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UNITED STATES NUCLEAR REGULATORY COMMISSION'S
ADVISORY COMMITTEE ON NUCLEAR WASTE

May 26, 2006

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)

170th MEETING

+ + + + +

FRIDAY,

MAY 26, 2006

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The Advisory Committee met at 10:00 a.m.
in Room T2 B3 of the U.S. Nuclear Regulatory
Commission, One White Flint North, 11555 Rockville
Pike, Rockville, Maryland, DR. MICHAEL T. RYAN,
Chairman, presiding.

MEMBERS PRESENT:

MICHAEL T. RYAN, Chairman

ALLEN G. CROFF, Vice Chairman

JAMES H. CLARKE, Member

WILLIAM J. HINZE, Member

RUTH F. WEINER, Member

I-N-D-E-X

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AGENDA ITEM

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

(9:59 a.m.)

21) OPENING REMARKS BY THE ACNW CHAIRMAN

CHAIRMAN RYAN: Okay. The meeting will come to order, please. This is the fourth day of the 170th meeting of the Advisory Committee on Nuclear Waste. My name is Michael Ryan, Chairman of the ACNW. The other members of the Committee present are Allen Croff, Vice Chair; Ruth Weiner; James Clarke; and William Hinze.

During today's meeting, the Committee will hear the representatives from the Office of Nuclear Material Safety and Safeguards on an overview of the NRC spent fuel storage program. And we will continue to just wrap up on our letters and reports, which we are very happy to finish most of yesterday afternoon.

Richard Savio is the designated federal official for today's session. This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions. Should anyone wish to address the Committee, please make your wishes known to one of the Committee staff.

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1 It is requested that speakers use one of
2 the microphones, identify themselves, and speak with
3 sufficient clarity and volume so that they can be
4 readily heard. It is also requested that if you have
5 cell phones or pagers, you kindly turn them off.

6 Thank you very much. And Allen Croff,
7 Vice Chair, will lead us in this session. Allen?

8 VICE CHAIRMAN CROFF: Thank you.

9 In this session we're going to have a
10 briefing from the Spent Fuel Project Office. And the
11 briefing is going to be led by the director of the
12 office, William Brach. Take it away.

13 MR. BRACH: Thank you, appreciate the
14 invitation from ACNW to provide you an overview of our
15 office's activities.

16 22) OVERVIEW OF NRC SPENT FUEL STORAGE PROGRAM

17 MR. BRACH: Assisting me in the briefing
18 today will be Bill Ruland, who is sitting to my right.
19 Bill is Deputy Director of our Licensing Inspection
20 Directorate; and at the other side of the table
21 sitting across from me, Wayne Hodges. Wayne is our
22 Deputy Director for Technical Review. And sitting
23 immediately to Wayne's left is Ed Hackett. Ed is also
24 our Deputy Director for Technical Review.

25 Let me just mention that Wayne Hodges is

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1 retiring Friday of next week. So Wayne did tell me if
2 you have any questions and they appear to be questions
3 that might take a little bit longer duration as far as
4 time frame, that he is going to defer to Ed.

5 But I want to acknowledge that Wayne is
6 retiring with 36 years of service and very much
7 appreciate his time and effort at the agency and, most
8 specifically, in the Spent Fuel Project Office. Wayne
9 will be covering our part of the briefing dealing with
10 technical challenges.

11 CHAIRMAN RYAN: Just a quick aside, Wayne,
12 let's have the Committee wish you every success and
13 benefit retirement has to offer and to thank you and
14 recognize you for your service to the Commission.

15 MR. HODGES: Thank you.

16 CHAIRMAN RYAN: Thank you.

17 MR. BRACH: Let me move to the next slide.

18 Now, I understand that due to some time restraints
19 that we're looking to if we can within the next hour
20 or two provide both time for a briefing and time to
21 interact with you on any questions or comments you
22 might have.

23 This slide provides an overview of the
24 presentation we will be covering today. I will be
25 covering the first four topics: organization,

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1 achievement, storage facility, status, and
2 transportation. And, as mentioned, Wayne Hodges and
3 Bill Ruland, Wayne will be covering technical changes
4 and Bill will be covering some of the licensing
5 certification challenges that we face in our
6 regulation of spent fuel storage and radioactive
7 material transportation. And then I will provide a
8 brief summary, wrap-up at the end of the presentation.

9 The next chart is just to give you an idea
10 about the organization. We have modified this slide
11 some for our presentation today, noting on the
12 right-hand side we have the two deputy directors,
13 Wayne and Ed, both included in the box. As mentioned,
14 Ed will be our deputy director for full-time effective
15 after Friday of next week.

16 Also, on the left-hand side, Rob Lewis,
17 our Chief of the Licensing Section, there are two
18 names in that box as well. Many of you here know Rob
19 from our transportation activities. I know Dr. Weiner
20 has had much engagement with Rob over the years. Rob
21 is in the SES candidate development program on
22 rotation. Melanie Wong is acting for him during this
23 time frame.

24 And I just want to highlight we have two
25 SLSEs in the Office of SFPO, Earl Easton, who has

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1 interacted with the Committee a number of time on
2 transportation topics; and also Dennis Damon, on the
3 right-hand side.

4 Dennis is the NMSS SLS adviser on risk
5 assessment. I believe Dennis provided a briefing to
6 the ACNW earlier this year on some of the NMSS risk
7 considerations. Dennis is organizationally in the
8 Spent Fuel Project Office but has broader
9 responsibilities for our risk assessment in support
10 across all NMSS.

11 While I have this slide up, I just wanted
12 to mention briefly that our office is organized in a
13 matrixed organization. And that is the left-hand side
14 of the organization under Bill Ruland, our licensing
15 inspection project management and direction are all
16 set under Bill Ruland with technical support coming
17 from the other side, Wayne Hodges, Ed Hackett,
18 providing some technical support in all aspects of our
19 activities, whether it be spent fuel storage reviews,
20 transportation reviews, as well as support for
21 inspection activities.

22 This slide lists in summary form the
23 responsibilities of our office. We have licensing
24 certification and inspection program responsibilities
25 for the review and approval of spent fuel storage cask

1 systems and also for the review and approval of
2 applications for licenses for independent spent fuel
3 storage installations.

4 With regard to the inspection program
5 oversight, our office has program oversight
6 responsibility for all aspects of the program. We
7 conduct out of headquarters inspections of cask
8 fabricators and designers -- and that would be both
9 for transportation and storage packaging and casks --
10 and also oversight over the regional inspection
11 program that provides on-site inspection review with
12 regard to licensed activities at license facilities
13 across all four regions.

14 The second bullet, noting as well we have
15 the certification and inspection responsibly for
16 review and approval of transportation packages
17 involved in spent fuel as well as non-spent fuel. And
18 this is the type B packages for our spent fuel
19 byproduct and fissile packages for special nuclear
20 material.

21 There is a significant level of effort and
22 engagement in our office we have with other federal
23 agencies, principally, for example, Department of
24 Transportation and also Department of Energy, a
25 significant engagement also with state and local

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1 governments -- and this is involved in both
2 transportation and storage activities -- and also a
3 significant engagement in international activities.
4 And I'll cover this in a little bit more detail later
5 but with regard to, for example, the International
6 Atomic Energy Agency. And, again, that's both in
7 spent fuel storage activities as well as radioactive
8 material transport.

9 The level of engagement our office has in
10 public outreach, public interest is high in all
11 aspects of both transportation and storage. I'm sure
12 that's not news to you. There's quite a bit of both
13 national interest with regard to spent fuel
14 management, especially as it relates to dry cask
15 storage and away from reactor spent fuel storage
16 facilities but also in the area of transportation,
17 transportation of both spent fuel, prospectively
18 planned, whether it be to facilities, such as a
19 private fuel storage facility, or to considerations
20 for the repository at Yucca Mountain, significant
21 level of interest at the national as well as state and
22 local levels in transportation of spent fuel. But I
23 would also offer significant interest as well in
24 transportation of non-spent fuel; that is, other
25 byproduct and special nuclear materials. Bill Ruland

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1 will be discussing some of our outreach activities on
2 one of the subsequent slides as well.

3 I will offer if you have any questions
4 while I'm going through this, please interrupt me.
5 Sometimes it's best to address a question at that
6 point in time when maybe it's on the overhead or it's
7 a comment that I just made, maybe in talking too fast
8 or too quickly and moving on.

9 The next two slides highlight some of the
10 achievements of the program over just the past two
11 years. You'll note the statistics with regard to some
12 of the casework activities. I will just offer that we
13 have what I'll call a fairly heavy workload in our
14 office in both storage and transportation activities.

15 We typically have anywhere from 25 to 35
16 active cases under review, in various stages of
17 review, whether it be a new application coming in that
18 we're carrying out; for example, an acceptance review
19 in various stages of review, and requests for
20 additional information. So it's a fairly heavy
21 workload.

22 I mentioned before we operate in a
23 matrixed organization from my perspective that allows
24 us to be most efficient with regard to our resource
25 utilization so the staff do not have necessary down

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1 time while waiting for a response to questions on one
2 application. They will be engaged in review of other
3 applications we have, again, both stage and
4 transportation.

5 I noted in the overhead we completed our
6 security assessments. Following September 11, 9/11,
7 the NRC engaged in a number of security reviews across
8 the agency, looking, whether it be power reactors,
9 non-power reactors, fuel facilities, and in our case
10 looking at spent fuel storage and transportation, both
11 spent fuel and non-spent fuel.

12 This past year we have completed our
13 security assessments looking at various terrorism
14 considerations of large airplane crashes into storage
15 casks or transportation packages, looking at
16 land-based assaults, again, whether it be to spent
17 fuel casks or transportation packages. I can't go
18 into much detail at all on those reviews right now.

19 We have completed those studies. The
20 results of those studies have been provided to the
21 Commission for their review and deliberation. And at
22 this point in time, we're waiting for further
23 Commission review and guidance in that regard. But
24 that's from the standpoint of an activity.

25 We initiated those shortly after September

1 11th. A significant level of effort on our staff with
2 contractor support over the past couple of years has
3 been engaged in a lot of the first-of-the-kind, some
4 aspects a state-of-the-art reviews and analyses.

5 The next item I've mentioned this past
6 year, in February of this year, we brought finality to
7 our regulatory and licensing determination with regard
8 to the part 72 application from the private fuel
9 storage with regard to their away-from-reactor storage
10 application.

11 I raise this not from the standpoint that
12 our issuance of the license but our completing our
13 regulatory actions and determination in that regard,
14 I think you may be aware. I know we briefed ACNW on
15 previous occasions in the past years with regard to
16 the status of that review, had significant public
17 engagement, stakeholder engagement, and hearing
18 interactions with regard to both safety and
19 environmental issues.

20 The last item is one that -- I'll be frank
21 -- I'd pat our sales on the back a little bit. OMB I
22 think you may be aware has a program for the
23 systematic review of agency programs. In the last
24 year, OMB reviewed our spent fuel storage and
25 transportation program and gave us a score of 89,

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1 which is a result of an effective program.

2 That's a small percentage of federal
3 agencies' programs are graded in that regard. We're
4 very proud of the outcome. That's a fairly thorough
5 review that OMB carries out. And we're proud of the
6 program that our staff implements but also very
7 pleased in the OMB assessment of the quality of our
8 program.

9 This next slide on achievements -- I won't
10 dwell on outreach. Bill will cover that in a little
11 bit more detail. But, again, just noting the
12 significant level of outreach activities, that pretty
13 much addresses all of our program's activities:
14 storage and transportation, both through national,
15 state, and local levels.

16 Our engagement in international activities
17 in both transportation and storage, NRC, I believe,
18 has much expertise and experience to share
19 internationally to help, whether it be the IAEA or NEA
20 in storage and transportation activities, as well as
21 I believe there are opportunities for us to learn from
22 others. And so in our engagement in the international
23 activities, we're looking to other programs, what
24 experiences they had that we can bring back and
25 incorporate in our own program.

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1 And, clearly, of course, there is an
2 interest on the U.S. to the extent we can influence
3 those activities with regard to the technical and
4 safety bases.

5 The NAS I know has briefed the ACNW
6 recently on their completed report. I would only
7 highlight that that has been a significant activity
8 for our support, Earl Easton, whom I believe also
9 briefed the ACNW with NRC views and perspectives on
10 the NAS study, significant engagement on our part in
11 supporting the NAS as well as supporting the outcomes
12 of the NAS study that found safe and secure transport.

13 CHAIRMAN RYAN: Just a quick follow-up.
14 We did have the briefing. And in it, we heard from
15 Dr. Crowley. He raised some questions about driver
16 exposures and the uncertainty relative to driving long
17 distances.

18 I was fortunate enough to have the
19 Chem-Nuclear folks, who have quite a large low-level
20 radioactive waste shipment fleet, as you know, provide
21 some actual data in a letter that's now in our record.

22 It turned out that from 1976 to now, now
23 being the late '90s, the average exposure per driver
24 per year was about 138 millirem. So it was nowhere
25 the question that they raised, though we might

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1 approach limits if we have lots of transportation
2 units and so forth.

3 So I just mention that to you so you could
4 get a copy of that data. And it's probably helpful to
5 you to have that kind of information from what is, in
6 essence, the same requirement, two millirem per hour
7 in the cab.

8 MR. BRACH: Having the factual data to
9 support is very good. Thank you.

10 CHAIRMAN RYAN: One set of data can
11 eliminate 1,000 speculations.

12 MR. BRACH: Exactly. Thank you.

13 The next two slides provide a snapshot
14 overview of the status of spent fuel storage
15 facilities. You'll note the first bullet. There are
16 42 licensed spent fuel storage facilities across the
17 U.S. today. I would just draw in contrast to 1999.
18 There were 12 facilities. So there has been a
19 significant, threefold, increase over the past few
20 years.

21 And if you look at the second line, there
22 are 14 facilities that have announced plans to develop
23 new spent fuel storage facilities. And I would add
24 that just that number can now be 15. The Limerick
25 facility just had a public meeting a week ago

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1 announcing their plans as well.

2 I would note that the information on the
3 14 announced we keep track of that. And also we hand
4 it out to the Advisory Committee and to visitors.
5 There's a copy of a map that shows the locations of
6 the various spent fuel storage facilities across the
7 U.S., those that are currently licensed as well as
8 those that are planned.

9 I just want to digress for a second and
10 note that we try to be very careful and not to be the
11 ones making the first public announcement of some
12 licensee's plans or a particular licensee's plans to
13 have a spent fuel storage facility. And that's why
14 this map that you have doesn't show the Limerick
15 facility.

16 We haven't had a chance to update that
17 based on last week's meeting. But we always want the
18 licensee to be the first to make that public
19 announcement. And we'll pick up behind them in that
20 regard.

21 You see there is a significant number of
22 spent fuel casks that are loaded today, over 800,
23 approximately 800 loaded casks, at these 42 different
24 facilities across the U.S. And you see the last two
25 bullets identify this fairly large variety, if you

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1 will, of spent fuel storage cask designs available to
2 the industry to use for storage their spent fuel.

3 MEMBER HINZE: Excuse me, Bill. Could you
4 give me a clue as to what you mean by general and
5 site-specific?

6 MR. BRACH: Yes, sir. Let me just go to
7 the next page. And you'll see on this map the colored
8 graphs. The green identifies those that are what we
9 call generally license facilities and the red are
10 site-specific. Let me start first with the red, a
11 site-specific, license-specific.

12 If you think about the traditional NRC
13 regulatory programs, where an applicant will come to
14 the NRC with an application that addresses all aspects
15 of safety, environmental security requirements, and
16 will make a submittal to the NRC, NRC will carry out
17 that review, make a licensing determination, either
18 issuing or not issuing a license, or hearing other
19 aspects. I'm trying to be brief.

20 The red refers to what we call a
21 site-specific. That's the traditional approach where
22 an applicant comes in. And based on licensing
23 determination review, if we find that they meet all
24 the requirements will issue what we refer to as a
25 site-specific license. That would be shown by the red

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1 graph on this page, about 14 or 15 of those
2 facilities. The green are generally licensed
3 facilities.

4 The regulations in 10 CFR Part 72 allow a
5 Part 50 licensee, a power reactor licensee, to proceed
6 to store spent fuel on their site without making
7 specific application or requests to NRC for any such
8 authorization or approval.

9 Part 50 allows them to do that with the
10 provision that that Part 50 licensee use a dry cask
11 storage system that has already been reviewed and
12 approved by the NRC and included and listed in 10 CFR
13 72-214 is the reference.

14 And the site-specific license application,
15 as I mentioned, does include opportunities, for
16 example, for public engagement and hearing processes
17 and opportunities.

18 The general licensing approach does not
19 require any application to the NRC, for that
20 particular licensee does not afford the public an
21 opportunity to engage in hearings or intervention in
22 that regard. The public's opportunity for engagement
23 in the process was in the review and our approval of
24 the dry cask storage system in its listing in Part 72.

25 There is a rulemaking process through

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1 which we provide opportunity to the public to review
2 and comment on the certification activity that we're
3 proposing. And so before that cask system is listed
4 in Part 72, the public had an opportunity to engage in
5 the rulemaking process.

6 The green graph on the overhead and also,
7 if you note, on the statistics show that at this point
8 in time, most of the licensees, power reactor
9 licensees, are planning to use the general license
10 authorization; that is, use a previously used and
11 approved dry cask storage system at their site, to
12 store spent fuel.

13 Also, I would highlight on this graph if
14 you interpolate, although the graph only goes to about
15 2008, we're clearly projecting that by the year 2010,
16 there will be over 50 spent fuel storage facilities
17 licensed by the NRC for storage of spent fuel. With
18 few exceptions, these are predominantly at power
19 reactor licensees.

20 The few exceptions are the license that I
21 mentioned a few minutes ago that we have issued to the
22 private fuel storage facility. There are also
23 licenses issued, for example, to the Department of
24 Energy for storage of TMI-2 fuel debris at the Idaho
25 facility.

1 Also DOE has another license at DOE Idaho
2 to store Peachbottom, Shippingport, and Triga fuel in
3 a spent fuel storage facility, which has its license
4 but not built or operational.

5 Also, I will mention all of these
6 facilities are dry cask storage facilities with the
7 exception of one, and that is the G.E. Morris
8 facility, a facility that was originally built and
9 planned to be a reprocessing facility.

10 They store spent fuel in spent fuel pools
11 at the G.E. Morris facility. And that G.E. Morris
12 facility is a licensed Part 72 spent fuel storage
13 facility using cool or what we'll call wet storage.
14 All of the other facilities are dry cask storage
15 facilities.

16 CHAIRMAN RYAN: Just out of curiosity, how
17 many total cores are in storage or some measure of the
18 fuel itself?

19 MR. BRACH: Cores. Wayne, can you help me
20 on that? About 800 casks each --

21 MR. HODGES: Eight hundred casks.
22 Probably the earlier ones were all 24 PWR or on the
23 order of 68 BWRs. And the recent ones are going to a
24 higher number. So for purposes of mental
25 calculations, maybe 25 assemblies per cask would give

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1 on the lower side a little bit. And you can go from
2 there.

3 CHAIRMAN RYAN: Okay. Thanks.

4 MR. LARKINS: Just a quick question on
5 this. Is there any limitation on the number of casks
6 that you can have on a particular site?

7 MR. BRACH: Under a general licensee, the
8 answer is no. Under a site-specific license
9 application, the license application typically will
10 identify very specifically all aspects of the planned
11 facility, including the number of casks.

12 So that for a site-specific application,
13 typically the answer would be yes. For a general
14 licensee, the licensee needs to store the spent fuel
15 consistent with the dry cask storage system that has
16 been approved. And a number of facilities have based
17 on initial pad construction and cask loading added
18 additional pads to their site under the general
19 license.

20 MEMBER WEINER: I would like to ask a
21 question, too.

22 MR. BRACH: Sure.

23 MEMBER WEINER: When you grant a general
24 license, since that's for a dry cask storage system
25 that has already been approved, what consideration is

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1 given to siting, where it's going to be?

2 What raised the question is I noticed that
3 Turkey Point is a potential general licensee. And
4 Turkey Point is located in the swamp.

5 MR. BRACH: Again, there's no application
6 to the NRC for a general license. So there's not an
7 NRC review and approval. The authorization for a
8 general license is provided through the regulations to
9 in this case Turkey Point but to power reactor
10 licensees.

11 Part 72 requires that not only must the
12 licensee select a dry cask storage system, but there
13 are other elements. And 72-212 is a specific citation
14 reference, requires the licensee to go through a very
15 detailed, comprehensive evaluation to demonstrate that
16 the dry cask storage system that they're selecting for
17 use at their site is enveloped in all regards by the
18 geo characteristics.

19 So it's everything from, say, the geo
20 characteristics of the facility to the fuel
21 characteristics of the facility to all other aspects
22 of managing and transferring, loading those canisters
23 with spent fuel, and transferring those loaded
24 canisters to the storage pads.

25 So that the 72-212 evaluation addresses

1 everything from security to environmental to siting
2 both the bad and also all aspects of the operational
3 use of that dry cask storage system. It's a very
4 detailed regulation that requires the licensee to do
5 that site evaluation.

6 And that site evaluation is subject to NRC
7 review, not approval but review, through our
8 inspection processes. And we typically provide
9 significant headquarters inspection support to the
10 regional in review of the 72-212 evaluations, where we
11 have folks who are very knowledgeable of the various
12 technical aspects of the dry cask storage system to
13 argument the regional inspection activity.

14 MEMBER WEINER: So, if I understand you
15 correctly, a general license would still involve a
16 72-212 review?

17 MR. BRACH: Yes. Each general license
18 requires a 72-212 evaluation carried out by the
19 licensee. That evaluation must be completed before
20 the licensee starts any dry cask storage activities
21 with regard to use of that dry cask storage system.

22 The next two slides briefly cover
23 transportation role. I've mentioned already that our
24 principal role is in the review and approval of type
25 B package, fissile packaging.

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1 The second bullet lists some of the
2 aspects. I know some of you are very familiar with
3 the accident requirements of Part 71 with regard to
4 the performance characteristics. The transportation
5 packages must demonstrate the robustness and
6 capability to contain material and maintain
7 subcriticality.

8 And then also I would mention inspection
9 with regard to our oversight, both out of our office
10 and headquarters and also the four regional offices.

11 We provide significant technical support
12 and collaboration to the Department of Transportation.
13 Department of Transportation is a U.S. competent
14 authority for transportation. And they rely on us
15 extensively with regard to technical support
16 activities for both domestic and also international
17 support activities.

18 And the last bullet notes that we, NRC,
19 serve with DOT as co-representatives to the IAEA
20 Transportation Safety Standards Committee. The
21 significance of that activity is the IAEA develops an
22 international transportation standard that forms the
23 regulatory basis that we, NRC, and DOT, use to base
24 our 10 CFR Part 71 and DOT's 49 CFR 171 requirements
25 with regard to radioactive materials here in the U.S.

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1 That same transportation standard is used
2 internationally to base the transportation standards
3 internationally to support international commerce and
4 consistency.

5 Yes, Ruth?

6 MEMBER WEINER: This may be a question you
7 will answer later. Are you coordinating risk
8 assessment, transportation risk assessment, with the
9 Department of Transportation?

10 MR. BRACH: I'll say yes. There are
11 aspects of risk assessment that we have been working
12 trying to engage internationally to clearly have a
13 safety but also a risk basis perspective brought into
14 TSR-1. We also are looking at risk assessment, risk
15 considerations in a broader context domestically. In
16 that regard, we're working with other federal
17 agencies, DOT and others, in that regard.

18 MEMBER WEINER: I ask because the DOT risk
19 assessment is pretty much out of date.

20 MR. BRACH: Are you making reference to
21 NUREG 0170? Is that?

22 MEMBER WEINER: No, no. The Department of
23 Transportation has a guidance on risk. And I just
24 wondered whether you had interacted with them at all
25 on that guidance. Apparently not.

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1 MR. BRACH: Well, I'm not real sure.
2 Bill?

3 MR. RULAND: I think the answer is no.

4 MEMBER WEINER: Thank you.

5 MR. RULAND: But the implications of your
6 question are interesting. And we'll go back and
7 cogitate about it. Thank you.

8 MR. BRACH: In the essence of time, the
9 last slide, I believe Earl has probably covered this
10 information with you, maybe Kevin Crowley as well,
11 that basically the story that we're trying to present
12 here is we feel that the transportation of spent fuel
13 historically and currently in the U.S. has a proven
14 safety record and I think consistent with the NAS
15 recommendation, future shipments as well can be safe
16 as long as we and the industry maintain compliance and
17 conformance with existing standards and requirements.

18 The last point, I would highlight that
19 there is a significant ongoing daily transportation of
20 radioactive materials byproduct and special nuclear
21 materials on a daily basis. And I believe the
22 transportation record speaks well in that regard as
23 well.

24 MEMBER WEINER: Can you give some idea of
25 what fraction of those 10,000 are fuel cycle

1 shipments?

2 MR. BRACH: Ruth, off of the top of my
3 head, I don't have an answer. The dominant number,
4 that 10,000, though, would be byproduct material,
5 non-spent fuel, and non-special nuclear material
6 shipments supporting either industrial purposes of
7 radiography example or for medical nuclear purposes
8 and applications. The dominant number, that 10,000,
9 is in the latter category.

10 With this, at this point let me turn to
11 Wayne, who will be covering some of our technical
12 changes and I believe discussing first our issues with
13 regard to transport of high burn-up fuel.

14 MR. HODGES: Go ahead to the next slide.
15 There are a few issues that have been on our plate for
16 several years, one of which is transportation for high
17 burn-up fuel. When we say, "high burn-up fuel," we're
18 talking about greater than 45 gigawatt days per ton on
19 the exposure of the fuel.

20 The two major impediments to getting
21 approval for that are: one, we have very little data
22 on the cladding properties once you start to get the
23 hydride build-up in the cladding as you oxidize the
24 cladding, the hydride built into the cladding. We
25 have a fair amount of data on the cladding materials

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1 without hydrides but almost none when you get to the
2 hydrides.

3 Another issue that has been a point of
4 major discussion with the industry over the years is
5 burn-up credit and particularly for burn-up credit for
6 fission product beyond the actinides.

7 We have issued several guidance documents,
8 the ISG-8, I think it is, for burn-up credit, which in
9 the rev. 2, ISG-8 talks about giving credit for the
10 actinides but the actinides only. And there is an
11 effort underway, which I will talk about a little bit
12 on the other slide, to try to get additional
13 information, to include other fission products. But
14 at present, we're restricted to the actinides only.

15 We also have in that guidance a
16 requirement that they take a relative measurement, a
17 qualitative measurement essentially, of the burn-up.
18 And that particular requirement has I think prompted
19 the vendor to not ask for burn-up credit in their
20 applications generally. So essentially all of the
21 applications thus far consider fresh fuel in their
22 applications, although we have provided a means for
23 getting credit for at least the actinides.

24 There are some potential solutions to
25 these problems we have identified here. One is there

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1 are data on burn-up credit that are available. The
2 French have a fair amount. And DOE has contracted to
3 obtain some of that. I'll go into that a bit more on
4 another slide.

5 For the issue on planning properties, what
6 we need are basically tests. Irradiated fuel, which
7 have the hydrides in them, those are fairly expensive
8 tests. Several years ago we kind of got on the
9 coattails of a program that was being done for NRR to
10 get properties of the cladding for local accidents and
11 this type of thing. And we just added onto that
12 program. And they were getting data at Argonne
13 National Lab.

14 In recent years, we had tried to tailor
15 that more to the specifics for the transportation
16 issues. You're probably aware that in January of this
17 year, Argonne announced that they were going to be
18 shutting down their hot cells and would not be done
19 any more work there. In actuality, they haven't done
20 any work for us there for I think over a year because
21 of some issues that had been identified.

22 We have been waiting for that to start
23 back up to resume some testing there. There's been an
24 agreement reached. These tests, by the way, are all
25 being run through our Office of Research. We're not

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1 doing them directly. We're working through our Office
2 of Research to do this.

3 They have made arrangements for the work
4 that needs a hot cell that can be done at Oak Ridge,
5 but that is going to take some time to clean up the
6 hot cells at Oak Ridge and get ready to do the test.

7 Some of the tests we've done with the
8 cladding defueled so that they can be done outside the
9 hot cell. And those will still be done at Argonne to
10 try to get at some data. We've been talking about
11 that a year and a half before we start seeing any data
12 that we can use beyond the few data points that
13 already exist.

14 A couple of other potential approaches.
15 One is the concern with the mechanical properties is
16 you can't predict what the fuel assemblies will look
17 like on an accident if they tend to get very brittle.
18 And so if you analyze for a standard geometry, so to
19 speak, assume that the fuel breaks up and analyze that
20 and get away from the need to have all these
21 properties, that's not real easy to define some
22 limiting cases. So that's not really been followed
23 yet. But that's one possibility.

24 Another one, which is if you were to
25 assume that no moderator could get in there, then just

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1 about any configuration you would imagine that could
2 be achieved, you're going to have a difficult time
3 getting above about a .65 or .7 on the K-effective.
4 And so it kind of makes the problem go away.

5 But there are a lot of other issues
6 associated with trying to get moderator exclusion.
7 And so that would take some time to get to that point
8 as well. But those are some potential solutions to
9 problems identified as far as the transportation of
10 high burn-up fuel.

11 MEMBER WEINER: Are the data that you have
12 to date from the Argonne test available?

13 MR. HODGES: Yes, yes.

14 MEMBER WEINER: Okay.

15 MR. HODGES: And it has some interesting
16 results. For example, it turns out that as you start
17 to increase the hydride, you get more brittle up to a
18 point. But then above very high hydride
19 concentrations, you actually get a reversal of some of
20 that. And so it's not a linear phenomenon. It's a
21 very complicated issue.

22 And we have data on zircalloy. We have no
23 information on M-5 or zirlo cladding materials.
24 They're designed to be more ductile. So you would
25 expect to be not as much of a problem as you would

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1 have with -- we just don't have the data.

2 Bill, do you want to go to the next one?

3 MR. LARKINS: Wayne, is any of the work
4 that's going on at EPRI on high burn-up fuels
5 applicable to this issue?

6 MR. HODGES: Well, after the stuff at
7 EPRI, it's just a cooperative program between EPRI and
8 the NRC. And DOE is involved in that as well. That's
9 a cooperative program.

10 MR. LARKINS: Same data. Okay.

11 MR. HODGES: Yes. As far as burn-up
12 credit, I would say there is a DOE program to try to
13 expand the database. The French had agreed to sell
14 that to the Department of Energy, with Oak Ridge being
15 their agent, to get the data and analyze it.

16 That data will go to be purchased in three
17 installments as much for financial reasons as for
18 anything else. We received the first installment of
19 data early last summer.

20 And Oak Ridge has done a fair amount of
21 analysis with that particular data. Unfortunately,
22 that is primarily supportive of the actinide that's
23 used and doesn't do much for other fission products,
24 but it will help reduce the uncertainty as far as
25 actinide assessment. So it is useful but not as

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1 useful as the other data would hopefully be.

2 The other data has been slower in coming
3 because with budget cuts, DOE has decided they don't
4 have the money to purchase them now. And so the
5 purchase of the other two parts of the data has been
6 delayed until they can get the funding to do that.

7 There were also some tests that DOE was
8 looking at running at Sandia to look at both fission
9 products and for cross-section measurements and also
10 just a really important isotope.

11 And then ISG-8, rev. 2, which I've talked
12 about, would allow burn-up credit for the actinide
13 only. We would use this data then to revise the
14 guidance we would put out to take credit for the
15 fission products where it is available.

16 Now, we do have one application under
17 review almost completed from one of the vendors, where
18 they have taken what little bit does exist as far as
19 fission product data and are requesting approval for
20 use of burn-up credit for fission products other than
21 just actinides.

22 Because the database is very limited, it
23 would be fairly large uncertainties associated with
24 that, but we are very near approval of that particular
25 application. And once that is approved, then there

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1 will be a fair amount of interest from the other
2 vendors as well.

3 We also have been in the business of
4 trying to issue guidance. And we have standard review
5 plans that have been out for a long time. Our initial
6 plans were to review the standard review plans about
7 every three years to try to keep them current.

8 That hasn't happened because we really
9 haven't had the resources to do that. And what we
10 have done, instead, is as issues have arisen, we have
11 developed what we call interim staff guidance that
12 deals with the way to deal with the issues that do
13 come up.

14 We not have an effort in progress that's
15 fairly early in the effort to try to update at least
16 the storage standard review plans. And that would be
17 done using a risk-informed approach.

18 I mean, what's there now is more of a
19 deterministic approach. If you want to update it,
20 let's go ahead and go the full mile and try to put
21 risk considerations there at the same time. And so
22 that is our intent to do that.

23 MEMBER WEINER: When you say,
24 "computational modeling," "guidance on computational
25 modeling," is that referred to finite element

1 analysis?

2 MR. HODGES: I'll get into those in a
3 moment.

4 MEMBER WEINER: All right.

5 MR. HODGES: We're not quite there yet.
6 We'll get there. Just be patient.

7 I have those two examples up there as the
8 most two recent ISGs that we have issued, one dealing
9 with -- ISG-21 is the one for computational modeling.
10 ISG-22 deals with issues involving oxidation of the
11 fuel in an air environment.

12 The computational modeling one, it does
13 basically get involved with finite element modeling,
14 the kinds of things we need to submit, the
15 benchmarking of the codes, all the things that the
16 staff would be looking for when a vendor submits an
17 application.

18 We have had a history of asking lots of
19 questions. When an application comes in, it doesn't
20 include what you need. So we go back and ask a
21 question. And they submit some stuff. And then we
22 really start to review after we have had the first
23 round of questions. It doesn't make a lot of sense.
24 So what we try to do is put in this guidance document
25 the kind of information we need to do a good technical

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1 review of the calculations.

2 There has been some push-back from
3 industry when we issued that. Our process for inner
4 staff guidance is that we put together a draft
5 guidance document. We issue it for public comment.
6 It goes on our Web site. It goes in the Federal
7 Register notice. And so we receive quite a bit of
8 comment from industry on both of these ISGs.

9 These are the first two, by the way, to go
10 through that particular process. In years past, we
11 have not gone with the public comment. These two have
12 actually gone through the public comment process and
13 have now been issued. And there was a fair amount of
14 push-back from some of the industry on both of these.
15 But we felt that what is in this ISG-22 is what we
16 would need in order to do a review and approval of a
17 model.

18 The air oxidation one is kind of
19 interesting. This one actually was identified to us
20 as an issue from some of our inspectors. One of the
21 regional inspectors basically said, you know, "When
22 they go to drain these casks, they're using air to
23 displace the water that is drained out."

24 And we should have been but we're not
25 fully aware that was always being done. And it's not

1 always being done but in some cases is being done.
2 And so we had a concern that when you do that, if
3 there are any flaws in the cladding at all, oxygen
4 gets in there.

5 And it goes to a conversion to U409 and
6 finally to U308. When it gets to U308, you've got
7 about a 33 percent increase in the volume. And if you
8 have a flaw in the cladding, you could start to open
9 the cladding up. And so that's a major concern.

10 We put out the guidance on this. And
11 basically what the guidance calls for is if you drain
12 the water out with an inert environment, there's no
13 particular issue. You can use air provided there are
14 no pinhole or hairline cracks or other flaws that
15 would allow oxygen to get to the fuel.

16 So if you can show from plant records that
17 you got intact fuel, specifically pristine fuel, then
18 you could use air or anything there or you could still
19 use air if you could show that the temperatures remain
20 low enough that you don't have a problem because this
21 is a time-dependent phenomenon.

22 If you're talking about, for example, at
23 360 degrees, it takes 2 to 10 hours for this to
24 happen. At 290 degrees Centigrade, it would take over
25 100 hours for it to happen. So if you can keep the

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1 temperatures low, you don't have a problem either.

2 And so we gave them several options as to
3 how to assure the cladding doesn't tend to open up on
4 this oxidation. And this was primarily of concern
5 when you're loading the fuel, but it gets to be a
6 transportation issue. So this was kind of to alert
7 the industry to be aware of what you could be doing to
8 yourself as you put the fuel in the canister because
9 when you get rid of transport, if you're not careful
10 how you handle it, you may not have the same fuel you
11 thought you started with.

12 MEMBER WEINER: Does the temperature
13 coefficient of your expansion follow any kind of
14 theoretical equation or is it just something you have
15 observed empirically?

16 MR. HODGES: It's essentially an empirical
17 equation or curve that has been developed. In fact,
18 most of the data was taken back in the '80s. This is
19 not even any recent data. And there's no data, again,
20 on high burn-up fuel.

21 The indications from the data that are
22 available which say that as you get to a higher
23 exposure on the fuel, high burn-up on the fuel, the
24 rate of this goes down except for the fact in the rim
25 of the fuel, you get the very fine particulates, which

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1 give you a larger surface for oxidation, may cause it
2 to go up. And so we really don't know what happens
3 with the higher burn-up fuel.

4 Burn-up credit issues. I said briefly we
5 need data for benchmarks to make sure we can
6 characterize the biases and uncertainties. We need it
7 primarily for the fission product to go beyond the
8 actinides, but we can use it to strengthen the
9 actinide basis as well.

10 You get the cross-sections from critical
11 experiments. And you need assays to get the isotopic
12 inventory. The industry would like to see us give a
13 lot of credit to reactor criticals when you start the
14 reactor up. You can give some credit for that, but we
15 don't give a lot of credit to that for several
16 reasons. One is in many cases, the codes that are
17 used to analyze the criticality when you start up a
18 reactor have been tuned to the core for that
19 particular reactor. So the fact that you can predict
20 at start-up is not quite as nice as it would be if you
21 were doing it blind.

22 And, secondly, the actual conditions in
23 the cask are somewhat different. You have a different
24 temperature. You've got a smaller set of fuel. So
25 you don't have the same thermal environment that you

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1 would have in the core. So it's not fully compatible
2 to say, "Well, I'll just use the reactor criticals to
3 define that."

4 And, finally, you have this issue of the
5 burn-up measurement. What we have been requiring is
6 what I call a qualitative measurement. It's basically
7 looking at maybe the gamma as you pull the assembly
8 out and use that with a comparison of what you would
9 expect from plant records.

10 So it's not an absolute measurement of the
11 burn-up of the fuel. It's just a relative
12 measurement. And the concern is that you may have a
13 misloaded or several misloaded assemblies.

14 Now, we have done through Oak Ridge and
15 EPRI have done some analysis of misloading. If you're
16 down at low enrichment, you can actually misload a
17 fair number of assemblies and still not have a
18 criticality issue. But as you go to enrichments
19 approaching five percent, then it doesn't take but one
20 or two assemblies to start getting what could be an
21 issue.

22 So it's an issue that may not be a major
23 problem. But at this point we maintain we would like
24 the measurement. The industry when we met with them
25 back in March told them that they would try to pull

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1 together some data to show us we didn't need that
2 requirement. And so we'll be anxiously awaiting what
3 they submit on that.

4 MR. BRACH: We'll move now to licensing
5 challenges. And Bill Ruland will cover a few of the
6 licensing certification issues.

7 MR. RULAND: Thank you, Bill.

8 Before I start going over my slides, I
9 just wanted to say that I've been in the regions for
10 about 20 years. I've been in my current position
11 about a year now. And one of the interesting things
12 I found out about the Spent Fuel Project Office is the
13 wide variety of regulatory functions we perform.

14 We perform virtually every function that
15 the NRC performs: rulemaking, international,
16 inspection, enforcement, licensing. As you heard,
17 we're actually doing licensing, issuing licenses. And
18 so as a professional regulator, it really gives you
19 good experience. And, of course, I have the fortune
20 to work with terrific folks.

21 Anyway, let's move on. These two
22 regulatory issues, or summaries -- and these are the
23 titles for them -- were issued both 2005 and late 2005
24 and late 2004.

25 These two summaries were published as a

1 result of a conference we had with NEI. And we
2 recognize that for us to improve our effort, we really
3 need to solicit comments from industry. And we got a
4 number of them.

5 And we used these two vehicles to
6 communicate both our standards and what we're looking
7 for in our applications, how the industry should
8 interact with the Spent Fuel Project Office. And we
9 also listed, as you can see by the second bullet, what
10 our review process was and the rules of engagement.

11 We have noticed over the last year or so,
12 really, an improvement and a regularization, if that
13 is even a word, of the way we interact with licensees.
14 And we're not finished. We keep looking for that.
15 And virtually every opportunity that we meet with the
16 industry, we reemphasize these rules of engagement.

17 Just to give you an example of the kinds
18 of things that the rules of engagement list:
19 pre-application meetings, emphasize the role of the
20 project manager, frequent telephone conversations,
21 things that you would normally engage in. But we have
22 noticed, really, a significant improvement in the way
23 we interact with our licensees and applicants.

24 As far as the inspection program goes, the
25 Spent Fuel Project Office has overall responsibility

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1 for the inspection of independent spent fuel storage
2 installations, both direction-setting resources. And
3 we both support region-led inspections for the dry
4 runs that licensees must do before they actually load
5 these casks and also we are the primary inspection
6 office to inspect vendors and fabricators.

7 Just a few other topics I would like to
8 cover that really have been on our minds. One of the
9 things has to do with the license term and the
10 certificate of compliance renewal terms. Initially,
11 as Bill had previously described, the site-specific
12 license and the general license requirements, the
13 site-specific licenses were issued for 20 years.

14 The renewals were issued for 20 years.
15 And several years ago, the Commission when we asked
16 for, several licensees asked for, an exemption such
17 that the renewals could be for 40 years, we sent a
18 Commission paper.

19 The Commission approved that. And we
20 issued 2 renewals for 40 years. And they directed the
21 staff to go back and look at the terms of the license
22 and the terms of the renewal.

23 The staff has taken a careful look at
24 that. And the Commission is due probably -- well, I
25 think it is like June. Next month the Commission

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1 paper should be, in June. We should be sending it to
2 the Commission. And it would be premature right now
3 to say exactly how we think it is going to come out.
4 But we're going to recommend some changes to the
5 license terms. And we have not identified any major
6 technical issues associated with that.

7 This issue particularly revolves around
8 the difference in the way we treat general licensees
9 and site-specific licensees. So hopefully we'll be
10 improving our regulations in that area.

11 Special package authorizations. We
12 recently issued a special package authorization for
13 the LaCrosse reactor vessel, BWR reactor vessel. This
14 special package authorization was a relatively new
15 provision in our regulations that if licensees or
16 applicants can't comply with our normal regulations,
17 they can for a one-time shipment apply to us for
18 authorization for a special package.

19 In this case it was a reactor vessel. And
20 they have to demonstrate to us that they provide a
21 level of safety that is equivalent to our normal
22 regulations. It was like late April that we issued
23 that special package authorization.

24 So it was our first time to use this
25 regulation. And as part of the spent fuel projects

1 lessons learned program, we're going to go back. We
2 haven't done this yet, but we're going to go back and
3 take a look at how that review and approval went and
4 try to decide, is there something else we need to do.
5 Do we need to issue guidance to additional licensees
6 if they have to go down this path? But we thought
7 that this particular regulation was well-suited for
8 this application.

9 72.48 change authority. You may be
10 familiar with the change authority that reactors have.
11 It's called 50.59 in the reactor world. 72.48 is a
12 provision in the regulations that permits licensees or
13 certificate holders, the vendors to change the
14 certificate of certain criteria are met.

15 Now, the guidance that we currently have
16 for this regulation is an NEI document that the
17 industry submitted to us and we endorsed. But
18 primarily this guidance has a number of -- it was
19 developed for reactors. It was then adapted for the
20 Spent Fuel Project Office. And licensees continue to
21 use this regulation. For the most part, we believe
22 this has been successful, but recently there have been
23 some cases where the industry in implementing this
24 regulation. We have to take a really careful look.

25 We're right in the middle of talking to

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1 one particular reactor licensee. And, frankly, we
2 have a difference of opinion on whether they could
3 conduct this change without our review and approval.

4 So once these recent examples are
5 completed, we're going to take another look at this to
6 try to understand if we need additional guidance.
7 Industry has already asked us to put this on the
8 table.

9 We have an NEI task force where we're
10 working with them to understand what the issues are
11 and work through those. This is one of the items on
12 the list. And we're going to no doubt engage them to
13 try to understand where we're headed on this matter.

14 Public outreach. I'll talk about that in
15 a minute. And as far as changes in the national
16 strategy for spent fuel management, no doubt everybody
17 here is aware of GNEP and a number of other efforts
18 going on.

19 It's our view that the Spent Fuel Project
20 Office is -- you know, it's our role to stay aware of
21 what those changes are and be ready to respond to
22 whatever comes down the pike. I think we're doing a
23 particularly effective job at that.

24 Bill, next slide. As one particular
25 example of that, the TAD canister, or the

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1 transportation, aging, and disposal canister, that DOD
2 is proposing to ship spent nuclear fuel to Yucca
3 Mountain is still not there.

4 The performance, the canister performance,
5 specifications, DOE has told us throughout the summer.
6 We're working very closely with the high-level waste
7 repository safety organization in NMSS so that, as
8 appropriate, we marriage our reviews.

9 We believe, however, in examining our
10 storage and transportation regulations right now that
11 they are sufficient to make sure that whatever TAD
12 canister DOE proposes, that they will be safely stored
13 and transported.

14 Public outreach is a big effort in the
15 Spent Fuel Project Office. The National Academy of
16 Sciences study has really reinforced that message.
17 One of the things the National Academy has identified
18 was this whole notion of social risk, if you can
19 remember.

20 And our view was that as a regulator,
21 we're not there to manage the social risk. Rather,
22 we're there to communicate what our role is, the
23 quality, and the detailed evaluations that we do,
24 basically to provide information to a number of
25 organizations and in this case, some of the people

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1 that make up the key transportation infrastructure,
2 which these groups are listed right here.

3 You could see the state, regional groups,
4 the National Conference of State Legislators, NEI, the
5 U.S. Transport Council.

6 We devote a significant effort to make
7 sure we communicate effectively with these folks.
8 And, in fact, when we examined the NAS study, we
9 started asking ourselves, what additional research,
10 what additional studies do we need to do to be able to
11 continue to reinforce our case that we think the
12 transportation of spent nuclear fuel is safe.

13 MEMBER WEINER: Have you noticed any
14 difference in the attitudes of any of these groups; in
15 particular, the public groups, because you have
16 undertaken a huge public information effort? Is there
17 any way to measure the effect? Have you done any
18 assessment of the effect?

19 MR. RULAND: You know, I'm really glad you
20 asked that question because one of the key folks in
21 our office, Earl Easton, I think I actually put it in
22 his performance appraisal, believe it or not. You
23 know, let's develop a way to measure the effectiveness
24 of the efforts. It's on my mind. It hopefully is on
25 Earl's mind.

1 And so you've hit the nail on the head,
2 and I'm really glad you asked this question. Right,
3 Earl? So I am tickled. I am tickled you asked this
4 question. It is extremely difficult and I recognize
5 an extremely difficult question to formulate an answer
6 for.

7 Earl and I have talked about it somewhat.
8 It's on our plate. I don't have an answer yet. What
9 I can say is the folks on the regional/state groups I
10 have noticed just since I have been here, really, we
11 have established a genuine rapport with those folks.

12 And there are certain people that are
13 adamantly opposed to the transportation. How should
14 I say? They actively engage us. And I think we have
15 listened to their arguments carefully. And once we
16 listened to their arguments, we try to think, well,
17 how can we deal with that argument.

18 We have gone back and done that. Those
19 folks have started to change their arguments, which
20 tells me they might not be happy with our answers, but
21 they recognize the validity of our responses. And I
22 think we're making headway.

23 MEMBER WEINER: Your last statement is
24 very important in public outreach that they recognize
25 the validity of your arguments. I think that's

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1 extremely critical.

2 MR. RULAND: And it's not like, boy, we
3 really agree with you, but we can see their arguments
4 changing, very important. And so I think we're
5 getting our money's worth, although, like I said,
6 we've got to do better deciding how to measure that.

7 Let's see. Where am I? In storage also,
8 we support local public meetings. As Bill had
9 mentioned, Limerick did have a public meeting
10 recently. And we provided them some technical
11 information.

12 And, then, finally, industry workshops.
13 What is the next? I think I'm done, right?

14 MR. BRACH: Yes.

15 MR. RULAND: Okay.

16 MR. BRACH: Let me pick up. And I realize
17 in time we're about at that 11:00 o'clock time frame.
18 One thing we didn't mention and it's evidenced on the
19 map, a number of power plants have extended their
20 license term, if you will, gone through license
21 renewal, the need for a capacity for storing spent
22 fuel that's generated now, will be generated in the
23 future as an important function/role that our office
24 has to provide the regulatory structure to meet and
25 address those needs as they come along. I believe

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1 we're doing our best in that regard.

2 Wayne mentioned a lot of the technical
3 issues, working very collaboratively with DOE, with
4 EPRI, the industry, and internationally to gain a
5 better grasp and understanding, high burn-up fuel.
6 Burn-up credit issues, whether it be in transport or
7 storage, have been discussed and addressed for a good
8 number of years. A lot of it in the past has been
9 more discussion than being addressed.

10 I think what Wayne was describing, we have
11 efforts underway collaboratively to hopefully bring
12 some new information, new data to advance the ball,
13 technical ball, in that regard.

14 Bill mentioned our public outreach. The
15 last point I want to make, the very last point of the
16 slide, there clearly is a significant amount of
17 national interest with regard to changing, potentially
18 changing strategies, in spent fuel management, whether
19 that be increased or additional or away from reactor
20 storage facilities, whether they be licensed by the
21 NRC or not.

22 We're trying to maintain cognizance and
23 awareness so that to the extent there is an NRC role
24 in engagement, whether it be in storage, whether it be
25 in transport to the new or additional facilities, that

1 we are aware of and can be positioning ourselves to
2 respond as we have a regulatory role in that regard;
3 and also, as Bill mentioned, the GNEP, to the extent
4 that we process and recycle advances.

5 There are aspects of our office with
6 regard to transportation of fuel in that regard. It
7 would be a significant piece and part. So we're
8 trying to maintain cognizance there to position
9 ourselves as we're looking downstream of while we're
10 aware of power plants and power plant storage news,
11 there might be changes in the landscape that will
12 engage it. So we're trying to maintain awareness in
13 that regard.

14 At that point, this completes the
15 presentation we have planned. I would offer
16 availability on our part to try to address any
17 comments or questions that you may have.

18 VICE CHAIRMAN CROFF: Thank you.

19 Jim?

20 MEMBER CLARKE: Thank you very much. I
21 really don't have any questions.

22 VICE CHAIRMAN CROFF: Okay. Ruth?

23 MEMBER WEINER: I still have a couple of
24 questions, really for Wayne. What impact do you think
25 that the TAD will have on burn-up credit or the

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1 burn-up credit will have on the TAD? What do you
2 think that interaction is going to be?

3 MR. HODGES: Well, for transportation
4 purposes, the TAD, as I understand it, although we
5 haven't seen the criteria, will probably be for if
6 we're talking about PWR fuel 21 assemblies, as opposed
7 to 32, for example, some of the vendors are trying to
8 license now for transportation. With 21 assemblies,
9 you may not even need for transportation, but still
10 you have to be saying that it's very likely you won't.

11 MEMBER WEINER: Thank you. That's exactly
12 what I was wondering about.

13 The other question I have relates to
14 storage. At a conference I was at recently where
15 there were a lot of utilities people, they said that
16 there is so little space in the fuel pool that they're
17 going right from -- as soon as possible they put
18 material into surface storage. And then would that
19 have to be recanistered if there is a TAD? What role
20 do you see NRC playing in that? And how do you see
21 that playing out?

22 MR. BRACH: Dr. Weiner, a couple of
23 comments. One, for the licensees to move their spent
24 fuel into dry cask, they must conform with the
25 conditions of the certificate. The majority of the

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1 certificates require that the spent fuel be aged
2 anywhere from five years and plus. It depends on the
3 fuel characteristics.

4 So there is typically a minimum. There is
5 a minimum pool in time. And that is measured in
6 years. So for the ability to store, typically spent
7 fuel needs to be cooled for a good number of years.

8 With regard to the TAD and looking
9 downstream, one of the slides I had up before
10 identified there are today about 800 canisters lowered
11 into the spent fuel. Now, those are canisters that
12 are both some welded, most are for dual purpose, some
13 are storage-only casks.

14 As the TAD consideration in another
15 conference, the Department of Energy, had
16 acknowledged, while they're looking at the Yucca
17 Mountain design, considering the TAD, they recognize
18 that they will have to have also a strategy to handle
19 the other canistered fuel.

20 That's a DOE decision in that regard, but
21 I want to offer they recognize that there is a
22 significant inventory of fuel currently stored and in
23 the near term will be additionally stored in what we
24 have a dual-purpose cask, a storage and transport
25 cask. And they need to have a strategy for the

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1 repository as to handle the disposition of that fuel
2 as well. And we're waiting for that to answer.

3 MEMBER WEINER: Finally, is it your
4 estimate that 71 and 72 are adequately risk-informed
5 regulations?

6 MR. BRACH: I think we clearly have an
7 understanding that there are aspects and Wayne
8 mentioned before that much of our standard review plan
9 has been traditionally deterministically based and
10 there are aspects of both 71 and 72 that clearly are
11 deterministically based. And we are looking to
12 aspects of how we can better risk-inform, whether it
13 be our processes as well as looking at the
14 regulations.

