

BLUE RIBBON COMMISSION ON AMERICA'S  
NUCLEAR FUTURE

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TRANSPORTATION AND STORAGE SUBCOMMITTEE

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MEETING

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THURSDAY,  
SEPTEMBER 23, 2010

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The Subcommittee convened at 8:30 a.m.  
in Ballrooms A and B of the Washington  
Marriott at 1221 22nd Street, Northwest,  
Washington, DC, Richard Meserve and Phil  
Sharp, Co-Chairs, presiding.

MEMBERS PRESENT:

RICHARD MESERVE, Chair

PHIL SHARP, Chair

MARK AYERS

VICKY A. BAILEY

ALBERT CARNESALE

ALSO PRESENT:

TIM FRAZIER, Designated Federal Official

PHILIP BROCHMAN, US NRC

GORDON THOMPSON, Institute for Resource  
and Security Studies

CHARLES PENNINGTON, NAC International, LLC

CHRISTOPHER EARLS, NEI

BOB HALSTEAD, State of Nevada

TAMARA BAKER, South Carolina State Law  
Enforcement Division

JACK EDLOW, Edlow International

ALSO PRESENT (Cont'd):

JUDITH HOLM, formerly of the US DOE

CHRIS WELLS, Southern States Energy Board

CASH JASZCZAK, Nye County, Nevada

KEN SORENSON, Sandia National Laboratories

PUBLIC COMMENTERS:

PIERRE ONEID

IRENE NAVIS

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P-R-O-C-E-E-D-I-N-G-S

8:29 a.m.

MR. FRAZIER: Well, good morning.

We're going to go ahead and get started since enough commissioners are here and seated and the panel is here. So, I will just go right ahead and turn it over to Mr. Sharp.

CHAIR SHARP: Thank you very much.

My co-chair, Richard Meserve, opened up our last session and so it's my duty to open up this one and we certainly welcome the folks to another meeting of the Transportation and Storage Subcommittee of the Blue Ribbon Commission on America's Nuclear Future.

Today's subcommittee is going to be focused on two issues critical for storage and transportation of used nuclear fuel, namely security and risk. We've assembled two panels of experts to help us explore specific questions regarding these important issues.

First, there are security concerns raised by the storage and transportation of

1 used fuel and we want to explore what experts  
2 consider to be so-called hardened on-site  
3 storage or the acronym HOSS and how it's  
4 different from current storage configurations.

5 We want to hear about the  
6 different siting, security, worker exposure,  
7 operations and cost implications of so-called  
8 hardened sites and we want to discuss what  
9 security issues specific to transportation  
10 could affect decisions about moving used fuel  
11 instead of storing it at current locations.

12 I need to briefly note that this  
13 is an open meeting and we welcome the public  
14 into this meeting and, although we will be  
15 discussing security issues generally, we  
16 obviously will not be discussing or asking  
17 questions about any information that requires  
18 protection under the Nuclear Regulatory  
19 Commission or the Department of Energy  
20 security requirements.

21 If the need arises to discuss such  
22 matters, we will do so in an announced, closed

1 session sometime in the future.

2           The second expert panel will focus  
3 on issues of risk and risk perception. While  
4 the risk posed by potential security threats  
5 and safety issues at storage sites and during  
6 transportation is generally considered to be  
7 quite low, opinions vary widely as to whether  
8 this risk or these risks are acceptable and we  
9 want to hear about what benefits there may be  
10 to consolidated storage, related  
11 transportation or even upgrades at current  
12 sites which of course could involve  
13 significant handling of fuel and worker risk--  
14 if we made any changes to the status quo, what  
15 would be the consequences for these other  
16 items?

17           We'll be hearing from panelists  
18 who have been involved in significant shipping  
19 efforts and will learn how they have been  
20 dealing with these issues in the past. I want  
21 to note that these proceedings are being  
22 webcast and can be accessed via the

1 Commission's website, [www.brc.gov](http://www.brc.gov).

2 We have a busy agenda today and we  
3 will be keeping on schedule so I ask  
4 presenters and everyone involved to keep this  
5 in mind. We will, of course, accept any  
6 written statements or supplementary materials  
7 that anyone wishes to offer. We can take them  
8 today, or you can send them to the Commission  
9 at the website or by mail.

10 All the materials we receive, and  
11 the transcript from today's meeting, will be  
12 made publicly available as well as available  
13 to the other commissioners. At the end of this  
14 meeting, of course, probably sometime around  
15 noon or 12:30, we will have a public comment  
16 period and if an individual in the room wishes  
17 to sign up, there is a registration table  
18 outside. The amount of time available will  
19 depend on the number of those wishing to make  
20 a statement but will not exceed five minutes.  
21 We also reserve the right to limit the number  
22 of speakers, so be advised the list is first-

1       come, first-served.

2                       We're glad to be here and we look  
3       forward to an interesting discussion today.  
4       I'd like to ask my co-chairs and fellow  
5       Commissioners if there's anything they'd like  
6       to add.

7                       If not, I'd call upon our first  
8       panel and the first speaker on that panel is  
9       Mr. Phillip Brochman, who is with the Office  
10      of Nuclear Security and Incident Response at  
11      the Nuclear Regulatory Commission. Mr.  
12      Brochman, welcome. I would remind members of  
13      our panel we have a lighting system and, Tim,  
14      remind them what happens, because I can't--

15                      MR. FRAZIER: When you have two  
16      minutes left, the green light will start  
17      blinking. When you have one minute left, the  
18      yellow light will come on, and when you are  
19      out of time, red light and a very nice buzzer.

20                      CHAIR SHARP: And the lights close  
21      down and the place shuts up.

22                      MR. BROCHMAN: And then you cut my

1 sound off.

2 CHAIR SHARP: That's right.

3 MR. FRAZIER: We do have the  
4 capability to.

5 MR. BROCHMAN: Then I'll move  
6 briskly. First off, Commissioners, welcome. On  
7 behalf of the NRC, I want to thank you for  
8 this opportunity to present information on  
9 what the NRC is doing with regards to  
10 security. Can I have my first slide, please?  
11 Okay, all right. This is how I get to do it.  
12 Thank you. All right, let's try that. Point  
13 this at the--there we go.

14 Overview. From an NRC perspective,  
15 NRC regulations and security orders establish-  
16 -we've got a combination of those two at the  
17 moment--establish the requirements for storage  
18 of spent nuclear fuel at NRC-regulated  
19 facilities.

20 The security requirements are  
21 intended to provide a high assurance of  
22 adequate protection of public health and

1 safety, the common defense and security and  
2 the environment. Right now, the Commission is  
3 in the process of developing a rulemaking to  
4 update the security requirements for spent  
5 fuel storage.

6 The three broad goals are to make  
7 generically applicable the measures that were  
8 imposed by security orders following the  
9 events of September 11th, 2001. Also, lessons  
10 learned from previous NRC inspections of the  
11 security measures, of force-on-force  
12 inspections that were accomplished at reactors  
13 and could be issues that could be applied to  
14 spent-fuel storage facilities and security  
15 assessments that were performed in the past.

16 One of the big goals is regulatory  
17 consistency and clarity. We have two different  
18 types of licenses for these spent-fuel storage  
19 facilities at the NRC and that has caused some  
20 challenges to both industry and to the NRC in  
21 the past.

22 In terms of the term hardened on-

1 site storage, you had mentioned it in your  
2 introduction, the term HOSS or hardened on-  
3 site storage is not a term of art the NRC  
4 uses. In our world, we tend to speak in terms  
5 of protective strategies; denial strategies;  
6 detect, assess, and communicate protective  
7 strategies; mitigative strategies, and so a  
8 hardened on-site storage system is not  
9 something that the Commission necessarily has  
10 recognized in the past.

11 We do not that there is a petition  
12 for a rulemaking, which is currently active  
13 before the Commission, PRM 72-6, that does  
14 specifically ask these questions. It will be  
15 considered in the context of the rulemaking  
16 that I just mentioned.

17 In terms of the status of the  
18 rulemaking, the rulemaking is under way. The  
19 draft regulatory basis for the rulemaking was  
20 published for public comment in December,  
21 2009. The NRC received significant comments on  
22 the rulemaking that challenge--that differed

1 or opposed the principal technical approaches  
2 that were, that the Commission had set forth.

3 So, the staff has recommended that  
4 we pause this rulemaking effort to assess in  
5 detail the particular impacts and other issues  
6 that could arise from this, from these  
7 comments.

8 Right now, we have a paper in  
9 front of the Commission, you see the number up  
10 there, and the reference to it. That just went  
11 up in August, so we are still awaiting a  
12 decision from the Commission at this point,  
13 and that's all, about all I can say on that  
14 particular one.

15 Protective strategy. Overall,  
16 protective strategy for a spent-fuel storage  
17 facility will be achieved through a number of  
18 means. They can involve security personnel,  
19 weaponry that those individuals use, and  
20 security systems: screening, as well as  
21 standalone or remote-operated weapons systems.

22 There can't, in choosing a

1 particular system, a licensee can trade off  
2 hardware costs for personnel costs. That is a  
3 big issue. Also, capital costs versus O&M.  
4 Things like vehicle barrier systems are  
5 capital, are considered capital expenditures.

6 Remote-operated weapons systems  
7 are capital expenditures as opposed to  
8 personnel costs from individual guards'  
9 training salary and other issues.

10 One of the big questions that is  
11 confronting the NRC right now is denial  
12 strategy versus detect, assess, and  
13 communicate protective strategies. Those are  
14 the two principal protective strategies we see  
15 today in NRC facilities.

16 Denial, as it says there, the  
17 security force is required to interpose,  
18 interdict and neutralize the threat or the  
19 adversary, whatever term you want to use. That  
20 strategy is currently applied at power  
21 reactors and Category 1 special nuclear  
22 material facilities.

1                   The detect, assess, and  
2                   communicate strategy is applied to spent fuel  
3                   storage facilities today and, as it says  
4                   there, the success in that strategy is the  
5                   licensee detecting an issue and contacting  
6                   local law enforcement, who are the parties  
7                   that respond to the threat and would be  
8                   responsible for neutralizing any issues or any  
9                   adversaries that may have penetrated the spent  
10                  fuel storage facility.

11                  As you can understand, that may  
12                  take a bit of time for law enforcement to show  
13                  up and for them to be in a position to  
14                  neutralize any adversaries.

15                  One of the questions that we're  
16                  considering right now is whether we need to  
17                  require a denial strategy for all ISFSIs--for  
18                  some or all, I should say. This may be due to  
19                  the ability to assess what are the dose  
20                  consequences from releases. The NRC's view at  
21                  this point is that there is a potential for  
22                  some degree of release due to certain security

1 characteristics or certain threats at these  
2 storage facilities.

3 This particular information is  
4 tightly controlled and so, if the Commission  
5 has desire to discuss it further, we would  
6 need to do that in a closed session.

7 The other, another key point is  
8 how big a footprint or how much space they  
9 have on the site. There is the ability to  
10 trade off distance for dose, and for some  
11 sites you have a very small footprint, a very  
12 short distance from the storage casks to the  
13 site boundary. Other facilities have a much  
14 larger distance and that will impact the  
15 individual site's ability to implement  
16 security measures.

17 Rulemaking process is still in an  
18 early stage, I talked about that. Changes in  
19 technical direction may significantly impact  
20 the cost that industry is seeing and we are  
21 still in the process of assessing the costs.  
22 Our sense is that this will take us most of

1 this year, we will be having outreach efforts  
2 with industry and other stakeholders as well  
3 to talk about these issues.

4 And I think that wraps up my  
5 presentation, and I didn't get a red light,  
6 so. Thank you.

7 CHAIR SHARP: If there are no  
8 clarifying questions from my fellow  
9 Commissioners, we're happy now to turn to Mr.  
10 Thompson.

11 MR. FRAZIER: By the way, if you're  
12 more comfortable going to the podium, you  
13 certainly may.

14 MR. THOMPSON: Thank you. I think  
15 it's fine here. Thanks for the opportunity to  
16 speak to you. This is just for scale, it's  
17 interesting that we've created about half a  
18 million bombs' worth of plutonium. Just  
19 something worth thinking about.

20 I am focusing on a statement made  
21 by the co-chairs when they invited me here;  
22 the risk posed by potential security threats

1 and safety issues at storage sites and during  
2 transportation is generally considered low.  
3 I'm going to address the validity of that  
4 statement, focusing on what the NRC knows  
5 about the subject and what is said about  
6 subject.

7 Starting with spent fuel pools,  
8 I'll tell a little anecdote. In the winter of  
9 78-79, I was part of an independent group of  
10 scientists commissioned by the government of  
11 Lower Saxony to review a project to construct  
12 a nuclear fuel cycle center in Lower Saxony.

13 This center had lots of components  
14 including reprocessing, MOX fuel fabrication  
15 and fuel disposal. We addressed a variety of  
16 issues, one of which was compact storage of  
17 spent fuel, and I chaired the subgroup that  
18 addressed risk issues.

19 Some things emerged quite clearly.  
20 Firstly, there's a tremendous amount of  
21 cesium-137 in these pools. Secondly, due to  
22 the compact configuration, if water is lost

1 from a pool, then inevitably, in a packed  
2 pool, a fire will follow. The fire is  
3 initiated because the compact configuration  
4 prevents cooling adequately.

5 The chemical energy released is  
6 sufficient to evaporate a large fraction of  
7 the cesium-137 in the spent fuel and this  
8 creates problems far downwind, of land  
9 contamination. It also became clear to us that  
10 the worst case was one of partial drainage or  
11 blocked-flow case, and not total drainage.

12 The way we presented this finding  
13 was the government set up a forum in a big  
14 public hall where the technical people, the  
15 scientists, the proponents sat on one side.  
16 The independent study group sat on the  
17 opposite side. The government officials sat at  
18 the end. The whole event was chaired by a  
19 prominent German physicist and for a period of  
20 several days, the scientists on the opposite  
21 sides debated directly on public television  
22 and in front of the licensing authorities.

1           The point I just made about the  
2 pool fire were aired thoroughly. The industry  
3 had plenty of opportunity to critique it. They  
4 weren't able to shoot any holes in our  
5 arguments and within a few weeks of this, the  
6 Government issued a ruling that they would not  
7 tolerate compact racking of spent fuel in this  
8 project proposal.

9           There were various other aspects  
10 of the ruling because it was a very  
11 complicated project, but I'm just focusing on  
12 the spent fuel. So, this all went very  
13 quickly. It was--beginning to end of the  
14 hearing process was just a few weeks and it  
15 was an open, scientific airing of issues.

16           And, I thought, okay, well, I'm  
17 done with that issue. This was spring of 1979.  
18 I don't ever have to deal with this again. And  
19 it happened that later that year, I moved to  
20 the United States for a short time and wound  
21 up staying and here we are, thirty years  
22 later.

1                   And I've dealt with this spent-  
2                   fuel issue in a number of hearing processes.  
3                   Never have I been able to testify before an  
4                   NRC panel, never have I been able to engage in  
5                   direct dialogue with proponents or industry  
6                   scientists or NRC scientists or anybody else  
7                   in any regulatory setting.

8                   The focus has been on pools  
9                   adjacent to reactors. This is a pretty typical  
10                  PWR layout. You'll see the pool is outside the  
11                  building. About a third of the nation's plants  
12                  are BWRs and in most of those, the pool is in  
13                  the building, high up, elevated above ground  
14                  level.

15                  These are coupled-risk systems.  
16                  With this configuration, you couple the risk  
17                  of the pool and the reactor and I can  
18                  elaborate at any length necessary about what  
19                  that means. In terms of the regulatory  
20                  proceedings, I'll give you a few snapshots. In  
21                  1989, we're in an NRC hearing in Brattleboro,  
22                  Vermont about the Vermont Yankee Nuclear Power

1 Plant and almost the entire day is taken up  
2 about the admissibility of witness Thompson's  
3 testimony.

4 And at the end of the day, the  
5 board makes a ruling that Thompson is a  
6 qualified witness and part of his testimony is  
7 to be admitted and that's the part that just  
8 states his qualifications. All the remainder  
9 of the testimony is struck for complex legal  
10 reasons. So, that issue goes away.

11 Move forward another decade. A  
12 similar proceeding, in this case for the  
13 Harris plant in North Carolina. Again, in that  
14 instance, I never get to testify, I never get  
15 to speak, we never have any cross-examination,  
16 there's no running, open debate. This is  
17 twenty years after the German instance I  
18 described.

19 In the spring of that year, 2000,  
20 the staff of the NRC says that witness  
21 Thompson is the only person that they can  
22 identify who says that spent fuel aged more

1       than five years can ignite in the event of  
2       water loss. That's part of their Thompson's-  
3       an-idiot strategy. It turns out that, for that  
4       entire twenty-year period, the NRC had assumed  
5       falsely that total instantaneous loss of water  
6       from the pool is the worst case, which is not  
7       true at all and was quite evident to us in the  
8       German proceeding.

9                 So, for that and other reasons,  
10       all of the technical analysis they produced in  
11       that intervening period is essentially  
12       worthless. In the fall of that year, the  
13       Advisory Committee on Reactor Safeguards  
14       invited me to testify. Which I did.

15                And suddenly, the NRC staff  
16       discovered that they had misunderstood this  
17       issue of worst case, and they said that  
18       indeed, spent fuel aged more than five years  
19       could in fact ignite and burn.

20                No apology, no retraction of all  
21       the previous work, and, it turns out that back  
22       in 1979, the spring of 79, Sandia published a

1 study and if you actually read it, it shows  
2 very clearly that total instantaneous drainage  
3 is not the worst case. For whatever reason,  
4 the introduction to that report misrepresents  
5 its content and all the subsequent analysts,  
6 evidently, read the introduction and not the  
7 report.

8 No discussion of accident analysis  
9 was permitted in any of these proceedings,  
10 even though in a generic EIS in 1979, the  
11 staff had considered accident analysis.

12 Moving on to dry storage. I'm  
13 trying to cover a lot of ground here. This is  
14 a typical dry storage module. This is a way  
15 you could attack this module. This is, this  
16 shows you quite clearly that a standard shaped  
17 charge is capable of opening up this module.

18 This brings us forward another few  
19 years to a proceeding before the Commissioners  
20 in 2008 where we argued that the greatest  
21 threat to this sort of module is again, a  
22 fire, and that you can, using a technology

1 such as the shaped charge I just showed, open  
2 up this cask and with an incendiary device,  
3 initiate a fire, creating the same problem  
4 that I described for the pool, mainly downwind  
5 land contamination.

6 The NRC staff, although by this  
7 stage they were wrapped in secrecy,  
8 acknowledged that they had not looked at land  
9 contamination. Commissioner Jaczko, during the  
10 hearing, asked if they had any capability to  
11 model downwind land contamination using the  
12 MACCS code, which would be the simplest,  
13 standard code to do this, and the staff  
14 acknowledged that they had no in-house  
15 capability to use this code at all.

16 HE also asked what their  
17 capability was--I'd like to continue a little  
18 bit here.

19 CHAIR SHARP: Take another minute  
20 or so. But we need to wrap up.

21 MR. THOMPSON: Yes.

22 CHAIR SHARP: But we will come back

1 to questions.

2 MR. THOMPSON: And cutting it,  
3 cutting it short, it's a--and I've sent a lot  
4 of supplementary material, four different  
5 documents to the staff here. But the staff did  
6 not have any technical, scientific basis for  
7 stating that this is a low-risk issue.

8 Moving forward, this bears careful  
9 thought, this historical picture. A lot of  
10 recent work on bunker-busting. Why is this  
11 relevant in strategic terms? The National  
12 Infrastructure Protection Plan lays out very  
13 carefully the role of hardening facilities and  
14 building resistance into the design of  
15 facilities as a threat-deterrent measure.

16 General McCaffrey, who has served  
17 this country in many violent capacities, makes  
18 the same point. Richard Meserve, a member of  
19 your panel, takes a different view. I'd  
20 recommend reconsideration of this view in  
21 light of our experience over the years since  
22 2002.

1 Brings us to risk-reducing  
2 options. The pool is very simple. Just revert  
3 to low-density, the way the pools were  
4 designed in the first place. And for dry  
5 storage, hardening--this is an example. There  
6 is a system ready to go; the Holtec 100U  
7 system is now proved by NRC and is actually  
8 ready to use at this moment, and I'd be glad  
9 to elaborate on any of these points. Thank  
10 you.

11 CHAIR SHARP: Thank you very much,  
12 Mr. Thompson. We now turn to Mr. Pennington.

13 MR. PENNINGTON: I would prefer to  
14 use the podium, if it's acceptable. Chairman  
15 Sharp, Chairman Meserve, distinguished members  
16 of the Commission, I appreciate the  
17 opportunity to participate here today in the  
18 discussions on this matter.

