



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

May 8, 2013

MEMORANDUM TO: ACRS Members

FROM: Derek A. Widmayer, Senior Staff Scientist /RA/  
Technical Support Branch, ACRS

SUBJECT: CERTIFIED MINUTES FOR THE ACRS RADIATION PROTECTION AND  
NUCLEAR MATERIALS SUBCOMMITTEE MEETING, DECEMBER 4,  
2012 – ROCKVILLE, MARYLAND

The minutes of the subject meeting have been certified on May 8, 2013, as the official record of the proceedings for that meeting. Copies of the certification letter and minutes are attached.

Attachment: As stated

cc w/o Attachment: E. Hackett  
C. Santos



**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
RADIATION PROTECTION AND NUCLEAR MATERIALS  
SUBCOMMITTEE MEETING MINUTES  
December 4, 2012  
Rockville, MD**

The Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Radiation Protection and Nuclear Materials (RPNM) met on December 4, 2012, at 11545 Rockville Pike, Rockville, MD, in Room T2-B3. The meeting was convened at 1:00 pm and adjourned at 2:34 pm.

The entire meeting was open to the public. Mr. Derek A. Widmayer was the cognizant ACRS staff scientist and the Designated Federal Official for this meeting. A request for time to make an oral statement was received from Mr. Ralph Andersen of the Nuclear Energy Institute (NEI) concerning this meeting. No written comments were received from the public concerning this meeting.

**ATTENDEES**

**ACRS**

M. Ryan, Chairman  
D. Skillman, Member  
H. Ray, Member  
S. Armijo, Member  
J. Sieber, Member  
D. Widmayer, ACRS Staff

**NRC Staff**

J. Shepherd, FSME/DWMEP  
A. Persinko, FSME/DWMEP  
S. Garry, NRR/DRA  
E. O'Donnell, RES/DE

**Others**

R. Andersen, NEI

**SUMMARY**

The purpose of this Subcommittee meeting was to review and discuss Draft Final Regulatory Guide (RG) 4.22, "*Decommissioning Planning During Operations.*" Draft Final RG 4.22 contains the staff's recommended guidance on changes to facility operations in order to meet the new requirements for decommissioning planning promulgated in June 2011. The Subcommittee planned to gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the Full Committee at the December 2012 Full Committee meeting.

<b>SIGNIFICANT ISSUES</b>	<b>Reference Transcript Pages</b>
<p>J. Shepherd provided the FSME staff presentation on the development of Draft Final RG 4.22, “<i>Decommissioning Planning During Operations</i>.” The presentation included a history of the issues in decommissioning large NRC facilities, the License Termination Rule that the document supports, the development of the guidance, and views on guidance implementation.</p> <p>Members of the Subcommittee brought up the following issues during this presentation from staff:</p> <ul style="list-style-type: none"> <li>- The “actual” cost of decommissioning and the formula used for calculating the amount that needs to be reserved for decommissioning (Ray)</li> <li>- That operational issues during the life of the nuclear power plant will have more impact on final decommissioning costs than the size of the facility (Sieber)</li> </ul>	<p style="text-align: center;">1 – 51 (Slides Pgs 78 – 126)</p> <p style="text-align: center;">47</p> <p style="text-align: center;">50</p>
<p>Mr. R. Andersen of NEI provided industry views on the development and content of Draft Final RG 4.22. These views and staff perspective were discussed by the members and the staff in attendance whom assisted in developing the RG.</p> <p>Members of the Subcommittee had no issues during this discussion.</p>	<p style="text-align: center;">52 – 77</p>

<b>ACTION ITEMS</b>	<b>Reference Transcript Pages</b>
None	

**ATTACHMENT**

Official Transcript of Proceedings, