24, the DOE program “slow”suggests monitoring, not engagement.
- Some transp. are issues complex: learning for consultation-cooperation (not just reaction) takes time, energy/engagement, opportunity.
- SRG coordinators also limited.....admin/coordinative functions often take priority.

2. Consultation-Coordination and in SNF Transportation Planning

b) “Levels” of SNF Transportation Planning

What is “SNF Transportation Planning”? . . . A multi-level component of an integrated system, in which the limitation of transportation (and its impacts) is a legitimate design objective.

The levels include:

- **Integrated program plan:** Systems relationships btwn. generation, storage, disposition.
- **Major technical choices:** e.g. Geologic disposal? Large DPC disposal? Repackaging?
- **Destinations:** locations of sites for storage & disposition, given generation.
- **Removal sequence: “the queue”:** The efficiency of removal; duration of transp.
- **Modal & hardware choices:** Technical methods for transport; transp. system capacity
- **Routing:** Corridor communities impacted, given a set of origins and destinations.
- **Operations:** Inspections, notification, monitoring/tracking, emergency preparedness.

2. Consultation-Coordination in SNF Transportation Planning

c) “Barriers” x “Levels”: A Resolution?

Focusing consultation and cooperation at the lower levels ignores or discounts the upper levels of SNF transportation planning, at which transportation impacts are mostly determined.

Focusing consultation-cooperation at all or most SNF transportation levels quickly exceeds the capacities of SRGs and tribes (even of DOE-NFST) to really do it well.

3. Corridor Communities: A Neglected SNF Transp. Planning Constituency

a) The Yucca Case: Transportation an Afterthought, Purely Dependent Variable.

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Transportation program result?

- 77 sending counties (all eager for SNF/HLW removal)
- 9 affected units of local government (eligible for consent agreements)
- 891 corridor counties (110 in NE; 353 in MW; 298 in SO; 110 in West)
- 12.8 million shipment miles, over 25 years (first 70,000 MT)

3. Corridor Communities: A Neglected SNF Transp. Planning Constituency

b) What can one say about these 891 corridor counties?.

- Many **never aware they were selected** for this role in the national program. Each is a political entity, with elected officials, commission mtgs., staff agencies, etc.
- Have **very limited legal recourse**.....Commerce Clause; Supremacy Clause. But, they do have political recourse.
- Can expect massive (federal) documentation that **technically all very safe**. Limited trust in massive federal documentation.
- Plus, real local **concerns not directly linked to technical safety**:
 - Deep concern re high rad content of material being shipped.
 - Will reflect that they do not directly benefit from SNF/HLW transport.
 - Worry that local economy or property values might suffer.
 - Will question: Why *necessary* to ship thru us for this purpose?
- Will discover: there are **opportunities for incidents or accidents**....or even sabotage.
 - SNF transport is logistically complex and interdependent.
 - Embedded in the US rail freight system.....very large & complex.
 - All contingencies have not been (cannot be) anticipated.

3. Corridor Communities: A Neglected SNF Transp. Planning Constituency

c) SNF Transportation Incidents & Contingencies: Stakes for the Program

Incident in one community = incident for all 891.

Multiple incidents could shut-down entire program

Class 1 track: Generally improved and well-maintained and operated....but

- Lots of traffic: unit trains; mixed freight; short-haul.
- Mixed speeds: need to sideline some for others.
- Hazardous areas: hills, curves, trains are “low-friction”.
- Signaling/communications: sometimes requires split-second decisions
- Very heavy equipment: massive forces.
- Lengthy sections exposed to sabotage

Rail-Yards: a complex operation, involving very heavy stuff

- 120-140 trains per day
- Different train types: unit, mixed freight; intermodal
- Different carriers: arrival/departure
- Complex operation: humping mixed freight; locomotive service; crew change.
- 2000 employees (about half in train service)

4. Addressing the concerns of corridor communities in a program whose current major purpose is offsite storage, and in which disposal is long-term and uncertain.

a) **Alternative Basic Approaches**

One approach is to neglect or discount these concerns in program design.

- Be prepared to coerce (using Commerce Clause, gently or otherwise) in implementation.....*Hope* that:
 - Incidents will be minor and infrequent, with high quality response.
 - Over time, other local concerns are attenuated, not compounded.
 - Multiple incidents (could shut down the program) do not occur.

Might work, but could be contentious, messy, time consuming.

With incidents, could be very time consuming, or could risk the program.

4. Addressing the concerns of corridor communities . . .

a) Alternative Basic Approaches

Another approach: address corridor community concerns in program design.

- Design the program to address the question: **Why us, for this limited (offsite storage) program purpose?**
- Make the case that offsite storage is needed, then demonstrate: impacts on communities that do not directly benefit have been minimized.

Enable feds to deal with fewer corridor communities , more directly and effectively, over much shorter periods of time.

There will be concerns, but less contention, less focus on whose ox gets gored.

4. Addressing the concerns of corridor communities . . .

b) Exploring the Alternative Approach: Technically Appropriate (400 acre) Sites

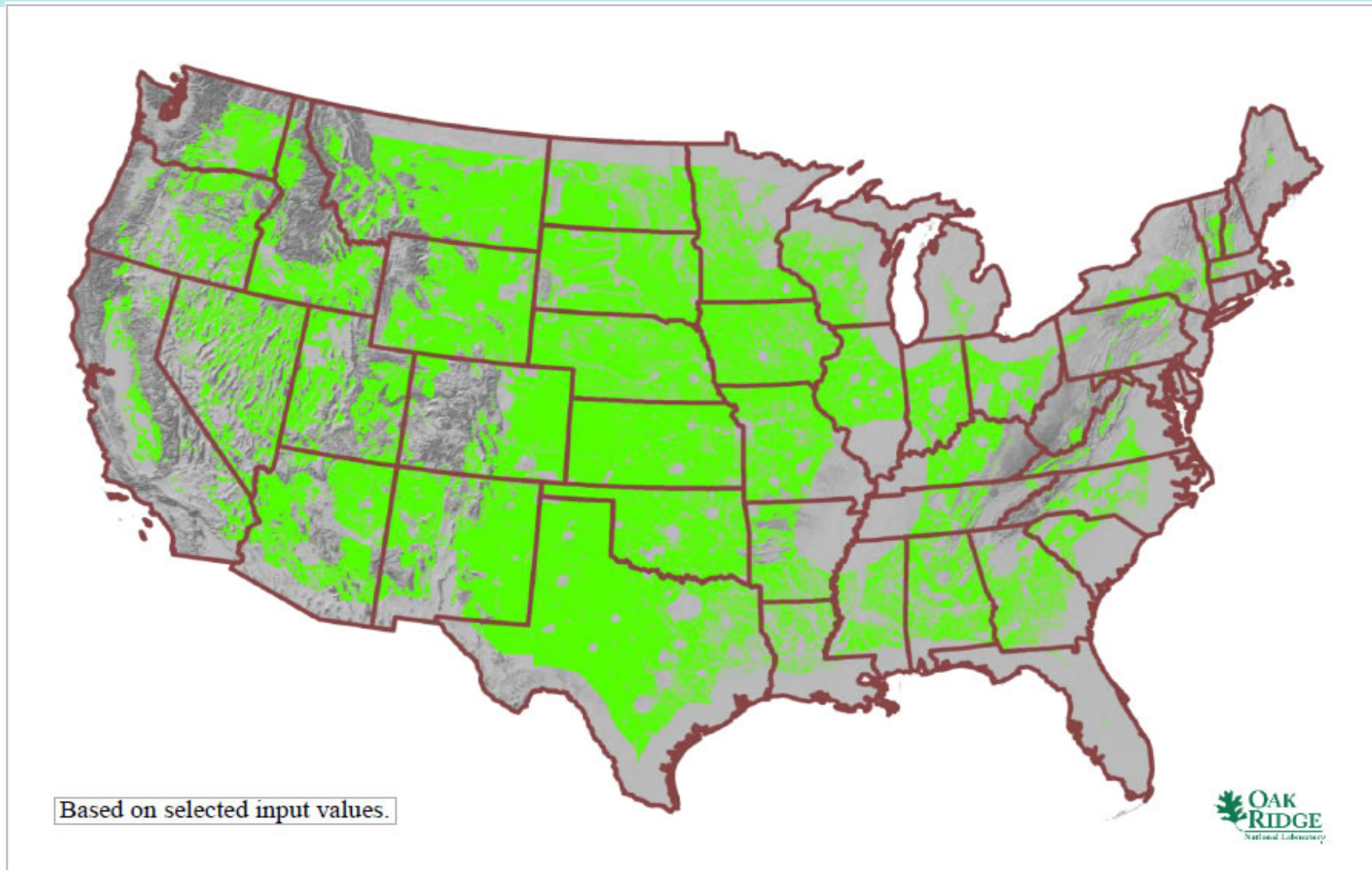


Fig. ES-1. ISFSI available siting results aggregated for nominal 400-acre sites.

4. Addressing the concerns of corridor communities . . .

c.i) 5 CSF sites....."minimum" transp impacts for off-site storage

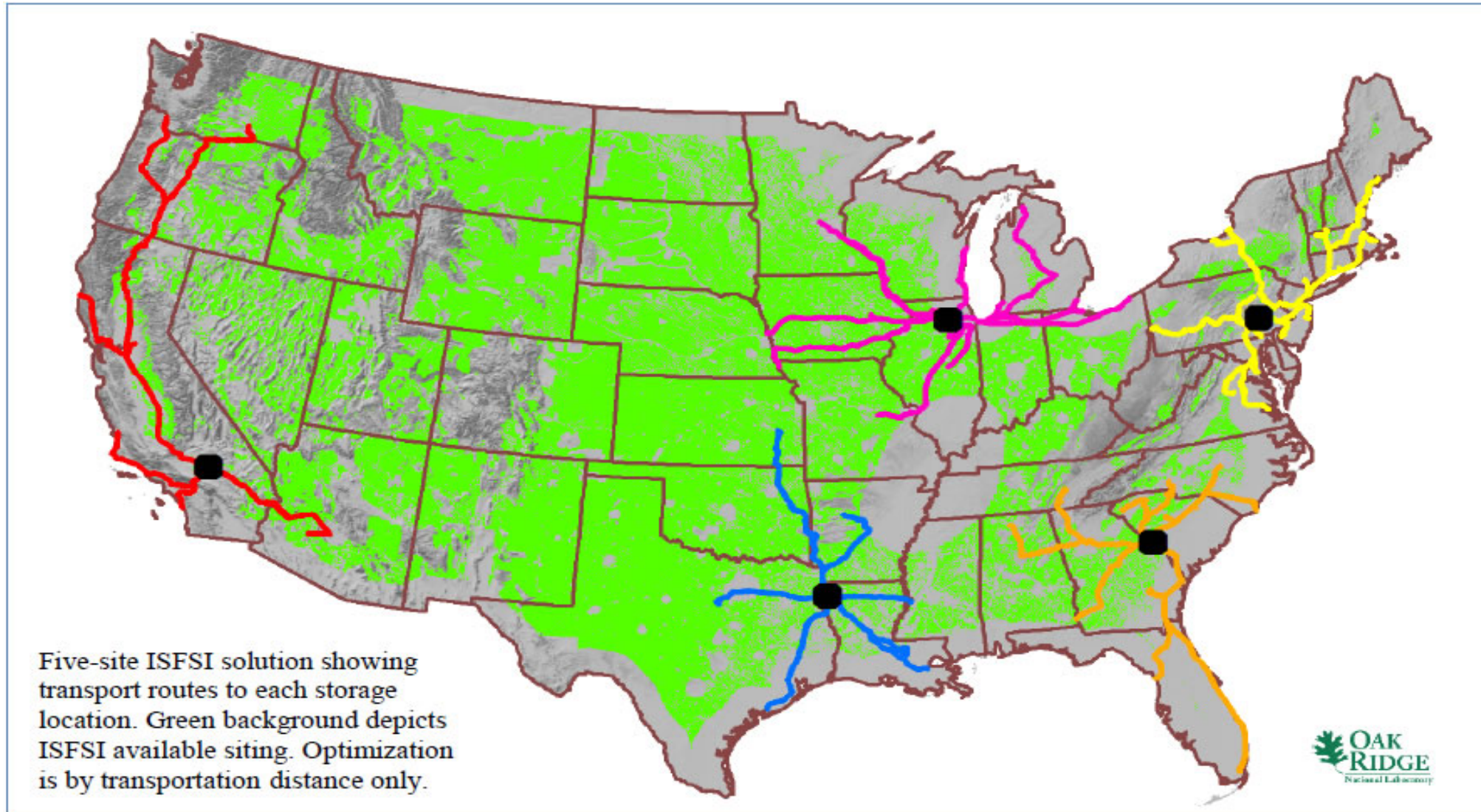


Fig. ES-4. Base case five-site ISFSI solution based on limiting transportation distance.

Addressing the concerns of corridor communities

c.ii) 4 CSF sites . . . transportation impacts 5%-9% > “minimum”

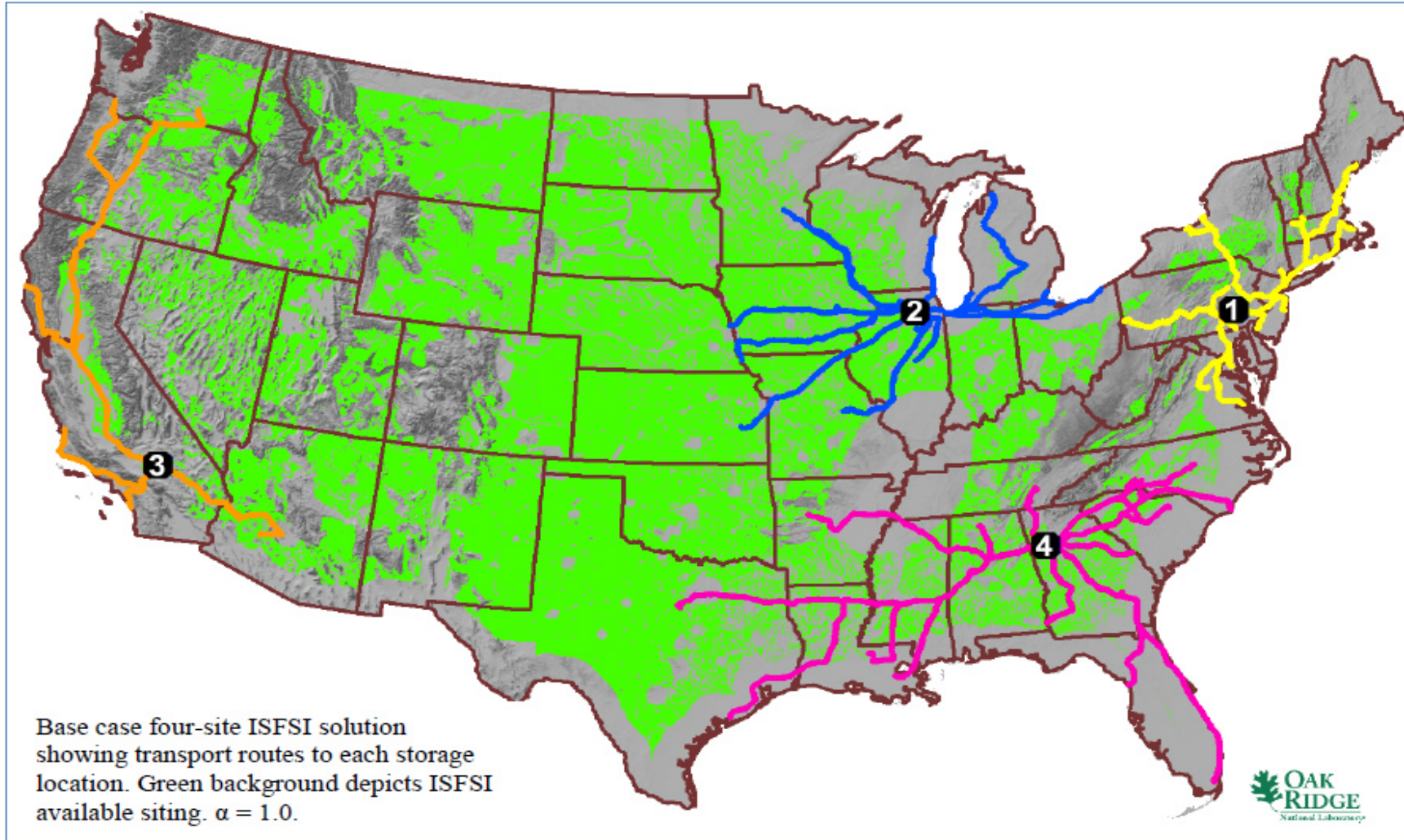


Fig. 47. Base case four-site ISFSI solution based on transportation distance ($\alpha = 1.0$).

Addressing the concerns of corridor communities . . .

c.iii) 1 CSF site. . . transp impacts 11X, 50%, 2.3X > “minimum” (Shipm, Counties, Pop.)