19 I have experience and expertise in  
20 both spent fuel transport and dry storage.  
21 Because of the extent of the comments  
22 requested, under topic 1, I will spend these,

1 I'll confine my remarks this morning to the  
2 issue of dry storage.

3           These are the topics I plan to  
4 cover, because, again, of the breadth of the  
5 subjects and a ten-minute limitation, I will  
6 go through these slides very quickly and rely  
7 upon the presentation summary that I provided  
8 earlier for your use.

9           First item to look at is design-  
10 basis versus beyond-design-basis events. A  
11 design-basis event is simply those types of  
12 events that we design our systems to, they are  
13 designed to those designed-basis events  
14 because of regulations and perhaps some  
15 specifics with respect to the technology  
16 itself.

17           Hardening is typically referred to  
18 as a means to bolster a system in the face of  
19 beyond-design-basis events. Again, beyond-  
20 design-basis events can be an infinity, or at  
21 least a semi-infinite number of addition  
22 events beyond a design basis.

1                   One cautionary subject is, you may  
2                   design for one set of hardening features for  
3                   certain design-basis events, and other design-  
4                   basis events may be made worse by those  
5                   hardening effects. So, anyway, hardening, I  
6                   think has, been pretty well covered by my  
7                   predecessor discussion, predecessor speakers.

8                   It is important, I think, to  
9                   understand the approach to, that industry  
10                  takes these days, and Phil Brochman has  
11                  touched on that, on how he approached beyond-  
12                  design-basis events, and this is, by the use  
13                  of an effective, tiered, deterrence and  
14                  resistance approach involving security systems  
15                  both national and local, security forces,  
16                  national and local, and the use of  
17                  conservative, robust, and resistant  
18                  technologies.

19                  Why do some people feel hardening  
20                  is necessary? Well, perhaps some people are  
21                  unaware of the system design margins that are  
22                  available to address beyond-design-basis

1 events. We use very conservative codes and  
2 standards. The materials that we use have much  
3 greater energy absorption capabilities than  
4 the codes and standards and regulations that  
5 we use allow for.

6 Second of all, we have protective  
7 overpacks. Protective overpacks are layered  
8 with external shells of materials. These  
9 external shells are not really challenged by  
10 design-basis events, and why is that?

11 Well, there is a unique feature  
12 with respect to nuclear packagings. We have to  
13 shield for gamma radiation. Gamma radiation is  
14 shielded by heavy, dense materials. These  
15 shielding materials have to be part of the  
16 structure and remain in place.

17 Therefore, they provide structural  
18 support well beyond the  
19 confinement/containment boundary that we have  
20 in a nuclear packaging. This is why a nuclear  
21 packaging is more structurally robust than  
22 other hazardous material packagings.

1                   We've demonstrated this with  
2                   aircraft impact evaluations of our systems,  
3                   showing that under aircraft impact, we do not  
4                   have any releases from the  
5                   containment/confinement system. Do a quick  
6                   look at typical NAC technology. Two components  
7                   that are visible here, the inner one is the  
8                   canister system in which the spent fuel is  
9                   retained and contained and confined.

10                   The outer system is the vertical  
11                   concrete cask, or VCC as it's known. This is  
12                   where we have the protective overstructure. We  
13                   see there concrete with density-improving  
14                   aggregates. We have rebar cages, either single  
15                   or multiple.

16                   And finally, on the inner part  
17                   there, we have a thick, steel shell, a thick  
18                   steel shell. I typically refer to it as  
19                   canister armoring in terms of beyond-design-  
20                   basis events because it does provide a  
21                   substantial amount of protection for the inner  
22                   canister.

1                   Other people feel hardening is  
2                   required because we are in the nuclear  
3                   business and nuclear seems to be associated  
4                   with some unique, very large radiological risk  
5                   for the public. There is a public health and  
6                   safety threat that is viewed as being highly  
7                   unique to nuclear.

8                   Once again, let me reemphasize  
9                   that design-basis events do not result in  
10                  releases. We're talking strictly about beyond-  
11                  design-basis events. Many analyses have been  
12                  done for beyond-design-basis events, a lot of  
13                  testing has been done over the last two or  
14                  three decades.

15                  Most recent analysis done by the  
16                  DOE was in the Final Supplemental  
17                  Environmental Impact Statement for Yucca  
18                  Mountain, doing a terrorist attack with one of  
19                  the weapons described by Mr. Thompson. They  
20                  did the analysis with a transportation  
21                  packaging, transportation package showing a  
22                  variety of outcomes depending on population

1 density.

2 The peak was 47,000 person-rem for  
3 a high-population density. The lowest was 92  
4 person-rem for a low population density.

5 Since storage packagings and  
6 transportation packagings have roughly the  
7 same penetration resistance you might  
8 associate the lower number here, the 92, with  
9 a storage site, since the population densities  
10 within fifteen or twenty miles of all reactor  
11 sites are less than 150 people per square  
12 kilometer, typically in the range of 110 to  
13 125.

14 So, there are far more analyses  
15 that have shown a variety of numbers and a lot  
16 of them much lower than the DOE numbers. The  
17 DOE numbers were done fairly conservatively,  
18 I believe.

19 But, at any rate, taking any of  
20 these range of population doses and putting  
21 any kind of credible sabotage probabilities  
22 associated with it, you see a fairly low risk.

1 But, again, this is looking at the nuclear  
2 experience in a vacuum. Anything that happens  
3 with the nuclear is automatically a threat.

4 We need to take a comparative look  
5 at things and see, is there some standard,  
6 some reasonable, objective standard, to which  
7 we can resort that shows the society's  
8 comparative radiological risk from a beyond-  
9 design-basis event? And I would submit there  
10 is.

11 A reasonable standard arises from  
12 non-nuclear industries. Non-nuclear  
13 industries, those select fifteen or twenty  
14 industries that expose populations to very  
15 large doses annually, decade after decade.  
16 These industries are not regulated to control  
17 their population dose characteristics.

18 I've listed the industries here  
19 that you can, you can see. All of these  
20 industries produce population doses that are  
21 log-normally distributed, which means that we  
22 have some very potentially relatively high

1 population doses out in the tail of the log-  
2 normal distribution.

3 So, what I would suggest here is  
4 that, one reasonable standard, is that we  
5 compare hypothetical, hypothetical dose  
6 consequences from a beyond design basis event  
7 with actual numbers that we experience in a  
8 number of non-regulated, non-nuclear  
9 industries.

10 I put together this table from  
11 published research and shown the seven  
12 industries. You can see a range of exposures  
13 there, from annual doses to exposures over the  
14 last fifty years, to prospective exposures  
15 over the next fifty years.

16 I've compared that to some, to, to  
17 some radiological releases that might occur  
18 with respect to storage and transportation  
19 systems that are in support of a growing  
20 economy, a growing use of nuclear energy. I've  
21 shown breach events and non-breach events. On  
22 a comparative basis, you can see that some of

1 these beyond-design-basis events are not a  
2 terrible threat to the society's accepted  
3 comparative risk with respect to radiological  
4 releases.

5           Are there liabilities of over-  
6 structure hardening? And, again, I'm really  
7 just addressing the HOSS concept. As Phil  
8 Brochman pointed out, this is not a  
9 terminology that's used by the NRC or the  
10 industry. Rather, this is a development by Dr.  
11 Thompson. This is his concept, and you can see  
12 his figure that he proposed, which is really  
13 just an 80-year old munitions bunker design  
14 that has been reconfigured to store vertical  
15 concrete casks.

16           I show here some of the  
17 liabilities associated with over-structure  
18 hardening, with the HOSS concept. Operational  
19 -- besides installing it -- the difficulty in  
20 that, the routine, the normal operation  
21 problems are significant.

22           The largest threat, though, the

1 potential concern that I would have most  
2 highly on my list, is the response of recovery  
3 staff after a beyond-design-basis event. It is  
4 fairly likely that the HOSS structure is not  
5 the ideal structure for a certain range of  
6 beyond-design-basis events and that there is  
7 collapse possibility.

8           Once you have a collapsed,  
9 hardened over-structure around a storage  
10 module, you've perhaps compromise cooling  
11 flow, you perhaps make it very difficult for  
12 recover staff to get access to the storage  
13 system to make sure that the system can be up  
14 righted if necessary, can be repaired, can be  
15 properly shielded.

16           So, my own personal concern is  
17 more along the lines of the recovery staff  
18 health and safety. With these types of  
19 liabilities, the benefit cost ratio does not  
20 appear particularly attractive for the HOSS  
21 concept, which is all I'm talking about.

22           Conclusions follow the

1 presentation. There is a number of issues  
2 associated with the HOSS concept. There is  
3 really no discernable, clear benefit to public  
4 health and safety or worker health and safety.  
5 Therefore, it would be my suggestion that the  
6 industry is best served to continue with it's  
7 effective, tiered deterrence and resistance  
8 strategy, effective security systems,  
9 effective security forces, and the continued  
10 use of the conservative, robust, and resistant  
11 technologies.

12 That concludes my remarks, thank  
13 you very much.

14 CHAIR SHARP: Thank you. We now  
15 welcome Christopher Earls.

16 MR. EARLS: Thank you. Excuse me. I  
17 want to thank you for inviting me here to  
18 talk to you about security. What I would like  
19 to do today is give you a brief overview of  
20 the security measures that we employ at power  
21 reactors and how those measures apply to  
22 current ISFSI facilities and may apply in the

1 future.

2 I'll really build upon some of the  
3 concepts that Phil mentioned earlier. The  
4 starting point is the design-basis threat.  
5 What the NRC does for the power reactors, and  
6 does this on a routine basis, is that they  
7 collect information from the various  
8 intelligence agencies and other groups that  
9 identify the various threats, both foreign and  
10 domestic.

11 They take this information along  
12 with studies and assess what the real threat  
13 is the commercial nuclear power plants. In  
14 addition to that, they look at the various  
15 threats and consider to what extent can a  
16 commercial facility address those issues.

17 All of those factors go into  
18 developing what we call the design-basis  
19 threat. And, as I said, that's assessed on a  
20 yearly basis and frequently changes. Since 9-  
21 11, we've changed that a couple of times.

22 The DBT, or design-basis threat, really

1       lays out the foundation for how we build our  
2       defensive strategies for the plant. Once we  
3       know what the design-basis threat is then we  
4       know how to establish measures at the plant.  
5       You know, what are the appropriate strategies.

6               But, in addition to that, the NRC  
7       provides us with detailed regulations.

8       Everything we do in security is driven highly  
9       by regulations. 10 CFR Part 73 is the base  
10      regulation that covers most of it, and in  
11      fact, we've just had a recent revision of that  
12      that went into effect in 2009.

13              What I'll do now is describe some  
14      of those measures that we employ. At a typical  
15      site, we have various zones on the, on the  
16      property. Each of the zones get a different  
17      level of security.

18              I'll start with the outermost zone  
19      in what we call the owner-controlled area. You  
20      can think of that as just, as the name states,  
21      it's the property on which the plant sits on.  
22      That's the owner-controlled area.

1                   For that, we have what I would  
2                   call a basic industrial security. You might  
3                   have a fence around the site. You have a  
4                   vehicle access point where vehicles entering  
5                   the site, the individuals are asked to  
6                   identify themselves and are subject to a  
7                   random search.

8                   Inside the owner-controlled area,  
9                   you would typically find your administrative  
10                  buildings, your warehouses, some of the  
11                  support structures for the plant. The next  
12                  zone that you enter into at the plant is what  
13                  we call the protected area and that's the real  
14                  focal point of security at a power reactor.

15                  That, that is where we, we, we  
16                  strictly control access and make sure that  
17                  only authorized folks get in there. To enter  
18                  a protected area, first, an individual must  
19                  go through an extensive background  
20                  investigation. It involves a criminal history  
21                  check with the FBI, checks with terrorist  
22                  watch list.

1                   There's also psychological  
2                   evaluations that are done. We employ a fitness  
3                   for duty or drug and alcohol testing program.  
4                   An individual has to go through all of that  
5                   before than can become authorized to go into  
6                   the protected area unescorted. Once an  
7                   individual has received that authorization to  
8                   enter into the plant, they have to go through  
9                   a typical security search process, similar to  
10                  what you would find at an airport.

11                  They'll go through an explosive  
12                  detector, a metal detector, and can be subject  
13                  to patdown as necessary and appropriate. Once  
14                  an individual has gone through that process,  
15                  they then enter the plant through, typically,  
16                  a turnstile situation where they use their  
17                  badge, and they have a biometric type  
18                  operation, typically a hand geometry. So, that  
19                  what we do is verify the individual is, that's  
20                  trying to use the badge is, in fact, the right  
21                  person.

22                  All right. So, the protected area.

1 As I said, that's the focal point of the  
2 security defenses. What you will see, we have  
3 a protected area barrier, it's typically a  
4 series of fences. You will have isolation  
5 zones, you will have various intrusion  
6 detection methods and not just one, there are  
7 multiple layers.

8 In addition to that, we have  
9 camera systems that include thermal imaging,  
10 closed-circuit TV that allows us to do  
11 playback of any potential intrusions. If we,  
12 all of these systems have an alarm function.  
13 All of this information is fed into a central  
14 alarm station that's manned 24 hours a day,  
15 you know, 365 days a year.

16 In addition to that, we have a  
17 secondary alarm station which has all the same  
18 functionality as the central alarm station,  
19 and, so, you can think of it as a redundant  
20 system so if we have a problem in our central  
21 system, we have a backup that maintains all  
22 the command and control and surveillance.

1                   In addition to the intrusion  
2                   detection systems that we have at the fence,  
3                   we also have an extensive response team of  
4                   security officers that are highly trained. We  
5                   have various positions throughout the planned  
6                   that are manned 24 hours a day in bullet  
7                   resistant enclosures typical of what you might  
8                   see at a prison, you know, the overlook watch.

9                   In addition to that, we have  
10                  roving officers, all of which have been  
11                  factored into the defensive strategy. There is  
12                  an extensive training program for these  
13                  officers. Each officer is required to  
14                  participate in a minimum of four exercises a  
15                  year, and that's in addition just to the  
16                  various drills they might run for certain  
17                  aspects.

18                  The, I think, right now, we  
19                  probably have upwards of 8,000 officers  
20                  manning the various plants. They received over  
21                  200 hours of training a year, so these guys  
22                  are very, very well trained. In addition to

1 that, we have the NRC come in on a tri-annual  
2 basis to conduct force-on-force exercises.

3 Those of you familiar with DOE  
4 facilities are probably familiar with this  
5 type where we will take a mock adversary force  
6 and have them come in and test the site's  
7 protective strategy. You know, it's not enough  
8 to say that you can do something, you have to  
9 be able to demonstrate that you can do it, and  
10 we run those on a tri-annual basis.

11 And I can tell you those are very,  
12 very challenging. The folks that, that consist  
13 -- the adversary folks are highly trained. The  
14 team leaders are typically special operations  
15 folks, so while we expect our typical  
16 adversary will be not that well trained, the  
17 folks that are testing our facilities are that  
18 well trained. And, as a result, they really  
19 challenge us and we, we learn a lot through  
20 those exercises.

21 In addition to, to the background  
22 investigations that I told you, all of our

1 employees are trained on behavioral  
2 observation. That's particularly important in  
3 today's environment. As the homegrown  
4 terrorist becomes more and more of a concern  
5 to us, we are more and more focused on the  
6 insider threat and so we have a behavioral  
7 observation program. Every employee is trained  
8 to look for aberrant behavior and report that.

9 We also monitor any problems  
10 individuals may be having off-site in terms of  
11 arrest and that sort of thing. And, finally,  
12 in the interest of time, I will shift to ISFSI  
13 security. So, how is all that matter to ISFSI?  
14 Well, in the various configurations that we  
15 have today, the, it's a direct impact and then  
16 there's an indirect.

17 For the ISFSI facilities that are  
18 located within the protected area of a power  
19 reactor, they are able to take the full  
20 benefit of the security measures that we use  
21 for the plant.

22 So there isn't a separate response

1 force in terms of that, so while the basic  
2 requirements for an ISFSI facility is to  
3 deter, detect, and notify, in the case of a  
4 facility that's inside a protected area,  
5 there's also an interdiction piece to it, just  
6 by the nature of where it's located.

7 With regards to the ISFSI  
8 facilities that are outside of our protected  
9 area but within the owner-controlled area,  
10 there's also a tie between the power reactor,  
11 security force, and that facility. Typically,  
12 there are armed responders that are segregated  
13 from the power reactors force, whose primary  
14 duty is to respond to any alarms or any  
15 indications of intrusion at our facilities.  
16 And, so, there is what I'll call a modified  
17 response there.

18 And then, the final situation is,  
19 is for standalone decommission site and that  
20 falls into truly, the category that Phil  
21 described which is the detect, deter, and  
22 notify.

1                   What I would tell you in  
2                   conclusion is that with the way we do business  
3                   and security, if we determine that the risk or  
4                   the treat to the ISFSI facilities is increased  
5                   from what we believe it is today, we are well-  
6                   prepared to adjust to that, and, in fact,  
7                   that's what we do routinely at the power  
8                   reactor so it's not a, not an unusual  
9                   situation for us to make changes like that so  
10                  in the event that rulemaking requires a  
11                  interdiction strategy, we're well prepared to  
12                  deal with that.

13                  I'll be glad to answer any  
14                  questions at the end, if you have any. Thanks.

15                  CHAIR SHARP: Thank you very much.  
16                  Now turn to Bob Halstead.

17                  MR. HALSTEAD: Well, thank you very  
18                  much for the opportunity to be here today,  
19                  members of the Commission. I'm going to do  
20                  something different based on my past  
21                  experience of getting to the bottom line in my  
22                  own presentations, which is, I'm going to

1 start with the conclusions first.

2 How do we manage and reduce the  
3 risks of transportation security? First,  
4 perhaps the major lesson learned from all the  
5 Yucca Mountain transportation security and  
6 safety risk analysis is to select sites and  
7 design transportation systems that are  
8 designed to minimize the number of shipments,  
9 reduce the number of shipment miles.

10 Secondly, radiological risk  
11 reduction is most easily achieved by shipping  
12 the oldest fuel first. Now, this is not  
13 necessarily convenient for the utilities,  
14 particularly as more and more of the older  
15 fuel has been gone, has been put into dry  
16 storage, so maybe I'd rephrase this to say  
17 ship the oldest available fuel first.

18 But, the reason for this is that  
19 there's an enormous radiological hazards  
20 reduction shipping fifty year cooled fuel as  
21 opposed to ten year cooled fuel, particularly  
22 because of the half-life decay of cesium-137

1 and strontium-90.

2           So, you get at least a 50%  
3 reduction in the release that would occur in  
4 a successful terrorist attack and you also get  
5 some other benefits in terms of routine  
6 radiation to workers and the public during  
7 shipments.

8           Maximize rail, requiring use of  
9 dedicated trains, is a recommendation that has  
10 come from many parties, not the least of which  
11 are the railroads, who are not anxious to ship  
12 all of this spent fuel, but certainly prefer  
13 to have it shipped in dedicated trains.

14           NRC regulation of all repository  
15 or storage shipments as if they were NRC  
16 utility licensees is very important because  
17 DOE shipments are at present exempt from the  
18 physical protection requirements. Assessing  
19 the implications of the new transportation  
20 security pipeline and hazardous material  
21 safety administration regulations for rail  
22 shipments of hazardous materials in urban

1 areas and through -- along routes that are in  
2 close proximity to what are called iconic  
3 targets and places of congregation is also  
4 important.

5 On the one hand, these regulations  
6 offer some real benefits in terms of reducing  
7 both the probability of an attack and the  
8 consequences of an attack. On the other hand,  
9 they are so complex and we don't know at this  
10 point how these regulations which were just  
11 adopted, really just went into effect about  
12 eighteen months ago, they actually posed the  
13 potential that they're so complex that they  
14 may complicate the logistics of transportation  
15 planning.

16 My last three points apply to  
17 security as well as safety. We believe that  
18 full scale cast testing should be required,  
19 regulatory sequential testing for the rail  
20 casks, an extra-regulatory fire test for the  
21 truck cask. This basically follows the  
22 decision that the Nuclear Regulatory

1 Commission made in their final enactment on  
2 the package performance study recommendations.

3 Secondly, adopting the  
4 transportation protocols for accident  
5 prevention and emergency response which have  
6 come out of the deliberations over, really,  
7 twenty years, between the effective states,  
8 the State regional groups in the Department of  
9 Energy, for shipments of transuranic waste to  
10 the Waste Isolation Pilot Plant in New Mexico.

11 Now, it's true that TRU waste  
12 shipments are considerably less dangerous than  
13 spent fuel, but a lot has been learned about  
14 the advantages of those extra-regulatory  
15 protocols.

16 And, finally, a comprehensive  
17 human factors management plan similar to what  
18 the Federal Railroad Administration adopted by  
19 rulemaking in 2008 for railroad shipments of  
20 all materials, should be developed, targeted  
21 on all aspects of loading, shipment, and  
22 unloading.

1                   And, all right. Having gotten the  
2 bottom line out of the way, I'm going to  
3 quickly go back to my original slides, if I  
4 can do this. Most of what I have to say is  
5 summarized in my pre-filed, one-page  
6 statement. But I want to say a few things in  
7 general and show you some pictures.

8                   It's important to understand as we  
9 look at all these different aspects of  
10 security, that once a repository opens,  
11 transportation and transportation security are  
12 concerns for at least fifty years, and that  
13 means that security planners have to deal not  
14 only with unpredictable events but the  
15 realities of history, that security systems  
16 have to operate in periods of prosperity and  
17 recession, peacetime and war. They have to  
18 accommodate natural disasters and civil  
19 disorders. They have to assume that there will  
20 be continual changes in the threat environment  
21 that require changes in strategies and  
22 tactics.

1                   One thing that does seem to be  
2 safe to assure, however, is that there will  
3 never be enough funding for transportation  
4 infrastructure, maintenance, and upgrades, and  
5 there will never be enough funding for police  
6 and fire services.

7                   Now, turning to the debate over  
8 the last thirty years on transportation  
9 security, it's basically focused on  
10 radiological sabotage, which the NRC defines  
11 as "any deliberate attempt to directly or  
12 indirectly endanger the public health and  
13 safety by exposure to radiation", and the  
14 debate within the debate has focused on the  
15 vulnerability of shipping casks to attacks  
16 using a variety of explosive devices.

17                   This is not to say that theft for  
18 purposes of diversion, theft for purposes of  
19 extortion, violent protest demonstrations, and  
20 other security matters are not also a concern.  
21 I'd be happy to talk about those. But the  
22 issue that's gotten the most attention has

1 clearly been radiological sabotage.

2 Now, you'd think in thirteen  
3 bullets I wouldn't have missed anything  
4 significant. In fact, I did. In 2005, the  
5 Energy Policy Act adopted a list of twelve  
6 factors that the NRC had to consider in their  
7 design-basis threat update, and one of these  
8 is very important for transportation.

9 It says that the NRC must consider  
10 the potential for attacks on spent fuel  
11 shipments by multiple, coordinated teams of a  
12 large number of individuals, and this really  
13 brings a lot of the last thirty years' debate  
14 into focus.

15 And, over the last five years,  
16 with that decision, the way the DOE approached  
17 these issues in their Final Supplemental EIS  
18 for Yucca Mountain in the TSA and FRA rail  
19 regulations, the fact that the NRC  
20 Construction Authorization Board admitted  
21 sixteen transportation contentions posed by  
22 the State of Nevada, nine of which directly

1 related to transportation security, and would  
2 presumably be fully discussed if the licensing  
3 proceeding were to resume.

4 And, finally, there is the recent  
5 action in July of this year by the Commission  
6 to move forward with a proposed rulemaking  
7 developed by their staff which incorporates  
8 pretty much all the recommendations that the  
9 State of Nevada made in its 1999 petition for  
10 rulemaking, plus the accumulated experience  
11 since 9-11, plus the findings of all the  
12 classified NRC consequence assessments.

13 So, the good news story is, after  
14 thirty years of debate, in the last five years  
15 or so I think we've moved towards a resolution  
16 of issues that is generally satisfactory to  
17 most of the people who have been adversarial  
18 combatants in this debate. It's nice to see  
19 that occasionally the rulemaking process and  
20 these policy debates actually move, you know,  
21 toward some resolution.

22 Let me quickly address the issue

1 of why repository operations, regardless of  
2 location, raise special transportation  
3 security risks. Any repository transportation  
4 plan is likely to involve about the same  
5 number of shipments that Yucca Mountain would  
6 have, which is 100 to 150 dedicated trains,  
7 200 trucks per year, every year, for fifty  
8 years. Dramatically different than what's  
9 happened in the past.

10 And while this is a map showing  
11 the impacts of transportation to Yucca  
12 Mountain, it's not that different from the  
13 nationwide impacts that you'd see if the  
14 repository were located in the Wolf River  
15 Batholiths in Wisconsin, or at Davis Canyon,  
16 Utah, or at some of the other sites, or even  
17 the PFS site in Utah.

18 So, one thing to keep in mind is  
19 there will be large numbers of shipments  
20 affecting millions of people in hundreds of  
21 jurisdictions, and certain cities like Chicago  
22 that are rail hubs are going to be affected.

1 Let me show you just a couple pictures from  
2 the tests that were done on explosives against  
3 casks.

4 The real importance of this 1982  
5 test is that the Army ballistics research lab  
6 at Aberdeen did a peer review which triggered  
7 the thirty years' debate over how to define a  
8 maximum credible attack scenario. And this  
9 test, which was done by a private company,  
10 ironically to demonstrate hardened target  
11 techniques where two tests were done, a  
12 Vietnam-era warhead missile against a German  
13 castor cask and its transport configuration,  
14 where you see it penetrated here.

15 But then, when the same test was  
16 replicated with a concrete jacket around the  
17 cask, barely the outer skin of the transport  
18 cask was damaged. Finally, just referring to  
19 the same consequence assessment that Charlie  
20 talked about, on the one hand, the DOE  
21 environmental impact statement is the best  
22 available document that summarizes all these

1 issues.

2 At the same time, the State of  
3 Nevada has critiqued all of those. We think  
4 the consequences of a successful event would  
5 be at least ten times greater, possibly 100 or  
6 200 times greater, and the economic impacts of  
7 cleanup are much likely to be of great concern  
8 than the radiological health effects. Thank  
9 you.

10 CHAIR SHARP: Thank you very much.  
11 We now welcome Captain Tamara Baker.

12 MS. BAKER: It's Tamara.

13 CHAIR SHARP: Tamara.

14 MS. BAKER: Yes. I would like to  
15 start by giving you a little background. I am  
16 a Captain with the South Carolina Law  
17 Enforcement Division, and we are State police  
18 in South Carolina. I've been employed by SLED,  
19 as it's affectionately called, for 28 years,  
20 and I've been in my current position for over  
21 ten.

22 I have participated in four fixed

1 nuclear facility DHS comprehensive reviews,  
2 and I've had numerous -- too many to count --  
3 hours of training in enhanced threat and risk  
4 assessment, threat vulnerability, terrorism  
5 and terrorism trends and tactics. I am a  
6 certified train-the-trainer in shipment  
7 tracking program. I'm responsible for the  
8 coordination and development of the DHS buffer  
9 zone planning for critical infrastructure in  
10 South Carolina.

11 I've also participated in the  
12 Southeast -- Southeast Transportation Corridor  
13 pilot in South Carolina by the DHS Domestic  
14 Nuclear Detection Office. Our agency has also  
15 participated in numerous force-on-force  
16 exercises that Mr. Earls was talking about  
17 earlier at the nuclear facilities.

18 My unit, the Protective Services  
19 Emergency Management Unit, coordinates and  
20 provides escort and security for spent nuclear  
21 fuel from foreign research reactors from  
22 around the world. It arrives in the port of

1 Charleston, and security is provided for that  
2 shipment -- whether it is transported by rail  
3 or truck -- between the Charleston Naval  
4 Weapons Station and the Savannah River site,  
5 which is located in Aiken, South Carolina.

6 We have also participated and  
7 assisted, and assisted with MOX shipments of  
8 plutonium. We conduct law enforcement escorts  
9 for domestic research reactor spent fuel from  
10 universities from their arrival at our State  
11 line of South Carolina to the Savannah River  
12 site. We are also responsible to provide  
13 escort for commercial reactor spent fuel  
14 shipments.

15 In addition, we have established  
16 emergency response plans to back up the  
17 physical security posture of stored spent  
18 nuclear fuel at five of the commercial  
19 reactors that we have present in South  
20 Carolina. Over the last seven years, I have  
21 participated in or coordinated ninety-four  
22 shipments of some type of spent fuel. In all

1 of those, we have had to incidences, two  
2 incidents and no accidents.

3 The incidents involved a flat tire  
4 on a truck and, with no accident, and a train  
5 fanatic in a small town. We believe that the  
6 risk -- and I'm not sure if that's the right  
7 word, I'm not supposed to use "fanatic"  
8 anymore, I think it's something. Okay, we  
9 believe the risk to the public from  
10 transportation of spent nuclear fuel is low  
11 and manageable, especially when compared to  
12 the risk presented by other hazardous  
13 materials that are, is transported throughout  
14 our State on a regular basis.

15 So, to address the security  
16 concerns or issues relative to transportation,  
17 I would like to -- I would like to examine the  
18 issues one at a time. The first one is threat  
19 assessment. Both SLED and DOE request threat  
20 assessments prior to our foreign research  
21 reactor shipments, in addition to all the  
22 others.

1                   And there, we actually ask for the  
2                   threat assessment. We believe this provides us  
3                   with an understanding of the security  
4                   environment relative to our activities.

5                   The second is operational  
6                   planning. Prior to each shipment, we  
7                   coordinate and develop an incident action  
8                   plan. This coordination is done with Federal,  
9                   State, and local officials and law enforcement  
10                  agencies, who assist us in these escorts. We  
11                  also conduct separate meetings, one for the  
12                  civilian activities that are associated with  
13                  the transport, and one for the agencies  
14                  involved in the security detail.

15                  We review our plans and provide a  
16                  -- a reminder of the pertinent details to  
17                  ensure all personnel know their position and  
18                  their roles and responsibilities. We carry all  
19                  the proper equipment, and we and specialty  
20                  personnel have the equipment they need for  
21                  that. We do not become complacent, and  
22                  everyone is cross-trained in each other's

1 responsibilities.

2           Equipment that we're issued are  
3 personal dosimeters, and some of the trained  
4 officers carry radiation detection equipment  
5 just in case. And there are also rapid  
6 assessment teams, both Federal and local, that  
7 are present and available if needed. The third  
8 topic or issue is transportation routes and  
9 timing.

10           Routes are determined with regard  
11 to the type of the highway, the location of  
12 schools and hospitals, the length of the  
13 route, and selection of appropriate safe  
14 havens in case there is a flat tire or some  
15 kind of mechanical issue with the vehicle or  
16 the mode of transportation, and those have  
17 been used in the proper way before.

18           All of these items can affect the  
19 risk management. The routes should also avoid  
20 towns with heavy traffic periods, like a rush  
21 hour and/or special occasions. If there are  
22 campaigns with numerous shipments, it is

1       advisable to alter schedules so they do not  
2       become predictable.

3                   Number four is information  
4       availability. It is important to balance  
5       public need-to-know with security interests.  
6       We believe the public has a right to know that  
7       the spent fuel will be moved, but they have no  
8       right to know the schedules or other  
9       information that would jeopardize our security  
10      plan or aid a potential adversary.

11                   It is important that each person  
12      or group involved with the spent nuclear fuel  
13      have a knowledge that they need to do their  
14      job, and awareness of the legal obligation to  
15      protect that knowledge. This includes  
16      notification of law enforcement agencies, to  
17      make them aware of the shipment so that, if  
18      help is needed when we pass through their  
19      jurisdiction, that they understand the nature  
20      of the activity that they are going to be  
21      called on to support.

22                   The fifth is accessibility.

1 Foreign research reactor shipments are  
2 typically carried in a very heavy transport  
3 container. This both protects and limits  
4 access to the material. A crane is needed to  
5 move the transport containers. These  
6 containers provide considerable protection for  
7 the material inside, and prevent release in  
8 accident conditions.

9 The sixth is communication.

10 Foreign reactor shipments have a global  
11 positioning locator. This provides continuous  
12 position information to our communications  
13 center and multiple means of communication  
14 between the security detail and local law  
15 enforcement. Assistance can immediately be  
16 requested in case of a need.

17 I believe that the associated  
18 security concerns related to the  
19 transportation of spent nuclear fuel are  
20 manageable with proper planning, and should  
21 not be an impediment to decisions concerning  
22 moving used nuclear fuels.

1           Most of the foreign shipments that  
2           I've been talking about are highly enriched.  
3           They have about a 20 percent -- and I am not  
4           technical any way, shape, or form by the rest  
5           of the members on this panel -- but I do know  
6           that it is some bad stuff compared to what,  
7           the other ones that we have actually  
8           transported, which are from the university,  
9           which is also highly enriched, and then from  
10          the nuclear facilities or the commercial  
11          power, it's, I understand, a three to five low  
12          enriched uranium.

13                 If the shipments increase, we will  
14          need to be more careful, change our plans  
15          around, conduct monitoring -- and utilization  
16          of additional resources may be needed. And at  
17          a time when the economy is so bad, our  
18          resources are low and of course we, as  
19          everybody, we would need additional resources.

20                 The benefits of having fuel at an  
21          alternate site is that it is not close to the  
22          public or stored close to the public, and

1       considerations is just the fact that it's  
2       going to cost us more resources with more  
3       shipments. Thank you for having me.

4               CHAIR SHARP: Thank you very much,  
5       Captain Baker. We're now ready for questions  
6       from our panel. Are there, members of the  
7       Commission like to ask? Co-chairman Meserve?

8               CHAIR MESERVE: I have a few  
9       questions. Mr. Brochman, you indicated that  
10      there is a paper that is currently before the  
11      Commission. Will that paper cause the  
12      Commission to address this issue you mentioned  
13      about whether the strategy should be denial,  
14      versus detect-and- communicate? Is that, is  
15      that, is that issue before the Commission now?

16              MR. BROCHMAN: No. I, let me -- the  
17      Commission in its 2007 decision recommended or  
18      directed the staff to use a dose-based  
19      approach. The comments we got from the public  
20      and other stakeholders were opposed to that.

21              The paper before the Commission  
22      right now is to basically recommend -- I'll

1 call it an interim step. Should the staff  
2 pause, or should it adopt the comments that  
3 were given by industry, or proceed with the  
4 original direction. The likelihood is that we  
5 will take nine months to a year to do that  
6 analysis, have the interactions with  
7 stakeholders, and then potentially, if we're  
8 going to change directions, submit a  
9 supplemental paper to the Commission.

10 CHAIR MESERVE: Mr. Earls, you had  
11 mentioned that ISFSIs that happened to be in  
12 the protected area have the benefit of the  
13 full capabilities of the protective system  
14 that exists around nuclear power plants. Do  
15 you have data at hand as to how many of the  
16 ISFSIs at plants are within the protected  
17 area, versus those that are outside and are  
18 subject to ISFSI strategy?

19 MR. EARLS: I can't answer that,  
20 but Phil might be able to help with that one.

21 CHAIR MESERVE: No, that's one of  
22 the questions.

1 MR. EARLS: Yes, I'm sorry. I  
2 don't, I don't know, it's --

3 MR. BROCHMAN: A third to a half.

4 MR. EARLS: Yes. My guess would  
5 have been a third, so it's not a large  
6 majority or anything. I think there's just a  
7 handful of the decommissioning sites and then  
8 the, the rest of them are split between inside  
9 the PA and the owner-controlled area.

10 CHAIR MESERVE: If you had more  
11 specific data on that, that would be useful--

12 MR. EARLS: Oh, we can, we can  
13 absolutely provide that information, I just  
14 don't know it off the top of my head.

15 CHAIR MESERVE: Mr. Halstead, you  
16 mentioned that for DOE shipments, that they're  
17 not subject to NRC regulations, and you  
18 recommended that they be subject to NRC  
19 regulations. I don't think there should be any  
20 implication, I want to clarify this, that the  
21 DOE shipments are not subject to security  
22 controls. I'm very confident that there are

1 DOE orders that cover them, that provide for  
2 security of such shipments. Am I -- do you  
3 disagree with that?

4 MR. HALSTEAD: Yes and no. DOE's  
5 own regulations require them -- where they are  
6 not subject to the commission's regulations --  
7 to adopt their own, supposedly equivalent,  
8 regulations. It has been our position since  
9 1999 when we filed the petition for rulemaking  
10 that not only would there be a material  
11 improvement in security if the DOE shipments  
12 were regulated for safeguards purposes as if  
13 they were utility shipments.

14 It also would enhance public  
15 acceptance and confidence in those shipments.  
16 As it is now, no one enforces DOE's self-  
17 regulation, and in fact, you may recall that  
18 you addressed this matter in some great detail  
19 in May of 2002 in your letter to Senator  
20 Durbin, and that is still the key document in  
21 discussion of this portion.

22 CHAIR MESERVE: Yes, I believe that

1       there was an issues as to self-regulation, but  
2       that does not mean that they're not  
3       requirements that the DOE is required to  
4       impose, and I don't -- there's no independent  
5       assessment by a different, by a separate  
6       regulatory agency.

7                   MR. HALSTEAD: Well, let me add on  
8       that the Commission in July of this year, in  
9       adopting SECY 09-0162 -- and forgive me, it's  
10      the only shorthand way to refer to these  
11      documents, because they have such long titles  
12      -- the Commission adopted the draft  
13      enhancement of physical protection  
14      requirements proposed by the staff in  
15      December.

16                   And then they had one of the  
17      longest list of add-ons for specific things  
18      that the staff had to address before they  
19      proceed to rulemaking that I've ever seen,  
20      probably Phil, too. And they specifically said  
21      "oh, there is this issue about the DOE  
22      shipments," so, in the proposed rule and the

1 draft regulatory guidance to accompany it,  
2 supposedly the staff is going to give a  
3 description of how the DOE safeguards planning  
4 is similar to and different from. So that,  
5 that I think will enhance our understanding of  
6 this point.

7 CHAIR MESERVE: Okay. Mr. Thompson,  
8 Mr. Pennington, in his comments had made some  
9 -- an analysis or assertions about the risks  
10 associated with hardened systems, and that  
11 they might compromise the cooling of, of the  
12 storage casks, and in fact would enhance risk.  
13 I wondered if you had a response to that.

14 MR. THOMPSON: Well--

15 MR. FRAZIER: Turn your mic on.

16 MR. THOMPSON: I welcome the fact  
17 that he opens up this issue of comparative  
18 risks. In order to compare them, you have to  
19 know what they are to begin with, and the  
20 burden of my testimony was that the NRC simply  
21 does not know what the risks are, of storing  
22 spent fuel in pools or in dry storage modules.

1                   And, until such time as this risk  
2                   is properly understood, it's impossible to  
3                   have a comparative analysis. And that's a  
4                   lengthy subject, and I could go on at any  
5                   length necessary. Trying to cut to the chase,  
6                   the -- and it would help if I could bring up  
7                   one of my slides, I don't know if that's  
8                   possible. Is that possible, sir?

9                   MR. FRAZIER: Just a moment.

10                  MR. THOMPSON: If it's not  
11                  possible, let me know, and --

12                  MR. FRAZIER: No, they'll take care  
13                  of it, just a second.

14                  MR. THOMPSON: Thank you. Okay,  
15                  this is a Holtec module, relatively typical.  
16                  The -- you'll see the bulk of it is concrete,  
17                  the outer layer is maybe three-quarter or an  
18                  inch thick carbon steel, maybe 25 to 30 inches  
19                  of concrete in a level inch, inch-and-a-half  
20                  of carbon steel gap, half- inch stainless  
21                  steel for the inner module, and then you're  
22                  into the spent fuel zirconium cladding, highly

1 combustible.

2           You'll see air enters at the  
3 bottom, leaves at the top. We're all familiar  
4 with how you start charcoal on your charcoal  
5 grill -- you have a little can with holes in  
6 it, you put your charcoals in, you light it,  
7 and it burns very nicely and gets your  
8 charcoals going nice and hot. Knowing that,  
9 anyone who wants to attack one of these  
10 modules is obviously going to say, "let's  
11 start a fire in it."

12           And they're going to open it up,  
13 top and bottom, and they're going to use an  
14 incendiary device, and they're going to ignite  
15 the zirconium. There's enough chemical energy  
16 that's going to be released that way to boil  
17 out a substantial fraction of the cesium-137  
18 in that module.

19           Typical module has about one to  
20 one-and-a-half million curies of cesium-137,  
21 which is about half the release from the  
22 Chernobyl accident of 1986. The land

1       contamination from that one incident would be  
2       very substantial, because it's a low level  
3       release, and NRC has never analyzed the  
4       scenario I just described.

5               They specifically rejected that  
6       scenario in testimony before the Commissioners  
7       on July 1st of 2008, and under questioning  
8       from Commissioner Jaczko, the staff admitted  
9       that they hadn't done the relevant analysis as  
10      to -- he asked specifically, "Can you tell me  
11      what will ignite a fuel assembly, and what are  
12      the consequences if you ignite it?" and the  
13      staff said they'd have to do additional  
14      analysis on that subject.

15              What did emerge is that they  
16      looked at a crashing aircraft on the cask, and  
17      they looked at a light truck carrying a truck  
18      bomb placed adjacent to the cask. Neither  
19      scenario would be expected to initiate the  
20      fire that I described. Both would be  
21      spectacular events with fireballs and smoke  
22      and noise. I'm talking about a much more

1 sophisticated, targeted attack designed to  
2 exploit the intrinsic threat properties of the  
3 material itself, mainly that it will burn.

4 Thank you.

5 CHAIR MESERVE: Mr. Pennington,  
6 would you care to reply?

7 MR. PENNINGTON: I would be happy  
8 to reply. First of all, I think we've had a  
9 very substantial and thorough security  
10 discussion here, so the cavalier statement  
11 that it's easy to get access to these systems,  
12 open them up, and put some incendiary device  
13 in there is, is not appreciably credible.

14 I would also submit that there is  
15 not a person on this panel that is an expert  
16 in zirconium chemistry or in zirconium fires.  
17 Having said that, I don't think that there is  
18 a convincing case to be made, either, that the  
19 NRC has not looked at this particular event.

20 My principal concern is that we  
21 have a very good system in place, from  
22 security systems through security forces, and

1 a robust technology. I don't think that we  
2 need a HOSS-type concept to improve the  
3 performance of our present security systems.  
4 So, I understand what Dr. Thompson is saying,  
5 but I do not agree with his conclusions.

6 CHAIR SHARP: Dr. Carnesale?

7 MR. CARNESALE: Mr. Halstead, you  
8 referred to the disagreements you had with the  
9 DOE analysis, both of the likelihood of  
10 sabotage and terrorism event being successful  
11 -- you said by a factor of ten, perhaps by a  
12 factor of 100 -- and also about cleanup costs.

13 I wonder if you could describe a  
14 bit the -- what is it, other than the  
15 conclusion that you disagree with, what is it  
16 about their analysis with which you  
17 disagree?

18 MR. HALSTEAD: Thank you for that,  
19 that, that question, Commissioner, and I'm  
20 going to be somewhat careful in answering it  
21 because, as I explained, we're in a peculiar  
22 situation where the status of the NRC

1       licensing proceeding for Yucca Mountain is  
2       somewhat unclear, until the Commission  
3       determines this -- and I'm likely to be a  
4       witness for seven contentions that directly  
5       address this, and two others that address it  
6       indirectly.

7                The easiest way to answer it --  
8       without getting into the new studies that the  
9       State of Nevada has developed -- is to state  
10      that the Department of Energy's key reference  
11      on this matter is a 1999 report prepared by  
12      Sandia National Laboratories, and that's the,  
13      the primary basis for their attack scenarios  
14      and their assumption that the attack they've  
15      studied, which uses one explosive device,  
16      would deeply penetrate, but not fully  
17      perforate, the shipping cask.

18               They go on to say, however, that  
19      if the shipping cask were fully perforated,  
20      the consequence of the attack would increase  
21      by a factor of ten. We can get into some of  
22      the physical mechanisms why that occurs, but

1 that, in and of itself, is sufficient reason  
2 why they should not have artificially  
3 constrained their analysis to assume that only  
4 one weapon was used, particularly after the  
5 Congress, in the Energy Policy Act of 2005,  
6 required the NRC's design-basis threat to  
7 accommodate a still somewhat vague but much  
8 more robust attack scenario than had  
9 previously been in the design-basis threat.

10 We took another approach, because  
11 we did not want to get into the area of  
12 classified information, and on our study team  
13 we have people who are ex-military, tank and  
14 explosives people and also nuclear engineers.  
15 And we began with an assumption that there  
16 were weapons that were available that could  
17 completely perforate a cask, and then we  
18 calculated the, the, from the lost mass of the  
19 spent fuel assemblies that would be in the  
20 path of the jet from the weapon as it  
21 perforated the cask, what the maximum  
22 percentage of certain radionuclides released

1 to the environment would be.

2 And, the good news is that this  
3 helps put an upward bound on a debate that  
4 goes back to 1977, 1979, where -- when we  
5 didn't know enough about these mechanisms so  
6 we assumed there could be a 100% release of  
7 the most dangerous radionuclides. So, the good  
8 news is that the worst case scenario is  
9 probably about a 10 percent release of the  
10 cesium-137.

11 But just as a fractional release  
12 of 140 curies of cesium-137 in an urban area  
13 is a potentially catastrophic event -- and  
14 that really is the event that DOE assessed in  
15 their SEIS -- we believe that release could be  
16 up in the 10- to 20,000 curies.

17 Now, understand the rail cask  
18 contains, depending on which model it is, one  
19 and a half million to two and a half million  
20 curies of cesium-137, and that's why I go to  
21 our number two argument for risk reduction.

22 Best way to reduce the impacts of

1       these shipments is to ship the older fuel  
2       first, essentially take advantage of the decay  
3       time, the half life, and simply reduce the  
4       amount of these dangerous vision products  
5       that's in a shipping cask.

6               And by the way the waste program  
7       has evolved, and the way that the utilities  
8       have chosen to manage their fuel on site, and  
9       the Commission -- the Nuclear Regulatory  
10       Commission's decision to look at extended  
11       storage, this in fact is one of those problems  
12       that may help play itself out.

13              If we're shipping older fuel,  
14       then, regardless of the depth and diameter of  
15       the breach in the cask or whether incendiary  
16       devices, if we reduced the amount of fission  
17       product, we've directly reduced the event.

18              I'm sorry, that's a long, involved  
19       answer, but I'm trying to put it in the  
20       context of managing the risk rather than  
21       exploiting the fear of the risk, which I think  
22       is a very important. We're going to have to

1 ship spent fuel at some point, and we need to  
2 focus on how to do it safely and securely, and  
3 not argue that it can't be done.

4 MR. CARNESALE: Would you care to  
5 comment?

6 MR. PENNINGTON: I would like to  
7 amplify upon Bob's comments. Interestingly, a  
8 number of things that Bob said today, I would  
9 agree with. This, however, is -- we need some  
10 realism here, and let's refer now to the one  
11 big test case that we have in this world for  
12 the effects of cesium, and that is the  
13 Chernobyl event.

14 The Chernobyl event, if you look  
15 at the total cesium that was, that was spread,  
16 you will find based upon the excellent work  
17 done by Dr. Zbigniew Jaworosky and his staff  
18 on the UNSCEAR report, 2000, Annex J, which is  
19 subsequently solidly endorsed by the Chernobyl  
20 Forum, you will find that the cesium impact --  
21 just the cesium -- over a fifty-year  
22 population dose, amounts to somewhere between

1 one and one-and-a-half person rem per curie.

2 I apologize for non-SI units, but I think  
3 better in curies.

4 So we have one to one-and-a-half  
5 person rem for 5.2 million people exposed over  
6 a fifty-year life. Now then, we as designers,  
7 we like to have safety margins in our  
8 calculations, so sometimes a 200-percent over-  
9 prediction and safety analysis codes -- maybe  
10 even 300 percent -- that's what we would  
11 prefer to see in, in the conservatism of our  
12 codes.

13 If you look at some of the  
14 analyses that were done for the State of  
15 Nevada, you will find that one of the studies  
16 that they commissioned showed, for a cask  
17 terrorist attack in Nevada, the population  
18 exposures were greater from cesium, greater  
19 than the entire Chernobyl event, greater than  
20 the entire Chernobyl event, with about 1.2  
21 percent of the content of the cesium that was  
22 in the Chernobyl event.

1                   Second of all, if you look at  
2                   their codes, or their results, I should say,  
3                   and you see what result, their population  
4                   doses are two orders of magnitude, two orders  
5                   of magnitude greater than the population dose  
6                   per curie that resulted at Chernobyl.

7                   That is, they're up around 140  
8                   person rem for the -- let's say one and a half  
9                   to two million people in the State of Nevada,  
10                  the entire State of Nevada, 140 person rem per  
11                  curie of cesium released. Now, I submit that  
12                  when you see numbers like that -- at least as  
13                  a designer and an engineer -- you say,  
14                  something's going on here. And I'm not sure  
15                  what it is, but I do know that the very  
16                  sophisticated safety analysis codes that we  
17                  used can be played with, to the user's delight  
18                  and to produce results that you might feel you  
19                  want.

20                  I don't know what happened there,  
21                  but I submit that two orders of magnitude  
22                  higher than the actual Chernobyl outcome is a

1 bit extraordinary.

2 MR. HALSTEAD: Might I make a brief  
3 comment? Again, Charlie and I may well be  
4 arguing this out before the Administrative Law  
5 Judges of the Nuclear Regulatory Commission,  
6 so we need to be careful here, but what I want  
7 to stress is that in Nevada's analyses, we  
8 have not focused on health effects, latent  
9 cancer fatalities or otherwise.

10 And this, as -- Charlie is right -  
11 - this much more concentrated deposition of  
12 the release is the result of a number of  
13 factors, including the release height and the  
14 assumptions. But, the key issue here is, we're  
15 not arguing primarily that the health effects  
16 are why attackers might try to carry out one  
17 of these attacks.

18 We've argued, it's a case of  
19 economic sabotage. In the United States, if we  
20 have an incident like this, we're not going to  
21 allow a city to be shut down for a year or  
22 two, we're going to clean up the release. And

1       it's the dollar cost of the release that we  
2       think is the, the impact that is most likely  
3       to be the intent of an attacker, and in fact  
4       this is one of the reasons why we've asked the  
5       NRC -- and I haven't seen the final results in  
6       the rulemaking -- to change their definition  
7       of radiological sabotage, which now assumes  
8       that you worry about an attack if it's  
9       successful in terms of inflicting population  
10      damage.

11                   And we think that the intent to do  
12      economic harm probably ought to be explicitly  
13      recognized there. But, I would agree with  
14      Charlie that there, there, there are, there  
15      are some valid technical debates about the way  
16      various parties have used the codes, the  
17      assumptions, and at some point it would be  
18      useful to have some of those resolved.

19                   CHAIR SHARP: Excuse me for jump --  
20      oh, go ahead, yes, please, Doctor.

21                   MR. THOMPSON: Just very briefly,  
22      Pacific Northwest Labs on behalf of the

1 Canadian Government did a dirty bomb release  
2 in downtown Toronto of 1000 curies of cesium-  
3 137 and they calculated the cleanup costs to  
4 various levels of cleanup standard.

5 And for what one could regard as  
6 cleanup damage the public might insist on, the  
7 cleanup goes into the many tens of billions of  
8 dollars, and I could supply that analysis if  
9 you wish.

10 CHAIR SHARP: Excuse me for jumping  
11 the queue for my fellow commissioners here,  
12 but help me understand a little more clearly  
13 the potential impact you were, Dr., Mr.  
14 Pennington, you and others have been talking  
15 about the dosage at Chernobyl of cesium, and  
16 I don't have a good appreciation -- lacking a  
17 technical background of -- just give me some  
18 sense of the argument, I hear the argument  
19 about the economics.

20 It's very costly to clean up, but  
21 most of us, as citizens, our main and  
22 overwhelming concern has been the health

1 impacts of what happened, and that's what  
2 we've heard most about, about Chernobyl and  
3 the other places. Help me understand what that  
4 -- the implications are -- of what you said,  
5 and what ten times that would do.

6 MR. PENNINGTON: Well, the  
7 implications are the subject of --

8 MR. HALSTEAD: Great debate.

9 MR. PENNINGTON: -- a number of  
10 debates. Clearly, there is a -- it is the  
11 objective of the nuclear business and cask  
12 manufacturers in particular, as well as  
13 reactor manufacturers, not to have any  
14 radioactive releases.

15 CHAIR SHARP: I know, but let's get  
16 to the case where there was a release, and  
17 what was the impact of that level that you  
18 were talking about, and the level that you  
19 were talking about. Just give us some sense --  
20 I don't expect a, you know, a highly technical  
21 thing here.

22 MR. PENNINGTON: Well, the sense

1 is, from the release from the, from the DOE  
2 analysis, from those types of population doses  
3 there would be no radiation injuries, no  
4 radiation deaths. Nobody's going to die from  
5 those types of releases. They are very small.

6 Bob made an inference about, oh,  
7 let's, people impute latent cancer fatalities.  
8 The ICRP and a number of other units of  
9 expertise have said, "That's not the right  
10 thing to do." You cannot extrapolate low  
11 doses to large populations and impute some  
12 form of latent cancer fatality. You cannot  
13 imply or infer health consequences from these  
14 types of doses.

15 And we're talking about doses that  
16 are less, to an individual, less than ten to  
17 fifteen rem, maximum, for this would be for  
18 the recovery types. So, for these types of  
19 events, we are not talking about deaths or  
20 significant personnel injury, we're talking  
21 about exposures that we would like to prevent,  
22 but for beyond-design-basis events, they can

1       happen.

2                   And, as other people have pointed  
3       out, weapons systems can penetrate just about  
4       anything, so there is, there's not a huge  
5       level of public harm from this, but there  
6       could be economic consequences, there's no  
7       doubt about that.

8                   CHAIR SHARP: Mr. Halstead?

9                   MR. HALSTEAD: Yes, that's the key  
10       point here. I, I'm sorry we're so limited in  
11       time, because I think for example it would be  
12       very useful for you to have a discussion of  
13       this measure of harm, the latent cancer  
14       fatality number, and the way it is used and  
15       misused.

16                   Let's stay away from that. The  
17       issue here is: at Chernobyl, you had a large  
18       amount of fission products distributed over  
19       millions of square miles because of the height  
20       of the release and the extent of the fire.  
21       We're talking here about a small amount of  
22       fission products, probably dispersed in a fire

1 over a small area, a couple of square  
2 kilometers, maybe forty square miles, at the  
3 maximum.

4 So, it's a completely different  
5 type of situation, and I believe that it I --  
6 I believe, there just isn't much technical  
7 basis to focus on the population dose and  
8 relating that to latent cancer fatalities a  
9 measure of harm. There is the case of  
10 emergency people who are likely to be close to  
11 the cask, and, remember, the surface dose rate  
12 of the spent fuel in the cask -- if it's ten  
13 years out of reactor, you're talking 25,000  
14 rem per hour, which is a big, a big point  
15 source of radiation.

16 Even after fifty years, it's still  
17 likely 8 or 10,000 rem per hour, but it's more  
18 manageable. But, it's likely that you'd have  
19 some emergency response people that get doses  
20 in the range of 20 to even possibly up to 100  
21 rem, although if the on-scene commander is  
22 properly trained, he or she will likely keep

1 her or his people from receiving a dose in  
2 excess of 20 to 40 rem, which is what we shoot  
3 for in a worst case scenario.

4 So, the point is, we're talking  
5 about economic sabotage, and it could be very,  
6 very costly and, in fact, the numbers in our  
7 models and our outputs that Charlie doesn't  
8 like are the numbers I don't like, which show  
9 that the worst case scenario costs 400 to 500  
10 billion dollars to clean up, but that's  
11 precisely the range of numbers you get from  
12 almost all the competent studies of dirty  
13 bombs in metropolitan areas.

14 And so, I'm not saying that those  
15 numbers are crazy, they're just, they're  
16 numbers that are very disturbing when you  
17 consider fission products, even a small number  
18 of curies being transported and deposited in  
19 a relatively small area, unlike what happened  
20 at Chernobyl or unlike what would happen in  
21 any reactor accident.

22 MR. PENNINGTON: May I--

1 CHAIR SHARP: One more shot, yes.

2 MR. PENNINGTON: Let me rebut some  
3 of that. The characterization of the Chernobyl  
4 accident is not accurate there. There were two  
5 components of the release, there was the huge  
6 explosion occurring about a minute into the  
7 accident. There was a steam explosion, there  
8 was a subsequent explosion eleven seconds  
9 later due to vaporization of the center of  
10 some fuel assemblies that caused the fuel to  
11 explode.

12 On the basis of those two  
13 explosions, somewhere, depending on your  
14 experts, between thirty and sixty percent of  
15 that core took up residence physically outside  
16 the reactor hall. They began to have as many  
17 as thirty fires, small fires, graphite  
18 burning, and those types of releases really  
19 were very similar to what you would expect  
20 from a spent fuel cask.

21 Now, the first two plumes, the  
22 first two plumes of the radioactivity released

1 at Chernobyl were released in two separate  
2 directions. The population density in those  
3 two plumes was very high because at Russian  
4 reactors, cities are built close to the  
5 reactors to get workers there.

6           You've got numbers of 3,000 people  
7 per square kilometer in the first two plume  
8 areas after the release. And, for the releases  
9 after the initial explosions. Yes, there was  
10 high atmosphere injection from the, from the  
11 first two explosions, for the subsequent burn.

12           And this went on count them, now,  
13 for forty days. Ten days of intense release,  
14 thirty days of continuing release before they  
15 managed to stop all that. Forty days, and yet,  
16 at that, with forty days of a completely  
17 consumed and burning core, only 30%,  
18 thereabouts, of the cesium was released.

19           Forty days of open, full-core  
20 access to the atmosphere, 30%. That just  
21 indicates the absorption coefficients that  
22 cesium has. Cesium loves to glom onto stuff,

1 and hang on, so.

2 CHAIR SHARP: The, this is, I know,  
3 an extremely important issue, but I need to  
4 let my colleagues into the question, Mark  
5 Ayers, who is next, and then Vicky Bailey.

6 MEMBER AYERS: Thank you,  
7 Congressman. I'd like to direct this to Mr.  
8 Pennington. You stated that the extra-  
9 structural protection of the HOSS potentially,  
10 if it is partially or fully damaged, could  
11 pose increased risk to first responders and  
12 that the cost benefit ratio for this approach  
13 appears unfavorable. Does your supplemental  
14 material, which I have yet to receive yet,  
15 provide quantitative and or qualitative  
16 details?

17 MR. PENNINGTON: You haven't  
18 received it because it is not yet delivered  
19 but it will be delivered.

20 MEMBER AYERS: Thank you.

21 MR. PENNINGTON: First of all, the,  
22 the issue is if you harden for weapons

1 protection, there is a potential for jet fuel  
2 causing very large fires, and I don't care how  
3 you design that HOSS structure, aviation fuel  
4 at 500 miles an hour is going to do a pretty  
5 good business of getting into structures.

6 We have had some very nice  
7 experiences recently, and I use the nice term  
8 guardedly here. The experiences were not nice,  
9 but the fact is that large aviation fuel type  
10 fires and concrete over-structures, that is,  
11 that are support structures, physically  
12 supporting weight in the presence of fires, do  
13 not do well.

14 First incidence has been made  
15 apparent by the World Trade Center event, in  
16 which a lot of heavy aviation fuel burning,  
17 all it had to do was collapse one floor,  
18 pancake effect. We also have the MacArthur  
19 Maze fire that NRC has analyzed, in seventeen  
20 minutes, outside, only 8400 gallons of  
21 gasoline caused this very large superstructure  
22 of highway to gradually fold and bend and come

1 down on top of the tanker.

2           These types of events in an  
3 aviation fire inside an enclosed structure  
4 become, essentially, a furnace, and you get an  
5 amplification of the temperature because of  
6 that event, and those structures might very  
7 well--we haven't done an analysis to support  
8 this, but there is reasonable, there's a  
9 reasonable conclusion that for that type of an  
10 event and a HOSS over-structure you might be  
11 doing yourself more harm than good.

12           Not to say that's a fact, it's  
13 just a possibility. The defense against a  
14 weapon is certainly a much lower probability  
15 event, and the defense that might be  
16 determined by the security folks to be  
17 important later on. But I'm simply saying you  
18 need to be careful when you talk about  
19 hardening a structure that's designed for one  
20 set of events.

21           Now, again, as I said, and I think  
22 I said it appropriately, the canister won't

1 fail under those fire events. The canister  
2 will not fail, there will not be a release of  
3 radioactivity. You're simply complicating and  
4 making it, life very tough on the recovery  
5 staff following the event.