15 I believe later this summer on the ACNW
16 agenda is a briefing by research -- and our staff will
17 be supporting that briefing -- on a dry cask storage
18 probabilistic risk assessment that is nearing
19 completion in draft form. And we are looking, I'll
20 say optimistically, hopefully not naively, but
21 optimistically, as to what information we can learn
22 from that PRA. It will help us in all aspects,
23 whether it be in our regulatory structure of licensing
24 inspection or in --

25 MEMBER WEINER: Okay.

1 CHAIRMAN RYAN: Thanks. This is a great
2 way to get us caught up and cognizant of what is going
3 on in your program across the nation. We appreciate
4 everybody being here.

5 Just a note for Earl. He does participate
6 in a lot of ACNW meetings and briefings. And they are
7 FACA committee briefings. So they are public outreach
8 in that regard. So don't

9 MR. RULAND: We're going to update that
10 slide.

11 (Laughter.)

12 CHAIRMAN RYAN: Okay. And seriously Earl
13 does participate with us quite a lot. I do want to
14 recognize that he's very informative and helpful and
15 always follows up. So we do appreciate his efforts.

16 MR. BRACH: Thank you for the recognition.

17 CHAIRMAN RYAN: Questions? Staff?

18 MR. HAMDAN: Yes, just one. You mentioned
19 the rules of engagement. It's the first time I hear
20 it. You know, it sounds good. And from what you
21 said, it's working very well.

22 The question I have, how do you do this?
23 Is it within the SRP space or do you have other
24 implements that you use to communicate this with the
25 licensees?

1 MR. RULAND: Well, first of all, we issued
2 the regulatory information summary in late 2004 with
3 our rules of engagement. Virtually at every one of
4 our NEI dry cask storage forms, we also reinforce the
5 rules of engagement. Since the project manager that's
6 assigned to each license application knows what the
7 rules of engagements are, when they talk to the
8 applicants or the licensee, they also reemphasize
9 this. So we get a whole host of ways that we continue
10 to kind of reinforce these.

11 MR. HAMDAN: But it is going to the SRP or
12 not? That's the main question.

13 MR. BRACH: Is it related to the standard
14 review plan?

15 MR. HAMDAN: Yes.

16 MR. BRACH: It is in that one of the rules
17 of engagement identifies the number of rounds --
18 actually, it's one round of requests for additional
19 information that we have. And the expectation to be
20 able to meet that goal is that not only is the
21 standard review plan in the ISG current, it's
22 available to the applicants.

23 What Bill mentioned some of our
24 preapplication means, we stress with the applicant
25 that to conform with our rules of engagement, they

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1 need to be sure that the quality and the content and
2 technical soundness of their application coming to us
3 are responsive to the regulations and with an
4 understanding of the information in the SRP that
5 identifies methodologies that the NRC has already
6 found acceptable in satisfying certain conditions in
7 the regulations that they need to be very explicit in
8 their application to us as to their conformance with
9 the SRP are those areas where clearly they had the
10 latitude to use a different approach or methodology to
11 clearly identify that in the application and in their
12 application fully support it to have an application
13 that hopefully through no more than one round of
14 questions we would be able to reach regulatory
15 closure.

16 I want to add also the two regulatory
17 information summaries that Bill listed in the
18 overhead. If you step back, that basically lays out
19 if you want to call it our business model, how we
20 carry out our process.

21 The industry was interested to know how
22 long do you typically plan for review. We laid all
23 that out in the regulatory information summaries as
24 far as what our expectations are, rules of engagement,
25 how we engage with the industry on all transportation

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1 storage applications, but also what are our templates,
2 what are our time frames to help them inform -- and
3 also our priority scheme for how we prioritize work as
4 it comes in. It basically is our business model for
5 how we carry out our licensing and certification
6 activities.

7 MR. HAMDAN: Thank you.

8 CHAIRMAN RYAN: I was just going to add
9 one thing from an applicant's perspective of years
10 ago. I worked for a company actually, Chem-Nuclear,
11 that has quite a large fleet of low-level waste
12 disposal storage casks and transport casks. From that
13 perspective -- and, again, it's a little aged, but I
14 think that you have characterized it well, the
15 expectations are clearly set. Sometimes the bars are
16 higher than you might like or there are challenges and
17 so forth in the review.

18 But I think your office needs to be
19 complimented because it is a pretty open process from
20 an applicant's or a permittee's point of view.

21 So that is an old hat, but I just felt
22 that it was helpful to mention.

23 MR. BRACH: Let me on behalf of all of our
24 staff say thank you because it's the staff that
25 implement the program. Thank you.

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1 VICE CHAIRMAN CROFF: With that, I think
2 we're at a conclusion here. I would like to thank you
3 for a very precise and informative presentation. And
4 we look forward to seeing at least some of you later
5 in the summer. Okay? Thank you.

6 CHAIRMAN RYAN: With that, we're
7 adjourned. Thank you all very much.

8 (Whereupon, the foregoing matter was
9 concluded at 11:09 a.m.)

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CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Advisory Committee on

Nuclear Waste

170th Meeting

Docket Number: n/a

Location: Rockville, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.



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Spent Fuel Project Office

ACNW meeting
May 26, 2006

E. William Brach, Director
M. Wayne Hodges, Deputy Director
Ed Hackett, Deputy Director
William Ruland, Deputy Director
Spent Fuel Project Office
U.S. Nuclear Regulatory
Commission

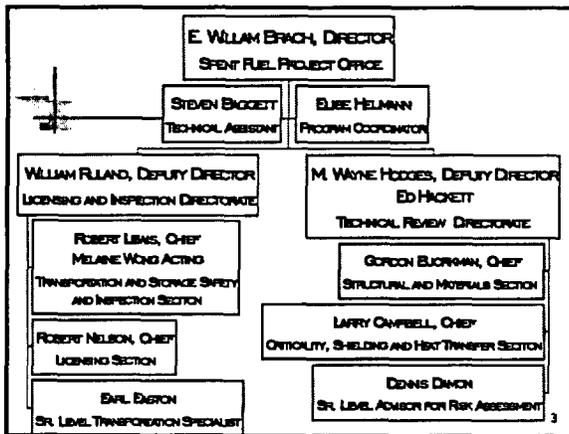


1

Overview

- Organization
- Achievements
- Storage facility status
- Transportation
- Challenges
 - Technical
 - Licensing
- Summary

2



3

Responsibilities

- Licensing and Inspection of Spent Fuel Storage Casks and Facilities
- Certification and Inspection of Spent Fuel and Radioactive Material Transportation Casks
- Coordination with State and Federal Agencies, International Regulatory Agencies, and Native American Tribes
- Public outreach on storage and transportation activities

4

Achievements

- Licensing, Certification and Inspection
 - Over 40 spent fuel storage facility and cask system reviews
 - Over 50 quality assurance program reviews
 - Over 80 transportation packaging reviews
 - Over 20 inspections
- Completed Security Assessments
- Issued the Private Fuel Storage License
- OMB PART review and outcome

5

Achievements

- Strides in stakeholder outreach on storage and transportation activities
- Engaging in international transportation and storage activities
- NAS report – "The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States"

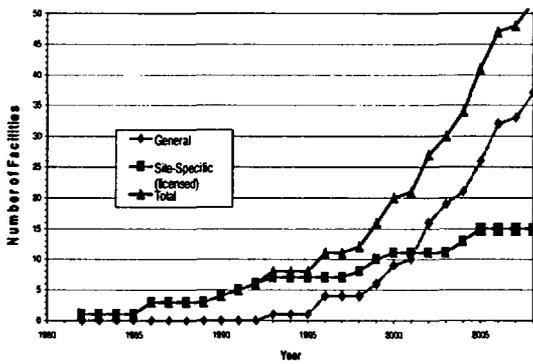
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Status of Independent Spent Fuel Storage Installation (ISFSI)

- 42 Licensed ISFSIs in 26 States
- 14 announced plans for new ISFSIs
- About 800 loaded dry casks
- 15 approved storage cask designs
- 8 dual (storage & transportation) purpose cask design

7

Growth of Independent Spent Fuel Storage Installations Over Time



Transportation Role

- Review and approve Type B & fissile transportation packages.
- Certify casks as accident resistant
 - Comprehensive review
 - Stringent test/analysis requirements
 - Role of quality assurance (QA)
 - Use of International Standards (IAEA)
- Inspect:
 - Cask designers, fabricators, and shippers and shipments
 - QA programs
- Technical support to the Department of Transportation
- Co-US representative to IAEA TRANSSEC

9

Favorable Transportation History

- Over 1,400 spent fuel shipments since 1979 in NRC approved packages
- ZERO spent fuel package failures
- Greater than 10,000 daily shipments of radioactive materials (all types)

10

Technical Challenges

Wayne Hodges
Ed Hackett

11

Transport of High Burnup Fuel

- Major Impediments
 - Lack of cladding mechanical properties
 - Burnup credit beyond actinides
- Potential solutions
 - Burnup credit data obtained by DOE
 - Argonne tests of cladding properties
 - Redefine acceptable geometry
 - Moderator exclusion