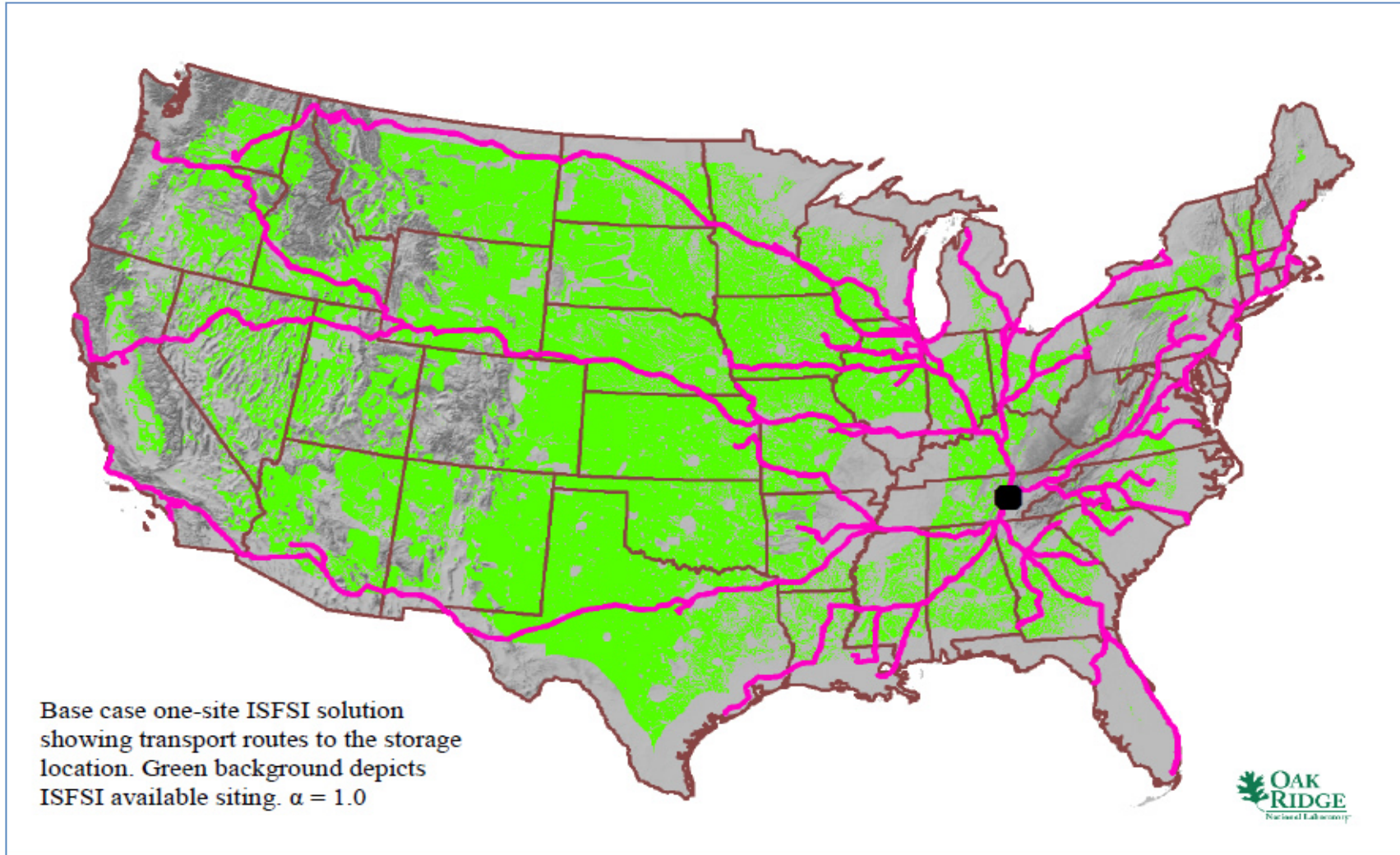


Fig. 50. Base one-site ISFSI solution based on transportation distance ($\alpha = 1.0$).

Addressing the concerns of corridor communities

c.iv) 1 CSF site. . . transp. impacts 11X+, 50%+, 2.3X+ > “minimum”