6 DR. THOMPSON: I conclude my slides  
7 with a schematic of a hardening option. And in  
8 the accompanying description, when I wrote  
9 that up in 2003, I specifically recommended  
10 that the configuration be designed so that jet  
11 fuel did not pool to avoid precisely this  
12 issue.

13 MR. PENNINGTON: 500 miles an hour  
14 jet fuel is going to gain access, you can see  
15 the cooling ducts, it's a long torturous  
16 cooling duct that will impair cooling, first  
17 of all, but will provide plenty of access  
18 since there has to be multiple openings for  
19 aviation fuel at 500 miles an hour.

20 DR. THOMPSON: What I said was that  
21 you can configure it so you don't get pooling,  
22 and therefore you'll have a very short fire

1 impulse which does not raise the concerns that  
2 Charles has talked about.

3 MEMBER AYERS: Okay, this is a  
4 related, related question. I guess it would be  
5 to you, Dr. Thompson. Do you have any capital  
6 or overhead estimates for this superstructure  
7 that you showed in a presentation?

8 My concern is that, that, and it  
9 is a concern that we have to keep in mind,  
10 that the cost of this superstructure could, in  
11 fact, increase the estimates for the cost per  
12 kilowatt hour of the fund, the waste fund.  
13 Have you done any cost estimates?

14 DR. THOMPSON: Short answer is, is  
15 no. The, these analyses I do are paid for by  
16 citizen groups, local governments, state  
17 governments. Budget's always very, very  
18 limited. We, we just don't have the resources  
19 to do that kind of thing. I would say that our  
20 gravel, dirt, riprap, rocks, concrete are all  
21 pretty cheap.

22 There is a greater land

1 requirement that most, most sites have plenty  
2 of land. So, in terms of cents per kilowatt  
3 hour, nuclear electric, you're looking at a  
4 very, very small increment.

5 MEMBER AYERS: Okay, thank you.  
6 Again, coming from the construction industry,  
7 particularly on nuclear sites, I would be  
8 concerned that the impact it would have on  
9 consumers if, if we went to such a  
10 superstructure, went from, for example, one  
11 mill to 1.001 mill, which would be a big, big  
12 cost.

13 MR. PENNINGTON: May I just  
14 comment? Is that acceptable?

15 MEMBER AYERS: Certainly.

16 MR. PENNINGTON: Thank you. I first  
17 heard of this in 2003, and made some  
18 presentations to one of our decommission  
19 sites. I did some calculations back then,  
20 these numbers are no longer relevant today,  
21 but I would say that the cost is not  
22 insubstantial just for the construction.

1           You're working in a security site,  
2           labor costs go up by a factor of at least 30%  
3           because you're working in such areas. If you  
4           had to rearrange a current ISFSI, part of the  
5           real cost however is the up-front licensing  
6           issues, the impediments to the present design  
7           caused by this particular structure's design.

8           So you've got a lot of up-front  
9           costs associated with redesign, re-analysis,  
10          submittal, review by the NRC, the NRC rates  
11          are now \$250-plus dollars an hour, so that is  
12          not insubstantial. And then the actual cost  
13          itself for installing this, which is a, would  
14          be a very significant operational impact on  
15          any operating utility.

16                 MEMBER AYERS: Thank you. And,  
17          Congressman, one last--I guess I'm making a  
18          point, more than anything. Mr. Pennington, you  
19          used the common industry approach of doses to  
20          people, relevant but only part of the  
21          consequences of a release.

22                 But it would seem to me that far

1 more important will be either the cost of the  
2 cleanup of the land, or, more likely, the  
3 economic cost or loss if the downland is  
4 cordoned off for decades or even centuries.

5  
6 MR. PENNINGTON: That is true, and  
7 I do not presume to be an expert in this area.  
8 However, the standards that you set for the  
9 cleanup should probably be determined by other  
10 natural type contaminations as well.

11 Mother nature is not very nice  
12 about how the radioactive waste which is left  
13 on earth from creation has been distributed  
14 either, so we have lots of, lots of  
15 capabilities to make appropriate cleanup  
16 decisions which can either increase or  
17 decrease the costs of the cleanup.

18 CHAIR SHARP: Let me turn now to  
19 Vicky Bailey.

20 MEMBER BAILEY: Thank you, and let  
21 me pick up on a point that Commissioner Ayers  
22 has just raised, and to Mr. Brochman, I had

1 the opportunity to visit one of the ISFSI  
2 sites, the Maine Yankee site, and I was struck  
3 by the perimeter, the safety perimeter, that's  
4 actually used, and in some of the discussion,  
5 it went to the fact that this perimeter is so,  
6 so wide that it also is a challenge for  
7 economic development around the site, from the  
8 standpoint of jobs and other issues.

9 So, I guess my question goes, I  
10 know you're saying there's a rulemaking  
11 currently in front of the NRC. Will it deal  
12 with this issue of the perimeter? Where, how  
13 large, how is it determined how wide the  
14 perimeter is, and what are the assumptions  
15 behind that?

16 And, I mean, these perimeters are,  
17 are, are, the security has considerable  
18 weaponry which is also very intimidating to  
19 the community surrounding it as well, so I'd  
20 like to hear your, your comments on that.

21 MR. BROCHMAN: I'm not sure--  
22 parameters or perimeter?

1 MEMBER BAILEY: Well--perimeter.

2 MR. BROCHMAN: Perimeter, okay.

3 Well, let me take the second question first.

4 I think the NRC's desire with regards to  
5 people being concerned with the weapons is,  
6 that can be viewed as a good thing. We have a,  
7 and that may be a bit humorous, but the idea  
8 is that an adversary looking at one of these  
9 facilities as a potential target, when he  
10 looks at it carefully, should go, "there are  
11 better targets for me, as an adversary, to  
12 choose".

13 And, so, deterrence, defensive  
14 capabilities serving a deterrent function as  
15 opposed to actually defending can be an  
16 important issue.

17 In terms of the size of the  
18 facility, right now, the regulations establish  
19 a, basically, a minimum distance from the  
20 storage containers and the question becomes  
21 whether or not any consequences from a release  
22 are acceptable at that point, or the site

1 boundaries beyond that, wherever that is, or  
2 do you need to go to a denial strategy as I  
3 indicated earlier.

4 So, that question can depend on  
5 type of events you're talking about, what the,  
6 and what's the specifics of the site.

7 MEMBER BAILEY: So, it would vary  
8 with each ISFSI, is that what you're, you're  
9 saying?

10 MR. BROCHMAN: Yes, and, and that  
11 may lead to conclusions that, you know, the  
12 NRC's perspective is, all ISFSIs need to be  
13 regulated to an acceptable level of safety and  
14 security. The question your posing is, are the  
15 costs the same for all ISFSIs at all  
16 locations? That's a different issue, and  
17 that's really beyond what the NRC would look  
18 at.

19 MEMBER BAILEY: Okay. Mr. Thompson,  
20 and maybe Mr. Pennington, you each have talked  
21 to this subject, but while I was there and in  
22 the presentations that we heard, obviously

1 each of these dry cask storage units are  
2 monitored continuously, and I believe they're  
3 monitored for heat level, what have you.

4 So, I guess I'm going to Mr.  
5 Thompson. Is, are you stating that concern  
6 that an individual might be able to compromise  
7 this or are we looking at the chemical  
8 reactions being able to compromise this?

9 DR. THOMPSON: I focused here on  
10 the, the potential for a malevolent event  
11 affecting an ISFSI dry storage module and this  
12 would be a team, knowledgeable team equipped  
13 with weapons of destruction. So we're talking  
14 here an unusual event, a beyond-design-basis  
15 event.

16 It's not an everyday event, it's  
17 relatively improbable, but remember that there  
18 are ISFSIs all over the United States, more  
19 being established all the time, and they'll  
20 likely be in place for many decades, perhaps  
21 beyond a century. So you have to consider the  
22 cumulative possibility of this malevolent

1 event over that long period and over these  
2 many ISFSIs.

3 MEMBER BAILEY: Mr. Pennington?

4 MR. PENNINGTON: Just to go right  
5 to the heart of your question there, there's  
6 nothing chemical that can happen within the  
7 canisters that would cause the types of events  
8 postulated by Dr. Thompson.

9 I would also rely upon the  
10 expertise we've heard today from our security  
11 experts. We have a constantly changing  
12 environment with respect to national security  
13 and specifically homeland security-type  
14 events.

15 Site, national, and site security  
16 systems are constantly being upgraded for  
17 these types of alerts and warnings and  
18 postulates of possible organizations. That's  
19 why, as I talked about, this tiered response  
20 where we've got not only the security systems,  
21 we've got the security forces and then a  
22 robust technology to back it up.

1           I believe that the right focus is  
2           to keep the security systems and the security  
3           forces upgraded and constantly ready for such  
4           events that Dr. Thompson concerns himself  
5           with, and that is probably the best approach.

6           MEMBER BAILEY: Mr. Halstead, you  
7           talked about from the standpoint of moving. My  
8           question goes, you know, moving the spent fuel  
9           twice, moving from an ISFSI facility to  
10          storage and then from there to a permanent  
11          repository.

12          Are there concerns there related  
13          to heat levels, other things that I may not  
14          technically be aware of, but maybe you can  
15          address your comments to?

16          MR. HALSTEAD: Well, we're supposed  
17          to focus on the security issues on this panel,  
18          and I think there are some statistical  
19          transportation safety issues that occur with  
20          multiple movements, but I think we'll leave  
21          that for the second panel.

22          I think from a security

1       standpoint, again, trying to make a very  
2       complex situation simple, as a general rule,  
3       it is easier to protect spent fuel on-site  
4       than to protect it when it is in transit.

5               And it is easier to protect it in  
6       transit when it is moved once rather than  
7       twice, or if it is moved for a smaller number  
8       of miles than a longer number of miles, and if  
9       it is moved in a truck--in a rail cask rather  
10      than a truck cask, because of the thickness  
11      and the materials of the walls and some other  
12      considerations, which have to do with the  
13      ability to provide security on rail lines  
14      versus providing security on highways.

15              That said, I think that the  
16      Commission's exploration of the special issues  
17      that have been created by spent fuel being  
18      stranded at storage installations that no  
19      longer have operating reactors, is the, the  
20      one case where I think the minimizing  
21      shipments rule might not be the overriding  
22      factor.

1           It may be that the desirability of  
2 removing fuel from those sites, even if it  
3 means that that fuel then ends up being moved  
4 twice, is one area where I think there's a  
5 case to be made for moving more than once.

6           Secondly, we have a lot of spent  
7 fuel stored at reactors that don't have rail  
8 access. Maybe one third, depending on how you  
9 evaluate the sites. And, in the past, when DOE  
10 proposed to monitor retrievable storage  
11 facility at Oak Ridge to operate in a system  
12 with a repository that received shipments by  
13 rail, it seems to me there was an argument in  
14 terms of the security of the entire system,  
15 that having a facility in the east, relatively  
16 near where the spent fuel was, where you could  
17 deliver fuel to that facility by truck, and  
18 then it would be repackaged for ultimate  
19 shipment to the repository by rail, thereby  
20 eliminating those long, 2-and-3 thousand mile  
21 cross-country truck shipments.

22           That's a second case where moving

1 fuel twice might have lower overall risks than  
2 moving it once, so it's hard to find a rule  
3 that applies in all instances. Generally  
4 speaking, moving the fuel the fewest number of  
5 times and the shortest number of miles  
6 enhances both safety and security, but there  
7 are those exceptions.

8 MEMBER BAILEY: Mr. Pennington?

9 MR. PENNINGTON: I would agree, for  
10 the most part, with Bob, but let's make sure  
11 we understand what we're talking about  
12 volumetrically. There are many classes of  
13 hazardous materials out there, and the  
14 preponderance of them, in fact, I would, I  
15 don't want to overstate it, but I would say  
16 most, if not all of them, are far more  
17 hazardous to the public than spent fuel.

18 Let's make sure we understand that  
19 if you were to move all of the fuel, spent  
20 fuel, in the United States, and were to do so,  
21 let's say you were moving it on a regular  
22 basis and you were picking a correct number,

1 a correct amount to move every year, you're  
2 going to be impacting the hazardous material  
3 transport ton-miles per year by less than  
4 .008% of all hazardous materials.

5 You're talking about an incredibly  
6 small impact on the, on the transport of  
7 hazardous materials, in the most hazardous  
8 categories, including explosive, oxides,  
9 explosive flammable liquids, all of those  
10 major things that cause real risk to the  
11 public.

12 It's a tiny, tiny fraction. So, I  
13 would agree with Bob that there should be some  
14 thought put into this to make sure we do not  
15 over transport, but at the same time, there  
16 are other economic considerations that say  
17 "hey, two transports is not a bad thing, it's  
18 not going to be an increased risk, and it's  
19 going to have some good outcomes".

20 MEMBER BAILEY: All right, thank  
21 you. Captain Baker, having listened to all of  
22 that, in your comment and in your testimony,

1       you talked about the procedures that are quite  
2       extensive and the training that you've had. In  
3       looking at what you've done, have you had more  
4       experience with rail transport, or with  
5       trucks, or with both? And is there a  
6       considerable difference in procedure with  
7       either one?

8                    CAPT. BAKER: Both. I've worked  
9       probably an equal number. There, the plans are  
10      different and I can't really discuss the  
11      differences, per se.

12                   MEMBER BAILEY: Okay.

13                   CAPT. BAKER: Not in an open  
14      session.

15                   MEMBER BAILEY: Sorry to ask that,  
16      okay. Thank you.

17                   CAPT. BAKER: You're welcome.

18                   MEMBER BAILEY: Mr. Earls, I've  
19      obviously had a chance to experience firsthand  
20      a little bit of that security that you talked  
21      about when I got a chance to visit the ISFSI  
22      site, but are there other measures as we look

1 at America's nuclear future, are there other  
2 areas that we should be looking at that maybe  
3 we haven't asked about? Are there some things  
4 that keep you awake at night that maybe we  
5 haven't thought about, and maybe you'd like to  
6 comment on that.

7 MR. EARLS: Well, and as I  
8 mentioned, the threat is constantly changing,  
9 and evolving. You know, I mentioned one of the  
10 areas that has become more and more of concern  
11 to us, and that's the insider threat. And,  
12 and, you know, at our power reactors, we have  
13 a robust insider mitigation program.

14 But, even with that, you know,  
15 we're constantly redoing it. I think that,  
16 that's probably what keeps us awake more  
17 today, I believe we've had a lot of focus on,  
18 on, you know, the interdiction of folks coming  
19 from the outside, bad guys coming in, so I  
20 think we have quite a confidence level in  
21 that.

22 But it's the insider, and

1 particularly the homegrown terrorist, that's  
2 the one that is a challenge for us to look at.  
3 So we're continually looking at ways to make  
4 that better, and we continue to work with the  
5 NRC. The NRC just recently, as I mentioned,  
6 did a rulemaking. They enhanced some of the  
7 measures that we employ to mitigate the  
8 insider.

9 MEMBER BAILEY: All right. Thank  
10 you. Thank you, all. Excellent panel.

11 CHAIR SHARP: I just had one more  
12 question before we, our time is virtually up  
13 for this panel, but the tough question we face  
14 is, what is our role, what should we  
15 appropriately speak to, and what, what is,  
16 what do we have legitimate expertise to speak  
17 in.

18 And obviously on many of these  
19 questions a number of us certainly do not have  
20 the technical and we would not be the  
21 appropriate people to judge whether or not a  
22 specific design of security is the appropriate

1 one.

2 So, let me ask you this. One thing  
3 we might speak to is whether or not the  
4 institutions that have to make these decisions  
5 and, primary one being the Nuclear Regulatory  
6 Commission, but we are engaged with other  
7 institutions, whether there's anything that we  
8 ought to be saying about what those  
9 institutions need to either focus on, or how  
10 they need to be upgraded or reformed in order  
11 to manage what, as, as Mr. Earls just  
12 articulated, is an ongoing proposition.

13 And, so, I just wanted to give you  
14 an opportunity to, and fairly quickly if you  
15 could, say to us the institutional or,  
16 arrangement that we have in this country, and  
17 obviously, we're not even, have a number of  
18 the security institutions represented here, so  
19 if you wanted to take a swipe at them, you  
20 could, but the point is, is really, the  
21 decision making institutions that affect the  
22 nuclear industry, Mr. Thompson?

1 DR. THOMPSON: Big subject. Try to  
2 be brief. I'd focus on the National  
3 Infrastructure Protection Plan, get a stronger  
4 strategic grasp on what that means, focusing  
5 on the concept of protective defense--  
6 deterrence as an element of a balanced  
7 national security strategy.

8 And then, from that strategy, you  
9 distill a National Infrastructure Protection  
10 Plan that would apply across all agencies  
11 including the NRC, which actually signed up to  
12 the 2006 version of this plan and with,  
13 subsequently distanced itself in a public  
14 proceeding from that plan and the 2009  
15 revision took away all the agency signatures,  
16 so it's a substantially weakened plan. Thank  
17 you.

18 MR. HALSTEAD: I would just say,  
19 Commissioner Sharp, that while the Nuclear  
20 Regulatory Commission is far from perfect, and  
21 I have often been their critic over the last  
22 three decades, I think there are two things we

1 can learn from the way the NRC has dealt with  
2 the transportation security issues.

3 And I would also say, because I  
4 have worked on some of the on-site dry storage  
5 issues as well, and that is that I have  
6 confidence in their ability to get it right in  
7 the end, but it is extraordinary that it's  
8 eleven years since the State of Nevada's  
9 petition for rulemaking was filed and we're  
10 now waiting to see what the draft rule for  
11 public comment acting on that will be.

12 And on the other hand, with the  
13 Energy Policy Act of 2005, where the NRC was  
14 directed by Congress to deal with these  
15 issues, as Phil can well attest, having  
16 Congressional direction doesn't make the task  
17 any easier technically, but my guess is that  
18 they will develop a good response in about  
19 half that time.

20 So, I guess I would give a vote of  
21 endorsement for having the NRC resolve many of  
22 the issues that will come out of your

1       deliberations. It will be necessary for a  
2       successful implementation of your  
3       recommendations.

4               But I think you need to think  
5       about how they are directed to resolve some of  
6       these issues and how they are given the  
7       resources for the enormous amounts of  
8       technical work that may be involved in  
9       answering some of those questions.

10              MR. PENNINGTON: I would not  
11       necessarily disagree with either of the points  
12       made previously, although it might maybe in  
13       shading. One of my passions has been, in my 44  
14       years in the nuclear business, is that we  
15       have, we have done a disservice to the nuclear  
16       industry and to the nuclear technology by  
17       failure to educate and make sure that the  
18       public takes a firm understanding of what the  
19       real risks, the comparative risks, and you may  
20       have detected that in my presentation.

21              Comparative risk is what life is  
22       all about. That's what every human being does,

1 and yet we have historically and traditionally  
2 failed to do that with nuclear technology, be  
3 it systems, be it storage.

4 I would encourage the Commission  
5 to advocate for a public information and  
6 public training with respect to comparative  
7 hazards that society faces and put it in  
8 proper context. The economic arguments aside,  
9 we can, we can debate that, but the public--  
10 not those of us that have, have more  
11 education--the public is fearful, and the  
12 public should not be fearful.

13 This is not a technology that has  
14 that imminent level of threat to public health  
15 and safety, so I would encourage the  
16 Commission to take an active role in making  
17 some statements about getting government and  
18 industry involved in public, in upgrading  
19 public knowledge. Thank you.

20 CHAIR SHARP: Ladies and gentleman,  
21 thank you very much for your time and your  
22 help and your information and we will, of

1 course, you're welcome to provide followup  
2 information and we may have some additional  
3 questions for you. Thank you very much.

4 With that, we're going to take a  
5 15-minute coffee break and then we will be  
6 back at it.

7 (Whereupon, the above-entitled  
8 matter went off the record at 10:35 a.m. and  
9 resumed at 10:52 a.m.)

10 MR. FRAZIER: Okay, We're going to  
11 go ahead and reconvene. We've sent a search  
12 party out for Ken Sorenson, when we find him,  
13 but I suggest we just go by him until he  
14 returns. He's here, we just, he's lost.

15 CHAIR SHARP: We're very pleased to  
16 have our second panel here, and what I think  
17 we will do is, in a moment, I'm sure Ken  
18 Sorenson will be with us. Why don't we turn to  
19 Phillip Brochman again on this panel, from the  
20 Nuclear Regulatory Commission.