12

Burnup Credit

- DOE Program to Expand Data Base
 - French Data + Other Experimental Work
- ISG-8. Rev. 2 – BUC with Actinide Only
 - Expand Scope with Additional Data/Analysis
- One Application Under Review
 - Actinides + Fission Products
 - Other Vendor Interest

13

Guidance Development

- Licensing guidance
 - Standard Review Plan revision
 - Interim Staff guidance
 - Air Oxidization
 - Computational modeling

14

Burnup Credit Issues

- Need for Benchmarks (biases and uncertainties)
 - FP + Strengthen Actinide Basis
 - Neutron Cross Sections (Critical Expts.)
 - Isotopic Inventory Calculations (Assays)
- Reactor Startup Criticals
 - Applicability to Cask Configurations/Conditions
- Determine Fuel Burnup (Measurements)
 - Quality/Accuracy of Records – Basis
 - Misload Analysis

15

Licensing Challenges

William Ruland

16

Regulatory Issues

- NRC Timeliness Goals, Prioritization of Incoming License Applications and Voluntary Submittal of Schedule for Future Actions for NRC Review
- SFPO review process - Rules of Engagement

17

Inspection Program

- Spent Fuel Project Office
 - Agency's regulatory, licensing and inspection program for ISFSI
 - Source of technical expertise for storage systems and ISFSI
 - Manages scheduling and performance of inspections
 - Supports region-led inspections
 - Develops inspection procedures
 - Interfaces with other NRC offices regarding ISFSI activities
- Regions
 - Implementation of the ISFSI inspection program

18

Other Topics

- Part 72 license/CoC Renewal
- Special Package Authorizations
- 72.48 Change Authority
- Public Outreach Focus
- Changes in National Strategy for spent fuel management

19

Transport, Aging and Disposal Canister

- The transportation, aging, and disposal (TAD) canister performance specifications will be driven by the technical requirements of NRC regulatory requirements
- DOE developing canister performance specifications
- NRC's interim storage and transportations requirements are sound to review the TAD

20

Focus of Public Outreach Effort

- Transportation
 - State Regional Groups
 - National Conference of State Legislatures
 - Public and Industry Meetings
 - Technical Conferences
- Storage
 - Local Public Meetings
 - Industry Workshops



21

Summary

- Continue to meet industry needs for increased spent fuel storage capacity
- Working collaboratively to address technical challenges and anticipated casework
- Increasing public outreach effort
- Continue to monitor changes in the national strategy for spent fuel management

22

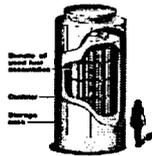
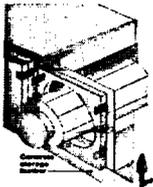
Background information

23

Spent Fuel Dry Storage Single & Dual Purpose Cask

At some nuclear reactors across the country, spent fuel is kept on site, above ground, in systems basically similar to the ones shown here.

1 Once the spent fuel has cooled, it is loaded into special containers which are designed to hold Pressurized-Water Reactor and Boiling-Water Reactor spent fuel. Water and air are removed. The container is filled with inert gas, welded shut, and rigorously tested for leaks. It may then be placed in a "vault" for storage or transportation.



2 The containers can also be stored in above-ground concrete bunkers, each of which is about the size of a one-car garage. Frequently they may be transported elsewhere for storage.

Storage Cask Diagrams

BOLTED-CLOSURE DESIGN

WELDED CLOSURE DESIGN



(TRANSCLEAR TN-68)



(HOLTEC INTERNATIONAL HHSTORM 100)

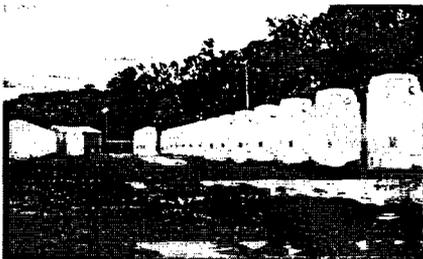
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Peach Bottom Dry Cask Storage



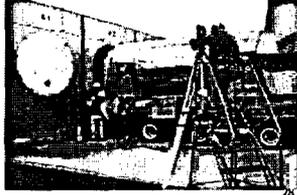
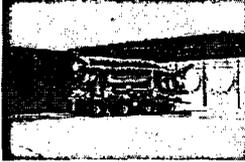
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Peach Bottom Dry Cask Storage

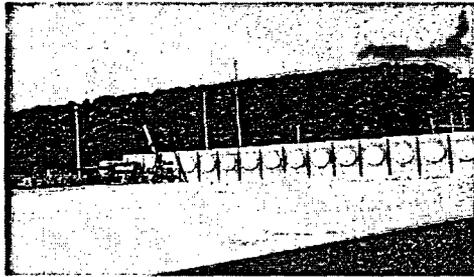


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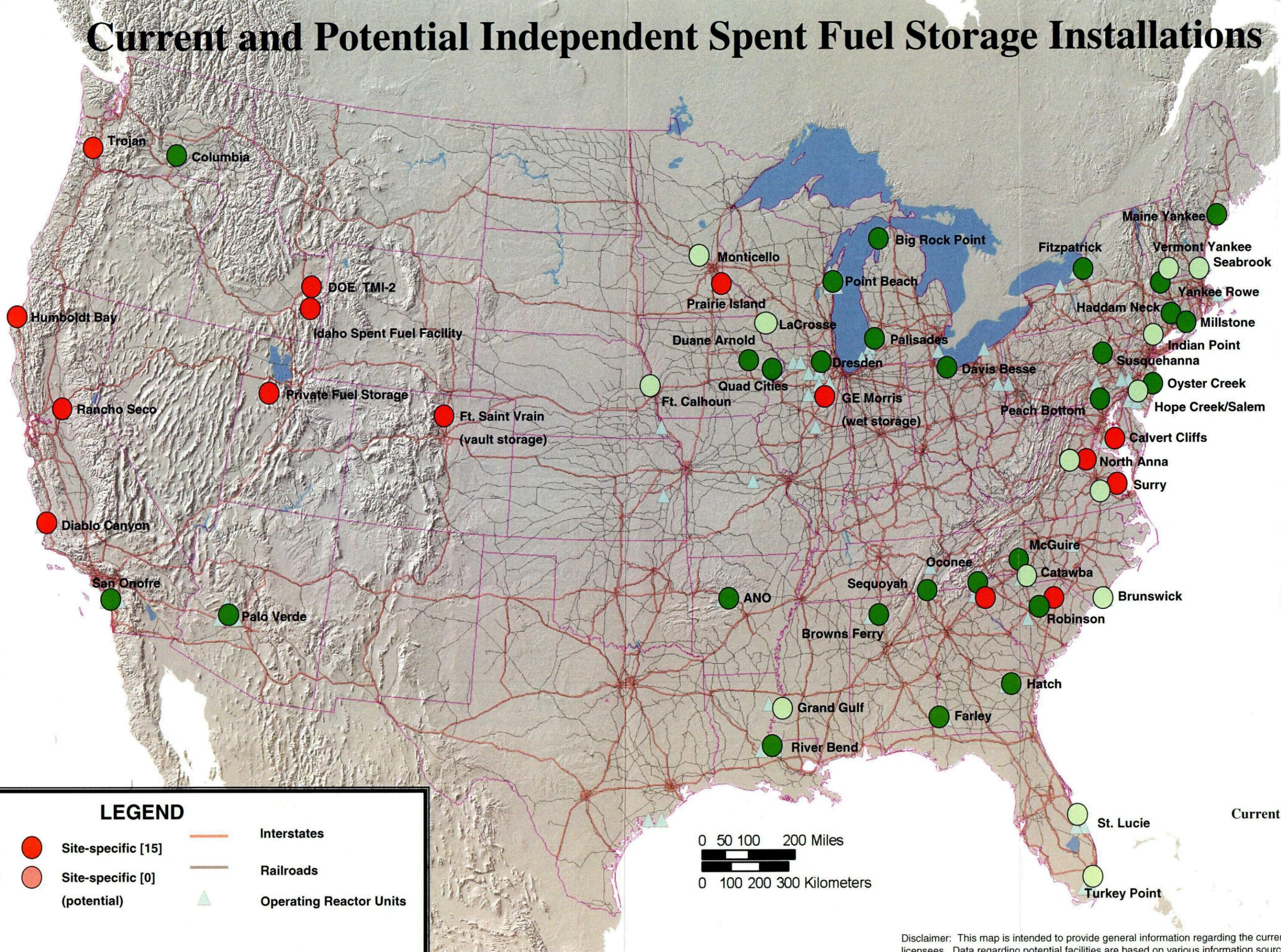
Susquehanna Dry Cask Storage



Susquehanna Dry Cask Storage



Current and Potential Independent Spent Fuel Storage Installations



LEGEND

● General [27]	● Site-specific [15]	Interstates
● General [14] (potential)	● Site-specific [0] (potential)	Railroads
		Operating Reactor Units



Current as of May 2006

Disclaimer: This map is intended to provide general information regarding the current and potential ISFSI licensees. Data regarding potential facilities are based on various information sources and may not be exact and/or may change in the future.

C-01