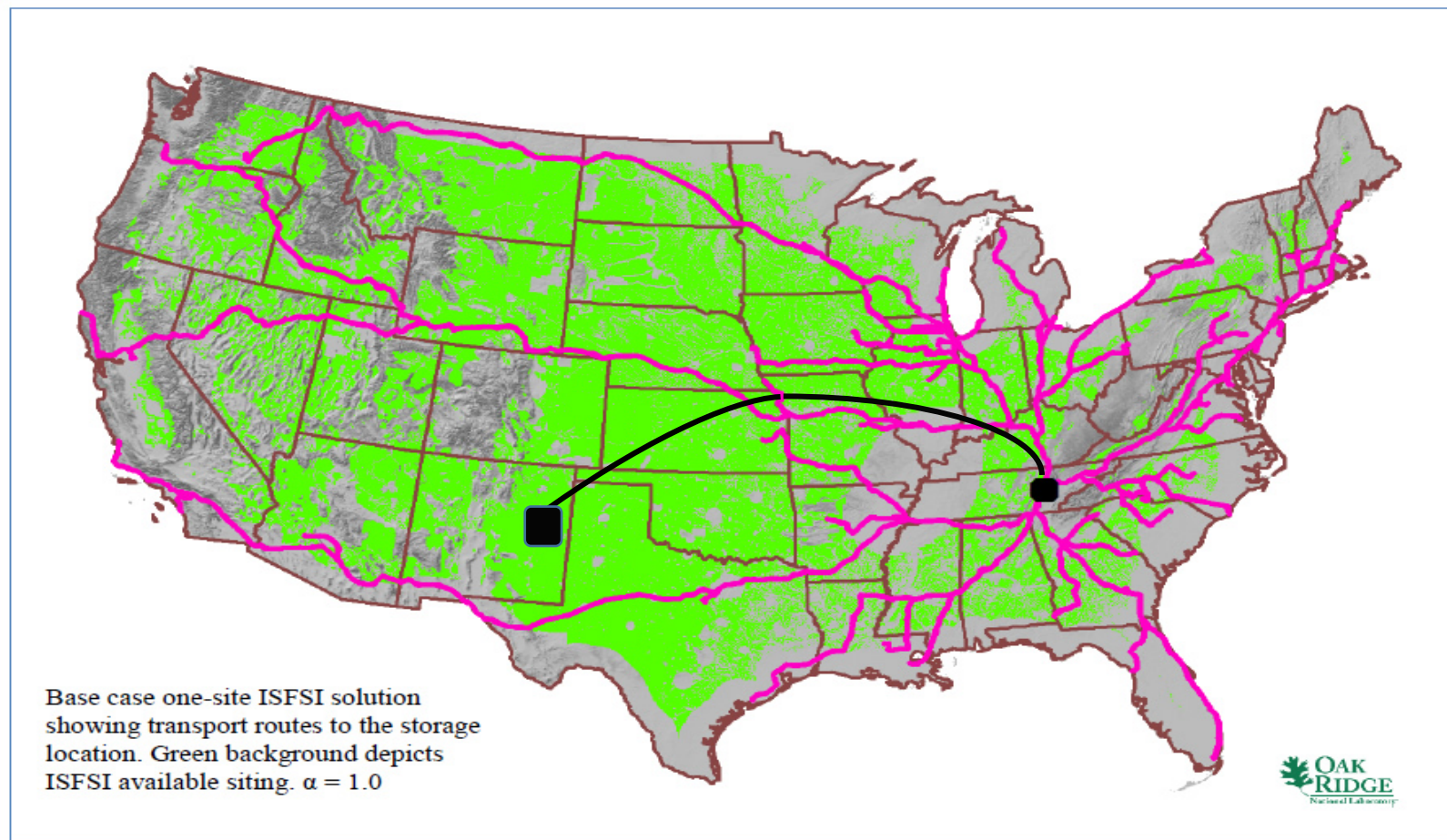


Fig. 50. Base one-site ISFSI solution based on transportation distance ($\alpha = 1.0$).

Addressing the concerns of corridor communities . . .

c) Potential Costs, Benefits

Costs:

- **Patient, purposeful, principled CSF siting**.....hard to do (but DOE-NE has the idea).
- **Increased construction & operations costs for multiple CSFs.**
- Likely no repackaging at CSFs (probably not at origins or at repository).

Potential Benefits:

- Convincing linkage between transport and current program purpose. The basis for:
- **Successful engagement with** (much fewer) **corridor communities** (over shorter periods).
- Much simpler transp. logistics: fewer railyards; less Class 1 track.
- **Transport program less vulnerable to transport incidents and contingencies.**
- More efficient clearing of origin sites & route tributaries (w. Std Contract adj)
- **Less carrier control over federal SNF transport program.**
- Reduced transport costs for interim offsite storage.
- **CSF location does not prejudice repository siting.**
- **Could provide a contiguous state role in CSF program.**
- Possible co-use (e.g. SMR power).

Summary:

1. Key documents in this program have **deficiencies regarding SNF transport**.
These **tend to persist** if not addressed at a fairly high level.
2. Consultation and coordination in SNF transportation planning is needed.
But there are **barriers on both sides**, which are exacerbated if SNF transport is a multi-level subsystem of an integrated transport-storage-disposal program.
3. The corridor community is a neglected constituency in this program. These communities have **real concerns not addressed by appeals to safety**.
To address these concerns involves program design, and upper transp. planning levels.
4. Minimizing the transportation impacts of offsite storage has **costs**, but also a range of **potential benefits** not yet seriously addressed.

Questions?