21 MR. BROCHMAN: Do you want to load  
22 my slides up?

1 CHAIR SHARP: Do we have the slides  
2 up for Mr. Brochman?

3 MR. FRAZIER: I'll just do that.

4 MR. BROCHMAN: All right, well--

5 MR. FRAZIER: Here we are.

6 MR. BROCHMAN: I will continue, and  
7 then when Mr. Sorenson comes, we'll let him  
8 talk.

9 CHAIR SHARP: No, no, we'll, no,  
10 no, we'll just go through and then--

11 MR. BROCHMAN: Got you. Got you.  
12 Very well. Since I spoke in the previous  
13 panel, I will try to move quickly through some  
14 of the slides. The overview for security--

15 CHAIR MESERVE: We saw that.

16 MR. BROCHMAN: You already saw  
17 that? It's the same for both. We also are  
18 doing a rulemaking in transportation security,  
19 same basic goals, mentioned the Nevada  
20 petition that Bob talked about a number of  
21 times.

22 And, just to make clear, that's a

1 separate rulemaking from what's going on in  
2 the storage area. Status. Correction. As Bob  
3 has pointed out, the Commission has approved  
4 the issuance of the proposed rule. They did  
5 that in July. The expectation of the staff  
6 right now is working on finalizing the  
7 Commission comments. We would expect that out  
8 in the next month or two, for comment.

9           So, that will come out this fall.  
10 There will also be guidance documents, and  
11 definitely projected before, it's now, it will  
12 be sometime this fall in terms of when it's  
13 published.

14           Major elements of that rulemaking.  
15 Improvements or new requirements on advanced  
16 planning and coordination with states,  
17 increased notification and communication of  
18 shipments, continuous enacted monitoring of  
19 shipments, armed escorts required over the  
20 entire shipment route, and new requirements on  
21 background investigations for access to  
22 Safeguards information and updated

1 requirements -- next slide -- on training and  
2 qualification.

3 I would note that there's going to  
4 be a separate rulemaking in the future to  
5 apply enhanced weapons, and by enhanced  
6 weapons, I mean machine guns and other things  
7 like that to spent fuel shipments. Right now,  
8 I'm working on a rulemaking that will apply  
9 such weaponry and related things to power  
10 reactors and CAT 1 facilities.

11 Once we finish that, we will then  
12 do a follow on rulemaking that will address  
13 spent fuel storage, spent fuel transportation,  
14 and other, in a range of facilities. One of  
15 the aspects of that in terms of personnel  
16 qualifications is, there's a new requirement  
17 for firearms background checks for armed  
18 security personnel that uses the National  
19 Instant Criminal Background Checks System that  
20 the FBI runs.

21 And the bottom point here I would  
22 just mention in passing but it is something

1 that will be of interest. Currently, United  
2 States Code, and I'd give you the citation  
3 number there, prohibits non-law enforcement  
4 personnel from having weapons, loaded weapons  
5 in school zones.

6 If you look at some of the  
7 transportation routes that go across this  
8 country, especially rail routes, you may find  
9 that they cross a number of school zones. So,  
10 this is an issue We're talking with the  
11 Justice Department on. It may ultimately  
12 require a legislative solution to resolve, but  
13 it potentially creates targeting and security  
14 vulnerabilities.

15 This is on the premise that we're  
16 talking, NRC licensees with the increased  
17 weapons capability providing the security  
18 escorts in addition to the law enforce, the  
19 law enforcement officials that may accompany.

20 And, basically, my summary is,  
21 we're at the midpoint of increasing the  
22 transportation security rulemaking

1 requirements, improving the, incorporating the  
2 orders, doing all those things I talked about.  
3 And the rulemaking on enhanced weapons is  
4 probably a couple years away.

5 All this conclusion may be brought  
6 up by other persons as well, but basically,  
7 spent fuel has been shipped safely and  
8 securely for a number of decades here in the  
9 United States. Shipments are occurring both  
10 domestically and internationally, and the NRC  
11 has ongoing and both future rulemakings that,  
12 to enhance security requirements.

13 So that's the scope of my brief  
14 presentation. I don't know if Mr. Sorenson,  
15 we'll just go, next way? And if I, if you have  
16 any questions, be glad to answer them. Thank  
17 you.

18 CHAIR SHARP: Thank you very much.  
19 We now welcome Jack Edlow.

20 MR. EDLOW: Good morning, and thank  
21 you very much for allowing me to come to  
22 address the Commission and the subcommittee

1 today. My name is Jack Edlow. I'm a second  
2 generation person in the transportation of  
3 radioactive cargoes.

4 My father started the business in  
5 1957. I'm involved since 1969. We ship only  
6 radioactive cargoes. We ship any form of  
7 radioactive cargo, and we ship between any two  
8 points in the world. So we consider ourselves  
9 experts on what we do.

10 Amongst those cargoes that we ship  
11 are irradiated, sometimes known as spent, and  
12 sometimes known as used, nuclear materials.  
13 And so, I'm going to limit my comments today  
14 only to irradiated, spent, or used nuclear  
15 materials.

16 As has just been indicated, the  
17 safe transportation of irradiated nuclear fuel  
18 has been carried out for probably fifty years  
19 in this country, in a regular and routine  
20 manner, without any major problems, protests,  
21 or disruptions.

22 It's not exactly easy to find out

1       how much fuel has really been shipped, because  
2       there's a wide variety of materials, but  
3       clearly, more than 80,000 tons, and probably  
4       closer to 100,000 tons of this material has  
5       been shipped around the world. Within the  
6       United States, it's probably in the 10-to-  
7       20,000 ton range, in my opinion.

8                 Shipments occur monthly in the  
9       United States and sometimes even on a weekly  
10      basis depending upon shipping campaigns. The  
11      use of either truck or rail for transport is  
12      safe and secure. Safety measures, safety  
13      issues have been addressed through package  
14      design, testing, and certification process  
15      under the auspices of the Nuclear Regulatory  
16      Commission.

17                Security issues have been  
18      addressed through regulations and security  
19      plans which are modified on a case by case  
20      basis, depending upon the need to do so, also  
21      under the auspices of the Nuclear Regulatory  
22      Commission. Advanced planning involves working

1 with State and local officials and this is in  
2 the best interest of the shipping plan for  
3 this material.

4 Additional training from time to  
5 time may be needed and is provided when it is  
6 needed. This is similar to the shipment of  
7 other forms of hazardous materials, of which  
8 there are many thousands of other forms of  
9 hazardous material which move in this country  
10 as well.

11 Shipments are managed routinely  
12 and professionally in this country. Now, what  
13 I'd like to do, is having said that, is tell  
14 you a little bit about some of the more  
15 difficult campaigns of materials that Edlow  
16 has been involved in shipping so that you  
17 understand the context of this.

18 Most of these involve some form of  
19 domestic U.S. shipment as well, but generally  
20 are international. This is a shipment that  
21 took place in 1963. It was the first return  
22 shipment to the United States under Atoms for

1 Peace. My father performed the shipment. I  
2 attended as a 14 year old, this shipment.

3 It came into the port of Savannah,  
4 Georgia. Four casks, you see on the rail car,  
5 moved in regular train service, to Idaho,  
6 Idaho Falls, where it went out to the  
7 reprocessing plant out there. This was the  
8 first, this shipment came from Sweden. It was  
9 the first of many, many, many shipments.

10 The most recent shipment under the  
11 same program arrived a few weeks ago, so it  
12 has continued all of this time on a regular,  
13 routine basis, not, no longer going on regular  
14 train service, but we'll show some other  
15 examples of that in a few minutes.

16 This is a picture of those casks  
17 arriving at Idaho, my father is on the left,  
18 there. In fact, he is the only man, to the  
19 best of my knowledge, ever to have shipped  
20 spent fuel from every continent, because, yes,  
21 he shipped from McMurdo Sound when they closed  
22 the reactor there, so as far as I know, that's

1 the only guy, probably ever going to be the  
2 only guy.

3 We, we made a large series of  
4 shipments in the 1980's from Taiwan. This  
5 involved, I think, close to 300 caskloads. It  
6 was in groups of ten, moved initially on a  
7 liner service, but eventually moved to charter  
8 service for a lot of reasons.

9 This is a picture of one of the  
10 casks being loaded onto a vessel in Taiwan.  
11 Came to the United States and went by rail to  
12 Savannah River. Rail or truck, I think at that  
13 time.

14 This is an interesting case. This  
15 is an airplane getting ready to depart Bogota,  
16 Colombia. This was some highly enriched  
17 uranium fuel which was being removed from  
18 Bogota in 1996, not a good time in Bogota.  
19 Under Department of Energy orders, NAC  
20 International and Edlow worked together on  
21 this, they packaged the fuel and Edlow  
22 transported it.

1                   It was to have been transported by  
2 road to Cartagena to be loaded onto a ship,  
3 but at last minute a security alert was put  
4 out and we were asked to change to aircraft,  
5 which we did within 24 hours. The truck is  
6 inside the airplane. The truck with the cask  
7 drove into that aircraft.

8                   It flew to Cartagena, where it was  
9 loaded then, the cask was loaded onto a ship,  
10 to Charleston, and then it went by rail.  
11 Interesting. Truck, air, ship, rail. All four  
12 modes involved in that transport, 1996.

13                   This is a very, another  
14 interesting shipment, a few years before.  
15 1994, eight casks involved from eight reactors  
16 in six countries in Europe. The emergency  
17 relief shipment required to get highly  
18 enriched uranium back to the United States,  
19 the logistics coordination in bringing all  
20 these together, to bring them into Savannah  
21 River, were massive, but easily accomplished.

22                   This is my most recent shipment.

1 This was in April. This is Chile. The casks  
2 were loaded and ready to leave the day the  
3 earthquake hit. My staff down there were  
4 thrown out of bed by this earthquake. They  
5 determined that the casks were safe but that  
6 the port we were planning to use was destroyed  
7 by the tsunami.

8 We shifted the operations to a  
9 secondary port, checked all the bridges and  
10 roads, redirected the police, left two days  
11 late, arrived at Charleston five hours behind  
12 schedule. How were we able to do that? We had  
13 a plan, and we knew that things change from  
14 time to time. So this is what is necessary.

15 Other operations we've been  
16 involved with recently. After the First Gulf  
17 War, NAC and Edlow worked together to evacuate  
18 the fuel from Iraq which had been left in a  
19 hole in the field. We repackaged it, and  
20 shipped it by air back to Russia, to Mayak.

21 Also, recently, the other one was  
22 a shipment from the Adriatic Sea to Murmansk

1 by sea, Russian HEU spent fuel being returned  
2 under DOE program. We used trains, here's a  
3 picture of a train with containers involving  
4 casks. We ship, this train picture, has casks  
5 in different frame containers.

6 Here's another train with other  
7 containers involved. We shipped by truck. I  
8 gave a promotion to Tri-State this time, but  
9 there are other carriers that are usable as  
10 well. The cask is inside the container. Here  
11 are other casks in different frame containers.  
12 You can see the emergency, the security  
13 personnel that are involved in this process.

14 Casks in the ship, more casks in a  
15 different ship. I mean, this is a normal, you  
16 can see, the casks fit very easily inside the  
17 vessel. You can put a lot of casks in this  
18 ship if you really want to move a lot of fuel  
19 at one time.

20 So, generally speaking, I would  
21 say that there have been a lot of other  
22 campaigns in the United States as well. There

1 are -- we, obviously had two reprocessing  
2 plants in the U.S., West Valley operated and  
3 received a lot of fuel, some of which then had  
4 to be shipped back, and the Morris facility  
5 received I think some 3,000 spent fuel  
6 assemblies, which still reside there to this  
7 day.

8 Other utilities provided intra-  
9 plant, between their plants operations, and  
10 additionally to that, there have been research  
11 reactor shipments here, Navy reactor shipments  
12 here. A lot of spent fuel has moved, does  
13 move, and will continue to move in the United  
14 States as we sit here today.

15 Now, abroad, my friend Alastair  
16 Thomas, who used to work for British Nuclear  
17 Fuels, ran their spent fuel operation. He  
18 personally shipped more than 70,000 tons.  
19 That's correct, he personally oversaw the  
20 shipment of 70,000 tons. He had a five-ship  
21 fleet to bring fuel from Japan. He had his own  
22 railroad to move fuel around within the U.K.,

1 and he had a truck fleet as well.

2 So, he already oversaw the amount  
3 of fuel that was destined for Yucca Mountain.  
4 So this is something that has been done,  
5 there's a vast amount of experience involved,  
6 and I just thought that you should see what we  
7 do. Remember, we've already done this a lot,  
8 we do it safety, and we do it securely.

9 We follow the regulations as  
10 needed. All we need to know is where do we go  
11 next, just please tell us where you want it.  
12 Thank you very much.

13 CHAIR SHARP: Thank you very much.  
14 We now welcome Judith Holm.

15 MS. HOLM: Thank you. I always do  
16 better on my feet. Thank you very much for  
17 inviting me to speak today. I always love to  
18 follow Jack. He's so inspiring.

19 Today, what I'm talking about is  
20 institutional arrangements that have been  
21 conducted and basically built into many of the  
22 DOE shipping campaigns, and please forgive me,

1 it's been three years since I've really been  
2 associated with the DOE. I retired in 2007.  
3 I'm a free agent, I'm happy to say.

4 I had participated in a number of  
5 shipping campaigns, and been involved in  
6 planning and managing institutional program  
7 activities to prepare, if you will, the field  
8 for the kinds of discussions and arrangements  
9 that are needed. I can't claim as much as Jack  
10 in terms of longevity, but over 23 years, I've  
11 seen shipping campaigns from Three Mile  
12 Island, which I touched briefly with a piece  
13 of paper, from a headquarters standpoint,  
14 through WIPP, cesium, which I'll talk about,  
15 from Colorado to Washington State, and some of  
16 the foreign fuel shipments.

17 Jack, you'll be interested to know  
18 that I handled the quick EIS on some of the  
19 last of the early shipments of foreign fuel  
20 until we conducted EISes in the department, so  
21 we cross currents. It's a small community in  
22 transportation. But the fact is, there is a

1 history, there are ways to achieve public  
2 involvement and public acceptance that don't  
3 prevent you from shipping, that actually help  
4 your system and improve the process.

5 Some of the topics of discussion  
6 are risk perception and program management,  
7 and how do we gauge people's concerns about  
8 risk. A lot of the technical issues you've  
9 heard, but we're concerned about how people  
10 think about these.

11 And, so, we did some survey  
12 research, which I'll talk about. And we have  
13 experienced a lot of controversial campaigns,  
14 where people were adamantly opposed to  
15 shipments, but actually those shipments  
16 finally went on, and how you do that is not  
17 tricky, it's just common sense.

18 I think the previous panel with  
19 the Captain from South Carolina talked about  
20 a lot of the shipping protocols and security  
21 features that were included. We learned from  
22 those kind of experiences and I'm happy to say

1 we're still doing those.

2           So, the basis, where we started,  
3 was looking at groups like Peter Sandman and  
4 his -- I should stand back, perhaps -- Peter  
5 Sandman's guidance on public involvement and  
6 public participation with EPA basically  
7 focused on hazardous sites, reckless surplus  
8 sites. And what he identified was a range of  
9 interests from the public. The public is not  
10 monolithic.

11           People are concerned at various  
12 times and at various levels, and not all  
13 publics are the same. There are people who are  
14 only interested and want to be kept informed.  
15 Around sites, people may have more of a stake  
16 and want a more thorough involvement, and then  
17 there are people who are actually responsible  
18 for certain policies and implementation for  
19 safety, security, and other programs, so you  
20 need to involve local officials and State a  
21 different level.

22           And then, a lot of people talked

1 about informed consent, how do you get that,  
2 what does that mean. And then we also, and  
3 rather than saying we're going to have broad  
4 public acceptance for a lot of this, as a  
5 program manager and thinking about these  
6 things, you wonder, is tolerance enough? So  
7 that people may not accept it, and that's  
8 okay, but will they allow you to carry out  
9 your mission and your functions.

10 Some of the foundations for our  
11 plans, as we worked through the years of these  
12 activities, included some of the early  
13 civilian waste program engagement with states,  
14 with cooperative agreements, with western  
15 states, and the southeastern State regional  
16 groups, working directly with local officials,  
17 working with tribal officials, very important  
18 on a Government to Government basis for any  
19 federal entity.

20 We also looked at transportation  
21 planning and the protocols that everyone talks  
22 about, and had a chance to test those out, and

1 I'll talk about that in a minutes. And then,  
2 the national transportation programs that we  
3 managed, which included a national forum, that  
4 included all stakeholders, industry, states,  
5 tribes, and other interested parties, to talk  
6 about the process, the features of different  
7 shipping campaigns, and how to  
8 institutionalize some of these things through  
9 DOE orders, rules, and other mechanisms.

10 We also did lessons learned  
11 studies during that time on naval reactors and  
12 commercial shipments, and my colleague, Alex  
13 Thrower, may have some of those old studies  
14 that he could provide to the panel.

15 For the information that I  
16 understand you were interested in, Hank  
17 Jenkins-Smith addressed the panel earlier this  
18 year. We did Commission him to do a study,  
19 several studies across the three-year period.  
20 For historical context, WIPP had intended to  
21 open and ship in 1988. However, that didn't  
22 happen.

1                   But they had also developed the  
2                   series of protocols that Bob mentioned, and  
3                   yet, hadn't tested those protocols. When the  
4                   cesium shipment came along, we thought that  
5                   was a good chance to test the protocols, scrub  
6                   them down, and see how it works, so it  
7                   benefitted not only WIPP, the states, tribes,  
8                   and others, but we also learned about what  
9                   people thought about that campaign and how to  
10                  gauge trust, credibility, and what kind of  
11                  information sources people used.

12                  We did some similar surveys with  
13                  the foreign research reactor spent fuel urgent  
14                  relief shipment, and the foreign fuel shipment  
15                  from Concord. There were some different  
16                  results, and I think the Concord shipment was  
17                  especially interesting.

18                  But we found, one, knowledge  
19                  equaled greater confidence. I think someone in  
20                  the last panel suggested, we need to have a  
21                  strong information and education campaign. We  
22                  looked at that as, if people didn't understand

1        what we were doing, how could they even accept  
2        of believe or trust anyone?

3                    We found State and local officials  
4        were the most trusted conveyors of  
5        information, and as one of the people in  
6        Concord put it, we know where they live.  
7        Therefore, we can trust them because they're  
8        going to do what we think they ought to do.

9                    Interestingly enough, in both pre-  
10       and post-surveys, we found that both DOT and  
11       DOE were accorded a level of competence which  
12       is important, I think, for trust.

13                   We spent a lot of time both with  
14       cesium and with the foreign fuel shipments and  
15       being in local communities and talking with  
16       people extensively, and thereby, not always  
17       answering things to people's satisfaction  
18       because we couldn't do everything they wanted  
19       us to do. But at least they understood that we  
20       were trying, that we kept our word, and the  
21       shipment was safe.

22                   The media was the most frequent

1 source of information, even though the media  
2 always came in last as trusted, which is kind  
3 of interesting, but people do gain information  
4 from media. And, keeping commitments was  
5 really important to people.

6 The foreign research reactor  
7 program helped us understand that and change  
8 our messages and information, keeping the  
9 treaty commitments under the Atoms for Peace  
10 program was salient for people, and so the  
11 lesson is, keeping commitments and doing what  
12 you say you're going to do goes a long way  
13 toward mitigating some of the concerns.

14 So, how did we change our shipment  
15 plans? In cesium, we found because State and  
16 local officials were most trusted, instead of  
17 having, as WIPP had been doing, contractors  
18 deliver training to local officials, we worked  
19 with the States to develop a training program,  
20 provided funding to the State agencies in  
21 emergency management, to go deliver the  
22 training, and they worked with the local

1 officials along the way. That was a little  
2 different.

3 We had local media involvement.  
4 There was a full-scale exercise on the border  
5 of Idaho and Oregon, and we actually brought  
6 the media in and had a panel to not only let  
7 them talk to us, to the Federal agents, but  
8 also to the trainers about what their needs  
9 were, so that we had better understanding.

10 And, again, keeping commitments  
11 was very important. The other thing we did was  
12 look at communications pretty carefully. We  
13 had a transportation plan, part of that plan  
14 was how to communicate what role the states  
15 would have versus the Department of Energy.

16 So we segmented our  
17 responsibilities appropriately and planned for  
18 worst cases with communications issues, we  
19 jointly developed information fact sheets  
20 where safety was stressed, the kinds of  
21 factors that were going into the shipping  
22 campaign, including a lot of the protocols,

1 inspection, tracking.

2 The idea that states had the  
3 ability to stop a shipment if it wasn't up to  
4 snuff or if weather was bad, we didn't want to  
5 compromise a shipment from going off in bad  
6 weather. And that seemed to work effectively,  
7 too. Those messages and information pieces  
8 were included both in the training and in any  
9 other communications we used.

10 On the urgent relief shipments,  
11 the State was involved in radiological  
12 inspections for the shipments coming into  
13 Sunny Point at the Naval Weapons Station, and,  
14 again, keeping our information linked to the  
15 treaty commitments.

16 Concord, California was an  
17 interesting example because this is where we  
18 had a lot of very great public concern, 250  
19 people showing up at public meetings. We  
20 actually had local officials who took the lead  
21 to manage those public meetings. Route  
22 selection was a joint effort between the

1 shipper, the carrier, the State and local  
2 officials, and the DOE.

3 And then, finally, the most  
4 interesting part, we did have a survey that  
5 was done by Hank Jenkins-Smith in Concord that  
6 the local officials requested in order to  
7 gauge whether or not people were concerned  
8 about economic development opportunities and  
9 the problems that might occur because of the  
10 shipments.

11 Basically, they found people  
12 weren't too concerned about that. So, what  
13 would I recommend to this panel? Update social  
14 science research. These are ten years old or  
15 more. I think it's important to understand  
16 what people's concerns are out there, and also  
17 how people are gathering information.

18 We didn't have Twitter and  
19 Facebook and all these other media. We need to  
20 understand how people get information, how  
21 they internalize information, how knowledge is  
22 transferred. And so, some interesting research

1 can be done there.

2 Establish institutional  
3 relationships early, early, often and  
4 continuously. Build that cadre of people who  
5 you're going to be working with who will be  
6 involved in shipping campaigns, and continue  
7 to work out issues with them. It's hard to be  
8 totally argumentative when you actually work  
9 together on solving a problem.

10 Provide funding for emergency  
11 training, like the Section 180(c) program.  
12 This was anticipated in the Act, I think it's  
13 really important. Third-party regulation of  
14 transportation is important for program  
15 consistency and credibility, and being  
16 consistent with the commercial world. Whatever  
17 kind of organization is set up, I think this  
18 is certainly an important feature.

19 Demonstrating shipment safety is  
20 important and finding that, shipments that you  
21 can actually use as test cases both to train  
22 the people doing the program as well as to go

1 through the protocols that you may set up  
2 around those programs. And keeping commitments  
3 and agreements.

4 Having set policy really helps  
5 with transportation. The three campaigns I  
6 mentioned all had decided policy, there was no  
7 confusion about what was going on and why we  
8 were making the shipments.

9 So, if you have a rational  
10 approach to, and a reasonable explanation for  
11 why these things are happening, you tend to  
12 have more confidence and acceptance from the  
13 public.

14 CHAIR SHARP: Thank you very much.  
15 We now welcome Chris Wells.

16 MR. WELLS: Thank you. Good  
17 afternoon. First, I'd like to thank Mr. Alex  
18 Thrower for extending this invitation to me  
19 today to present before you. And also, Mr.  
20 Frazier to put a face with a name and thank  
21 you for your tentative agreement to come and  
22 brief our committee at our next meeting in

1 December, now, I have that on the record, so  
2 hopefully you can't back out of that.

3 MR. FRAZIER: You notice I didn't  
4 say anything.

5 MR. WELLS: I think we've made a  
6 natural segue this afternoon. We began the  
7 presentation by hearing from all the  
8 scientific experts, if you will, the cask  
9 manufacturers, the regulators, those who  
10 really have the expertise and the knowledge  
11 that goes into the safety of this type of  
12 campaign.

13 We've heard from Mr. Edlow here,  
14 who has probably accomplished worldwide  
15 shipping campaigns before I was even born,  
16 transitioned to my old colleague here, Judith  
17 Holm, and so now I think I move one step  
18 further down the chain.

19 My relevance today is not so much  
20 in the technical aspect but in the political  
21 science aspect, which some of you may say is  
22 the reason for the delay in this program. But,

1 the political science aspect can be the, can  
2 be, I guess, the closer, if you will, if  
3 handled in the appropriate way.

4 And so I want to continue along  
5 the lines of Judith and show exactly how we  
6 conduct business and help with that endeavor.

7 My organization, the Southern  
8 States Energy Board, I've been working for  
9 them for about sixteen years now. We're a  
10 nonprofit interstate compact, we're  
11 represented, or, I guess, our executive board  
12 is represented by our Governors and  
13 Legislators in both the House and Senate in  
14 sixteen states and two territories, those  
15 territories being Puerto Rico and the Virgin  
16 Islands. We also have a Federal representative  
17 who is appointed by the President.

18 Our board has many different  
19 activities that we're involved in, whether it  
20 be carbon sequestration or clean coal  
21 recycling, different types of programs. I am  
22 involved in the Radioactive Materials

1 Transportation Program, and the way we conduct  
2 our business is we have three committees which  
3 deal with radioactive materials  
4 transportation.

5 Membership on these committees are  
6 appointed by the Governors of each State. They  
7 appoint someone from a State agency to serve  
8 on our committee. We have a Radioactive  
9 Materials Transportation Committee, that  
10 committee was charged with helping develop  
11 policies and procedures for eventual shipments  
12 to Yucca Mountain.

13 I had hoped that would be my  
14 retirement fund committee, but as we see,  
15 things have changed in regard to that. We have  
16 a Transuranic Waste Transportation Working  
17 Group. That committee is involved with the  
18 WIPP campaign, which you've heard different  
19 speakers allude about earlier today in terms  
20 of the protocols and plans that are in place  
21 for shipments from different sites to the WIPP  
22 plant out in New Mexico.

1                   Lastly, we have the Foreign  
2                   Research Reactor Committee, both a, an  
3                   internal committee just for shipments within  
4                   the State of South Carolina that come into  
5                   Charleston and are destined for Savannah  
6                   River, as well as a cross-country group which  
7                   addresses shipments that would go from  
8                   Savannah River to Idaho.

9                   I think that last campaign is  
10                  probably the one I'll speak about the most  
11                  today and has most relevance to what we've  
12                  been, been speaking about. I had the  
13                  opportunity to give testimony to the National  
14                  Academy of Sciences when they were creating  
15                  their publication, "Going The Distance".

16                  They actually invited me, as well  
17                  as some of these other people who've spoken to  
18                  give some lessons learned and information that  
19                  we learned from the foreign fuels campaign, so  
20                  there's more data out there if you wish to  
21                  explore that information.

22                  The relevance to what we're

1 talking about today. I think Mr. Pennington  
2 hit on it, we're looking at basically the  
3 public perception. I can easily place myself  
4 into that category as I start, I had no  
5 background or no insight into this field so I  
6 serve as a good example.

7 I can recall actually my first  
8 meeting in Augusta, Georgia, and meeting Mr.  
9 Edlow, here, and it was quite an informative  
10 meeting. And basically, what I learned from  
11 that process is that the way to accomplish  
12 this campaign is to work together. We had all  
13 of the, as I had mentioned before, the  
14 gubernatorial appointed professionals in  
15 place, so the State was on board.

16 If we could connect those with  
17 experts like Mr. Edlow, with experienced DOE  
18 program managers like Ms. Holm, with the NRC  
19 and with all of the other DOT and the other  
20 agencies involved, we could create a program  
21 that could move effortlessly.

22 Now, it didn't start like that,

1 from the beginning. We had some bumps in the  
2 road. But basically by having those experts in  
3 place and providing them with the information  
4 that they needed and going back and forth  
5 between what the states required and what's in  
6 the regulations and where we could somewhat  
7 stretch the rules to accommodate, you know,  
8 specific concerns, we were able to develop a  
9 very successful transportation program.

10 Basically, I had three points, or  
11 three keys, that I think were successful in us  
12 doing this. The first thing was teamwork. We  
13 did this on a regional basis, instead of  
14 having DOE go from state to state and try and  
15 reiterate the same program again and again, we  
16 brought together all of the states in our  
17 region and my counterparts as well, brought  
18 together their states.

19 We elected individuals who would  
20 represent radiological concerns, emergency  
21 preparedness concerns, transportation. You  
22 heard from Captain Baker on security, so we

1 had the teams in place.

2           The next approach we took was a  
3 prepared, unified message instead of, again,  
4 just having DOE or someone go into the states  
5 and they provide a certain message and maybe  
6 the locals have a different message and  
7 someone else in the media is coming across  
8 with yet another message, we all work together  
9 to, if you will, get in front of the campaign  
10 instead of working from behind and we all had  
11 one unified message to deliver to the public.

12           Lastly, training and resources, I  
13 think, was key. You heard Judith talk about  
14 the establishment of grants and funding in  
15 place to provide the states and locals with  
16 the resources that they need in terms of  
17 equipment, working with them in delivering the  
18 training and, again, having them incorporate  
19 it into the training so that it comes from  
20 their own.

21           As we know, there's probably been  
22 lots of studies done that the public is more

1 likely to trust the level of government closer  
2 to them than further away, so it was very  
3 important and instrumental that we had the  
4 locals to buy into and participate in the  
5 training.

6 We trained ad nauseam. For that  
7 foreign fuels campaign, we did tabletop  
8 exercises where we literally explored every  
9 aspect of the campaign, from when the shipment  
10 would hit the border until its destination,  
11 just going from, you know, participant A, what  
12 would be your role? If this happened, what  
13 would you do?

14 So, I think, again, just that  
15 level of preparedness is just another level of  
16 comfort that those agencies can experience and  
17 that they can relay to their counterparts in  
18 the public.

19 And so, basically, in closing, my  
20 message would be, the best way to accomplish  
21 these types of campaigns is to continue that  
22 regional, or that collaboration, if you will,

1 where you have all of the parties involved and  
2 they have, they have all of the training in  
3 place, they have all of the resources, so that  
4 they, the public can come to them and feel  
5 assured and feel that level of safety and any  
6 question that they may have, they could answer  
7 competently.

8 Thank you.

9 CHAIR SHARP: Thank you very much.

10 We now welcome Mr. Jaszczak.

11 MR. JASZCZAK: Very well. Mr.  
12 Chairman, thank you for having the opportunity  
13 to be here. You've heard the experts all  
14 morning. And my comments are going to address  
15 where we, Nye County, were and are engaged in  
16 what this process is.

17 At the end of the day, we are  
18 where the rubber meets the road, and no  
19 different from where WIPP was, and WIPP  
20 successfully opened. By virtue of the  
21 provisions of the Nuclear Waste Policy Act,  
22 specifically Sections 116 and 117, and

1 cooperative agreements, we were fortunate  
2 enough to have resources provided that allowed  
3 the county to hire a bevy of subject matter  
4 experts to facilitate the county's  
5 participation in all facets of the Yucca  
6 Mountain program.

7 And, in many ways, this staff  
8 ended up being a microcosm of what was the  
9 Office of Civilian Radioactive Waste  
10 Management, and the, those provisions of the  
11 law as it currently exists, exist, which you  
12 are supposedly going to address at some point,  
13 is whether or not you make recommendations to  
14 change or not change.

15 Those provisions are critical to  
16 our involvement as the site county, and have  
17 to believe that whatever you do, those similar  
18 provisions have to be retained for a local  
19 government or whatever site is ultimately  
20 selected.

21 Because, without that, the local  
22 community, who needs to inform its citizens,

1 who needs to be, who need to be engaged, will  
2 not have the wherewithal to do what it is that  
3 they need to do to buy the acceptance or the  
4 information and to get to where you want to  
5 go.

6 Officially, Nye County is neither  
7 for nor against Yucca Mountain. The decision  
8 to site the repository at Yucca Mountain was  
9 the result of a process spelled out in the  
10 Nuclear Waste Policy Act, and over the period  
11 of yesterday and today, I offer to you that  
12 the Nuclear Waste Policy Act went a long way  
13 to doing a lot of things right, probably needs  
14 some tweaking that you should be able to make  
15 some recommendations to do, but a lot of this,  
16 has been, ground has been plowed many, many  
17 times before and we've all heard that.

18 When Yucca Mountain was designated  
19 as the nation's geologic disposal in July of  
20 2002, the Nye County Board of Commissioners  
21 interpreted that action as the law of the  
22 land, and that was a pretty important step

1       because we felt that we were now in a position  
2       where this decision had been made by others  
3       elsewhere and we had a choice.

4               And we resolved to actively and  
5       constructively engage with DOE, to see to it  
6       that the safety, security of the citizens of  
7       Nye County and the environment were looked  
8       after and protected, that the money that we  
9       were provided allowed us to hire the experts  
10      to see to it that the repository would operate  
11      safely and successfully, and that whatever  
12      opportunities there were going to be available  
13      for economic development we wanted to pursue.

14              Ultimately, we wanted the people  
15      who were going to work at Yucca Mountain to  
16      live in Nye County and the businesses and  
17      industries associated with that to be located  
18      in proximity to Yucca Mountain to give us the  
19      opportunity to advance this.

20              And these are, were very, very,  
21      very large and detailed processes. And the  
22      more important part is, once that decision was

1 made, that we were going to have to actively  
2 and constructively engage with DOE. The, our  
3 county efforts became solution-oriented, as  
4 opposed to not why can't you do it, it's how  
5 can you do this, how do we make this work, how  
6 do we have an informed citizenry, how do we  
7 put this together and make it work, not only  
8 for us, but for Nevada and for the nation.

9           And I would offer to you that in  
10 the course of this period, up to the time when  
11 the political science entered into the  
12 equation, we were working very hard and I  
13 would offer to you that there are solutions  
14 out there and if ultimately that's the  
15 decision that gets made through the courts or  
16 whoever, we'll deal with that.

17           We'll continue to be pragmatically  
18 and actively engaged in this process until we  
19 get to where we need to go. However, one of  
20 the, obviously, the obstacles to that, and  
21 they are what they are, it was and will be  
22 virtually impossible to advance a repository

1 program where state and local governments are  
2 not aligned.

3 You've heard that many times  
4 during the full Commission, you've heard it  
5 during your subcommittee. Somehow, those stars  
6 need to align. Until they aligned in New  
7 Mexico, WIPP didn't happen and it's not going  
8 to happen anywhere else, whether its Nevada or  
9 anyplace else, until that does happen.

10 Our current circumstances proves  
11 that local governments cannot go it alone. You  
12 just can't do it by yourself, and I can give  
13 you examples of how it is well-intentioned, I  
14 would offer to you that our DOE friends work  
15 real hard, but because of the reality of the  
16 circumstances, routinely ended up with  
17 suboptimal decisions because of political  
18 expediency and path of least resistance, it's  
19 the way they had to do things to get their  
20 jobs done. No fault of theirs, just the work,  
21 the political science again.

22 So, state government, we can't go

1       it alone. And as long as state government can  
2       ignore federal government's siting decision,  
3       you're going to have these problems wherever  
4       you would site this.

5               As to the specific points of the  
6       subcommittee's question of the acceptability  
7       of risk at current storage sites, you heard  
8       the experts. Depending on which ones you want  
9       to listen to, but we looked at all of them and  
10      paid attention. The risks seemed to be  
11      acceptable in the near-term. They just do.

12             This view is consistent with that  
13      of the NRC, and you've heard them, the risks  
14      of storage could be further reduced if storage  
15      facilities were developed in more remote  
16      location, and that's pretty simple. I mean,  
17      when you take a look at the totality of  
18      isolation and being able to put things out of  
19      sight, out of mind, that are difficult for  
20      people to get to, you're going to increase the  
21      safety of that process.

22             And for those of you that are

1 intimately familiar with the Yucca Mountain  
2 project, you're well aware there was an aging  
3 pad associated with that. We felt that was  
4 kind of remote, they've already demonstrated  
5 that you can do dry cask storage almost any  
6 place you want it to be, and if you can do  
7 that there, we can do it there and obviously  
8 the PFS was the same sort of thing, so.

9 That was, that was just a matter  
10 of accepting the reality of the circumstances  
11 that currently exist. Our conclusions as to  
12 the acceptability of risk related to  
13 transportation aligned with the National  
14 Academy of Sciences report "Going The  
15 Distance," their conclusion that there were,  
16 quote, "no fundamental technical barriers to  
17 the safe transport of nuclear fuel."

18 The impacts to local traffic in  
19 the vicinity of either a storage facility or  
20 a repository, especially the provision of road  
21 and rail infrastructure improvements and  
22 emergency response associated with being the

1 terminus of all shipments, during construction  
2 and operations must be addressed in the  
3 integration of transportation program with a  
4 storage facility or a repository.

5 Consolidated storage could benefit  
6 the decommissioning of sites with shut down  
7 reactors and stranded fuel, we recognize that  
8 as a reality. The NRC just stated it's going  
9 to look at those issues that could be  
10 reasonably associated with on-site storage for  
11 the next hundred years or more.

12 While we suspect that on-site  
13 storage for longer durations is doable, we  
14 believe it best to do consolidated storage at  
15 only a few locations that will possess fuel  
16 handling capabilities for the same duration,  
17 and that's only sound, common sense which is  
18 what we think we've tried to approach this  
19 whole issue from the get-go.

20 And based on the delays that have  
21 occurred to the current repository program and  
22 the likelihood that a geologic repository is

1 still a long way off, as a nation and you as  
2 a Commission, probably ought to at least  
3 commit to a consolidation of the stranded  
4 fuels so you can move, solve at least part of  
5 the problem, move the process forward  
6 somewhere, somehow, some way.

7 We can do this stuff, we're  
8 Americans. And in the same vein, future  
9 decommissioning of nuclear power plants, and  
10 this probably applies to the NRC in  
11 recommendations that you might want to make to  
12 them, should provide for movement or the  
13 consolidation to a location that will retain  
14 the ability to handle monitoring and  
15 maintenance of spent fuel until it can move to  
16 a geologic repository.

17 I.E., you need to have some  
18 partial solutions. Let's make the problem  
19 smaller, let's not make them bigger as you  
20 move forward. Thank you very much.

21 CHAIR SHARP: Thank you very much,  
22 we appreciate all of your testimony. Let me

1 open it up to -- oh, I'm sorry, we, Ken  
2 Sorenson is here.

3 MR. FRAZIER: We were able to  
4 locate him fleeing the building.

5 MR. SORENSON: Yes. Thank, thank  
6 you, Mr. Chairman, and I apologize for the  
7 technical glitch. I thank you for your  
8 patience and thank you for the invitation to  
9 present today.

10 And I also want to thank my new  
11 best friend over here, that was able to  
12 reconvert the PowerPoint presentation to the  
13 one that would work on the machine. So, thank  
14 you for that.

15 I want to, in my presentation, I'm  
16 going to talk about safety and security risk  
17 assessments and assessments for transportation  
18 storage of spent nuclear fuel. I think this is  
19 an important time to look at the body of  
20 knowledge that has been accrued over the past  
21 thirty-five years.

22 We've heard a lot about the

1 operational body of knowledge. I want to talk  
2 about the assessment in experimental body of  
3 knowledge that has gone on over the past  
4 thirty-five years to assess these, these  
5 different types of risks.

6 So, in that context, the way my  
7 talk is formatted, I'll talk about some  
8 history that's gone over the past thirty-five  
9 years, and based on that history, what are  
10 some very general observations that we can  
11 make.

12 And then, given those  
13 observations, how can we apply this, this body  
14 of knowledge to moving forward in storage and  
15 transportation?

16 So, beginning with the history.  
17 Since the seventies, a substantial analytic  
18 and experimental work has been conducted to  
19 assess the adequacy of storage and  
20 transportation, the regulations, to protect  
21 the public and the environment from  
22 radiological material release that may stem

1 either from an accident or a terrorist event.

2 And you can categorize these into  
3 two broad categories, one safety, one  
4 security. They really are two different  
5 animals you have to look at but there is of  
6 course a lot of overlap in there.

7 And so, when we talk about safety  
8 and security, sometimes we talk about them  
9 together, though we have to understand that  
10 they really are distinct, different types of  
11 assessments that we do.

12 So, from the safety standpoint,  
13 the way I chose to kind of look at the  
14 evolution of looking at this is three NRC  
15 documents that have come out looking at the  
16 safety risk assessments for transportation.  
17 There's been a lot of work other than that,  
18 but this, this gives some, some big points  
19 throughout history of what, what's been done  
20 in this area.

21 The first one is NUREG-0170, which  
22 is the transportation EIS, was published in

1 1977. It looked at transportation risk for  
2 more than 20 different types of radioactive  
3 materials by all modes of transport, road,  
4 sea, and air. Spent fuel, of course, was one  
5 of those materials that was looked at.

6 And it came up with a set of risk  
7 values that were estimated. These were in the  
8 days when we did not have much computer power,  
9 we didn't know how to have a whole lot of  
10 testing, so there was lots of assumptions that  
11 went into these analyses.

12 And, every time you make a  
13 assumption on the conservative path to do  
14 these, or the path to do these analyses, you  
15 tend to make it conservative, and so, at the  
16 end of the day, the results tend to be  
17 conservative. So you feel that you've bound  
18 the risks, based on your analytical approach  
19 and the assumptions made in those analyses.

20 1987, another report was issued,  
21 NUREG/CR-4829, it's called the modal study,  
22 which looked at, again, transportation

1 assessments. They didn't actually do  
2 population risk but they were able to  
3 incorporate the evolving computer capability  
4 that was coming on board and finite element  
5 analyses, these sorts of things.

6 They actually developed event  
7 trees that assigned probability to different  
8 types of accidents and those sorts of things.  
9 So, it was a very useful document in, in the  
10 evolution of the capability to do these  
11 analytic risk assessments.

12 The third document is NUREG-6672.  
13 It reexamined spent fuel shipment risk  
14 assessments, and this looks specifically at  
15 spent fuel shipments. And it, I will say, it  
16 kind of completes the story in terms of using  
17 really high end computer capabilities,  
18 parallel processing, these sorts of things, so  
19 we're able to look at very discrete sorts of  
20 responses to the casks from mechanical and  
21 thermal loading conditions and having a pretty  
22 good feel for how the response of the cask

1 would be under certain accident conditions.

2           It's important to note as well  
3 that during these times, testing has been  
4 going on, and so we do develop data and use  
5 that data to benchmark the codes that are  
6 being used.

7           A lot of the focus is on the  
8 regulatory thresholds, the hypothetical  
9 accident conditions, is how do the casks  
10 respond to these hypothetical accident  
11 conditions. But as we've gone through these  
12 decades of assessing the risks, lots of  
13 questions come up in public fora and things  
14 like that in terms of, well, what if?

15           What if we had a, a train run into  
16 a truck cask that was high-centered over a  
17 railroad crossing? What if, during the  
18 earthquake in California, an upper level of  
19 roadway collapsed down on the lower level and  
20 just happened to be a transportation cask that  
21 was underneath there, what would happen?

22           What would happen in the Howard

1 Street Tunnel Fire if there had been a nuclear  
2 consys as part of that train? What would have  
3 happened to the cask and its contents?

4 And we've done lots, lots of those  
5 types of analyses, and by and large, what we  
6 find is that the loadings developed by those  
7 what we'd call severe actions are bounded by  
8 the regulations. And, so, the regulations, as  
9 we go through this evolution of better  
10 analysis capability, more data, better  
11 databases and things like that, what we do  
12 find is that the estimated transportation  
13 risks for safety really have come down on that  
14 basis.

15 And this is an analytical  
16 estimated transportation risk, it's not  
17 necessarily, it's not perceived risk, and it's  
18 something that we have to deal with as well,  
19 but these are the really accepted  
20 transportation risk analyses methods that are  
21 used in the industry.

22 So, through this evolutionary work

1 that's been done, and part of NRC's charter is  
2 to continue to look at the regulations, and  
3 determine their adequacy with real time  
4 conditions, be it different types of  
5 shipments, different types of materials,  
6 different types of threats, and these sorts of  
7 things.

8           And as these three documents have  
9 come out and evolved, in each case, the  
10 transportation risks have shown to be reduced  
11 and it validates the adequacy of the  
12 regulations.

13           And this just shows, pictorially,  
14 a little histogram, the change from NUREG-0170  
15 in 1977 to 6672 in the year 2000. These are  
16 looking at accident risks, hypothetical  
17 accident risks. For rail, the risk has been  
18 reduced two orders of magnitude, and for truck  
19 shipments, it's been reduced three orders of  
20 magnitude.

21           So, let's talk a little bit about  
22 security. In 0170, way back in 1977, it was

1 recognized that security is an issue that  
2 needed to be addressed. It was not addressed  
3 in that EIS. And, furthermore, it was also  
4 recognized that there was not an assessment of  
5 risks in fairly, a, highly densely--well--high  
6 density, thank you. High density populated  
7 areas. Okay. Like, downtown New York, for  
8 example. Manhattan.

9 And so, after 0170, the NRC  
10 commissioned several studies, both internal  
11 and at Sandia National Laboratories to look at  
12 some postulated consequences due to some  
13 malevolent attacks. What came out of these  
14 analyses, again, it's not unlike the safety  
15 assessments in the early days, doing these  
16 analyses, consequence analyses.

17 There were a lot of conservatisms  
18 that were added in because we just did not  
19 have the data, and so we were trying to bound  
20 what we thought would be the risks associated  
21 with these sort of attacks, and there was a  
22 lot of variability in the results.

1                   And it was hard to really  
2 understand what the true consequence was.  
3 Because of this, both the NRC and the DOE  
4 conducted studies, supported studies, actual  
5 experimental work, on different types of  
6 malevolent attacks on casks to see what the  
7 characteristics were of the cask to be able to  
8 withstand those sorts of attacks, what were  
9 the, in a gross sense, what were the dispersal  
10 characteristics of the fuel itself, and those  
11 sorts of things.

12                   And that data has been used in  
13 subsequent analyses to try to better refine  
14 and reduce uncertainties in looking at the  
15 consequences from terrorist sorts of attacks  
16 on these sorts of shipments, has been used, as  
17 we talked about earlier this morning, on the  
18 Yucca Mountain EIS and supplemental EIS.

19                   And, of course, after 9/11, the  
20 NRC instituted a very comprehensive analysis  
21 effort to look at what would happen for some  
22 very specific terrorist attacks on different

1 types of assets and transportation modes, and  
2 those sorts of things. This is, again, after  
3 the 6672, the safety analysis and those sorts  
4 of things.

5           It was analytical in nature only,  
6 and to a large extent there are a few  
7 exceptions, we did not look at any, any  
8 testing just because of budget and schedule  
9 and those sorts of things, but the analysis  
10 effort really was quite intense.

11           And looked at a broad range of  
12 different types of terrorist attacks, and also  
13 on different types of transportation cask  
14 designs as well as storage casks designs.

15           And I'll speed up a little bit  
16 here, but one of the issues that we deal with  
17 is being able to properly benchmark our  
18 analyses, do some real data, so we have a  
19 comfort that the responses that we're seeing  
20 in the analysis really do simulate reality.

21           And I will say, from the security  
22 standpoint, this was an area, still is an

1 area, where we are data-sparse, as composed to  
2 the safety testing area, where we really have  
3 quite a bit of data. From the security side,  
4 particularly dispersal characteristics and  
5 this sort of thing from the spent fuel, we  
6 don't have a lot of data.

7 And I think that's still an area  
8 that needs some work. Because we heard some of  
9 the divergence of opinions this morning in  
10 terms of what were the consequences from these  
11 sorts of events, and one of the reasons there  
12 is this divergence of opinion is because of  
13 the lack of data in certain areas.

14 But, I think most of you are  
15 familiar with the F4 crash into that meter  
16 thick concrete wall there at Sandia. We also,  
17 that provides some time versus distance  
18 deflection data that we can use for impulse  
19 calculations.

20 Also, analytically, looking at an  
21 aircraft impact into a rigid, flat surface,  
22 and then we compare those results to some

1 reference data, shown there on the right, the  
2 Riera model, it's called. And we come up  
3 really pretty close to what the reference data  
4 is.

5 And at that point, we have a  
6 degree of confidence that the modeling that's  
7 being used, the analysis that's being used, is  
8 pretty accurate and so then we can extend that  
9 modeling and analysis to real life problems.

10 So, the observations. The amount  
11 of work that's been done in the area of spent  
12 fuel storage and transportation, safety and  
13 security assessments really is substantial.  
14 There's been a lot over the past thirty-five  
15 years.

16 And based on that, I will say that  
17 transportation of spent nuclear fuel is safe.  
18 That doesn't mean it's risk free, but in my  
19 opinion, it is safe. And this is where safety  
20 maps over into the security realm somewhat.

21 The robust nature of the spent  
22 fuel cask, from the design, from the part 71

1 loading criteria for safety, and part 72 for  
2 storage, really acts to mitigate potential  
3 consequences that come from sabotage types of  
4 events, terrorist events.

5 And then I, the third point there  
6 is the lack of openness with security  
7 assessments can inhibit public acceptance of  
8 spent fuel transportation and storage. And, it  
9 is what it is.

10 I understand why we have to have  
11 this sort of level of secrecy with this  
12 information, but it does inhibit the public  
13 confidence I think in -- when we talk about  
14 sabotage issues with storage and  
15 transportation, we say "trust us, we've looked  
16 at that" and we have.

17 I particularly liked the  
18 presentation from Captain Baker this morning.  
19 I think engaging emergency first responders,  
20 emergency personnel, people like that, and  
21 getting them better informed in these specific  
22 issues, helps a lot with the public because

1 the public I think tends to trust those  
2 people.

3 This last paragraph is just a bit  
4 of a non-sequitur, but I want to emphasize  
5 that there's been a lot of work  
6 internationally as well, in this area, so we  
7 have a fair number of collaborative efforts  
8 with our international colleagues to move,  
9 particularly in later years, the security  
10 issues forward.

11 So, finally, with the conclusions,  
12 I just want to emphasize there's been a lot of  
13 work done in the past thirty-five years. I  
14 think it points to safety under a current  
15 operational scheme.

16 There's a regulatory process by  
17 which we look at new data as it comes along,  
18 and we impute that into the regulations as  
19 that comes along, as necessary, given the  
20 analysis that's been done and the experimental  
21 work that's been done and looking at the cost-  
22 benefit of making those enhancements for

1 transportation and storage. Thank you.

2 CHAIR SHARP: Thank you very much.

3 Let me turn to my colleagues and see if that's  
4 a question? Any questions? No questions?

5 Well, this panel may escape without further  
6 questions, you're all so effective in making  
7 your presentation on this important subject,  
8 and we certainly want to thank you very much.

9 And, obviously, this is an ongoing  
10 issue, these are ongoing issues in the  
11 Commission, and we'll probably be calling on  
12 some of you individually as well as your data  
13 and information going forward.

14 But, thank you very much for your  
15 time and attention and your effort to get  
16 here, in several of your instances. We  
17 appreciate that very much. Thank you.

18 And now, we are ready for our  
19 public comment period under our rules, in  
20 which we have two individuals who have signed  
21 up and each of whom will be given five minutes  
22 to come up to the--we sort of caught our panel

1 off-guard.

2 MR. FRAZIER: You can either sit  
3 there if you'd like, or you can take your seat  
4 in the audience.

5 CHAIR SHARP: When are we going to  
6 leave?

7 MR. FRAZIER: No, you can't leave.  
8 No, no, you can leave there, you just can't  
9 leave leave. No, it's up to you. It looks like  
10 your friends are leaving you.

11 CHAIR SHARP: We're finished, we  
12 appreciate it. Your obligation from our point  
13 of view is complete. Thank you very much.

14 Let me turn now, the first is  
15 Pierre Oneid?

16 Yes, five minutes. You can go up  
17 to the, probably there is the best thing.

18 MR. ONEID: Mr. Chairman and  
19 honorable members. First, I appreciate this  
20 opportunity. My name is Pierre Oneid, I'm the  
21 Chief Nuclear Officer for Holtec  
22 International. Our firm basically serves 44

1 out of the 104 operating units. To my  
2 knowledge, there's 94 units that have chosen  
3 a system, so essentially, we serve 50% of the  
4 market.

5 I'd like to, just to be absolutely  
6 clear, my understanding of your mission,  
7 because what I'd love to do is suggest for  
8 your consideration the answer to that  
9 question. And my understanding is, should the  
10 U.S. change the way in which it's storing used  
11 nuclear fuel and high level waste, while one  
12 or more final disposal locations are  
13 established?

14 And, if I may, the solution can  
15 really be said in less than thirty seconds,  
16 but certainly implementation of that solution  
17 is a little bit harder than that, and here it  
18 is.

19 First, it's the two things are  
20 location and technology. Location, let's take  
21 them off these sites and put them in a central  
22 interim storage, and then move them, such as

1 PFS, and then move them to a permanent  
2 repository such as Yucca. That's the location.

3 Technology, would love to  
4 recommend to you an underground technology  
5 that has been developed and has been licensed  
6 by the NRC. That's really the solution, I'd  
7 like to have a couple of more moments to  
8 elaborate a little bit.

9 In terms of the, in terms of the  
10 location, the, again, there has been, it's,  
11 maybe as an industry, and as a member of the  
12 public, we need to just take a look internally  
13 and say enough is enough. The idea of having  
14 a commitment not to move the fuel that was  
15 busted in 1998, busted again in 2010, and then  
16 we talk about 2022, and now, really, it is in  
17 limbo, and we have no idea when.

18 The location, there is a place  
19 such as PFS, that was licensed, and to the  
20 best of my information, it came in within I  
21 would say a hairline from spending the dollars  
22 and cents to make it effective, which is about

1 150 to 200 million dollars. And that project  
2 would have been started.

3 And the thing that nixed it, with  
4 all due respect, politics. The -- so from an  
5 interim storage, that's how close we came, and  
6 it was fully licensed by the NRC. I appreciate  
7 very much the two members, Mrs. Bailey and Mr.  
8 Mark, that you mentioned dollars and cents.

9 You know, it seems like the idea  
10 of, the notion of dollars and cents is often  
11 forgotten. The dollars that are flowing into  
12 the -- we, the taxpayers, are essentially  
13 paying for that mess, as you all know, as  
14 every utility sues the DOE, DOE turns and  
15 reimburses. At some point, that's the  
16 frustration, if you will, is why not find a  
17 solution.

18 So, again, the location, I just  
19 mentioned PFS, and then from a permanent  
20 repository, I understand most of you have went  
21 to CGS. From a permanent repository, I think  
22 it is the right thing to do to move them off

1 those sites, and yes, Holtec serves CGS, so  
2 I've been to that site many times.

3 And you would agree with me that  
4 as you're driving to that site, or, frankly,  
5 any nuclear site, the first thing typically  
6 you'd see is the hyperbolic tower, from miles  
7 away. And as we got closer, we see the dome  
8 for the reactor building. But that wasn't the  
9 case, was it, when you drove? You almost  
10 couldn't miss those over thirty casks, from  
11 far, far away.

12 And that's what's going to happen  
13 in 67 and more, about 70-some sites in this  
14 country. Again, the point on location from a  
15 recommendation is to look on moving them off  
16 those sites, and having a path. You could have  
17 a central, interim storage within few years,  
18 and then, in terms of maybe five or ten years,  
19 there ought to be a path to take them and put  
20 them in a repository, permanent repository.

21 And also, on the technology piece,  
22 I'd like to just show you something that's

1       been implemented, I hope you can see it from  
2       there, but I, but I will stick around if you  
3       don't mind, I'd love to see you after this.  
4       Got few more photos.

5                   This is an underground,  
6       implemented storage at Humboldt Bay. At  
7       Humboldt Bay. Very robust, and is, and safe,  
8       safer, and less dose. And also, accessible and  
9       one of the NRC commissioners just recently  
10      mentioned, out of the seven things that he had  
11      done since he's been on the Commission, he  
12      highlighted his visit to Humboldt Bay and the  
13      underground storage.

14                   So, I would urge every member of  
15      you to make that visit. You could have made it  
16      just when you were at CGS there, I made that  
17      a lot. So, bottom line, I, two more  
18      recommendations--

19                   CHAIR SHARP: If you could--

20                   MR. ONEID: Is one, is you would  
21      invite the cask vendors, there's only three,  
22      there's Holtec, there's TN, and NAC. If you

1 would invite their CEOs and better yet, their  
2 scientists, the folks that design those units,  
3 and I think you would gain a lot of insight  
4 because that is what Dr. Singh for instance,  
5 he happens to be the CEO and the scientist,  
6 that's what he did for the underground storage  
7 after 9/11. That's what spurred our company to  
8 start that R&D on that.

9           And the second, so, again, I would  
10 urge you to get just those three folks in a  
11 room and pick their brain. And the second  
12 thing is, we're proud of our facility in  
13 Pittsburgh where we manufacture 50% of the  
14 service in the country. It's in Turtle Creek,  
15 the old Westinghouse facility. We'd love for  
16 each of you, we'll again, stand by afterwards,  
17 would love to hand you my card, and come and  
18 visit, and find out about the anatomy of those  
19 systems. Thank you very much for your time.

20           CHAIR SHARP: Thank you very much,  
21 Mr. Oneid. We now welcome Irene Navis.

22           MS. NAVIS: Good afternoon, Mr.

1 Chairman, committee members, subcommittee  
2 members.

3 My name is Irene Navis, I am the  
4 manager of Clark County's Nuclear Waste  
5 Oversight Program, and seven weeks ago I was  
6 also appointed to be Clark County's Emergency  
7 Manager. So I am now the director of the  
8 office of Emergency Management Homeland  
9 Security for Clark County.

10 I am going to talk to you from  
11 both perspectives this afternoon. I listened  
12 to the presentations carefully this morning,  
13 when we were talking about risk and  
14 vulnerabilities and emerging trends, and one  
15 of the emerging trends that we're seeing in  
16 the emergency management arena is the risks  
17 associated with not just physical security but  
18 also communications and IT infrastructure that  
19 relate to potential cyberterrorism.

20 And, as you know, transportation  
21 systems today are heavily reliant on robust  
22 computer systems that must remain secure. So,

1 we want to make sure that when we're looking  
2 at security, we also address that arena as  
3 well. It's an emerging trend in safety issues  
4 and security issues, and we want to make sure  
5 that we pay attention to it.

6 Also, you heard about the Nuclear  
7 Waste Policy Act, Section 180(c), which  
8 related to training and technical assistance  
9 for first responders. In our experience, in  
10 reviewing those policies and reviewing the  
11 process and being somewhat involved, we're not  
12 sure that what the outcome was with 180(c) was  
13 actually adequate to address the concerns of  
14 the first responder community.

15 And we would urge you to take a  
16 look at that policy and consider inclusion in  
17 enabling legislation to make Section 180(c) of  
18 the Nuclear Waste Policy Act more robust in  
19 its next iteration.

20 I would also urge you to look at  
21 better linkages and coordination in  
22 programming regulations and funding between

1 DOE and DHS and between NRC and DHS. We think  
2 there are some gaps there that need to be  
3 addressed.

4 Also, point you to a number of GAO  
5 reports that have been done over the years on  
6 nuclear safety and security that I think would  
7 be very informative to your committee if you  
8 don't already have them.

9 There are also a number of county  
10 reports funded through the oversight funds  
11 that we've received over the years that I  
12 believe could and should be replicated in  
13 other jurisdictions.

14 We have a report on critical  
15 infrastructure identification that relates to  
16 risks and vulnerabilities related to nuclear  
17 waste transport. We have a rail vulnerability  
18 assessment that we'd be happy to share, and we  
19 have two commodity-flow studies that look at  
20 all hazards, hazardous materials, in, out, and  
21 through Clark County that could be useful in  
22 other communities as well, as far as a model

1 for what to study.

2 We also have a public safety  
3 impact assessment that is a gap analysis in  
4 police, fire, and emergency management costs.  
5 We also have a state laws report for nuclear  
6 waste transportation that looks at fees,  
7 inspections, placarding, and notification that  
8 may be useful to the committee.

9 We have a number of community  
10 surveys, you've heard about surveys in public  
11 perception.

12 We have a number of those that  
13 look at trust issues, impacts related to  
14 property values and tourism, and those  
15 property values and tourism impacts were  
16 actually addressed in DOE's final  
17 environmental impact study as it relates to  
18 stigma. Impacts, those studies were, really  
19 offshoots of the work done by Hank Jenkins-  
20 Smith that you heard about earlier today as  
21 well.

22 We also have a Community

1 Indicators Monitoring Program that looks at  
2 public safety indicators over a period of  
3 time, as well as economic and other indicators  
4 that come together to show a picture of what  
5 public, not only public perception, but actual  
6 data show with respect to community impact.

7 So, I offer all that to the  
8 committee for your use, you can work with your  
9 staff on providing that information, should  
10 you find it valuable. Thank you.

11 CHAIR SHARP: Thank you very much,  
12 Ms. Navis. We appreciate your coming today.  
13 Any other comments from the commissioners  
14 would be entertained at this point. If not, we  
15 will close out our business for now and we  
16 appreciate the imperative of these issues, and  
17 we are, of course, just remind anyone  
18 listening or watching that we welcome further  
19 information which can be mailed to us or  
20 emailed through the website. Thank you.

21 (Whereupon, the proceedings went  
22 off the record at 12:06 p.m.)

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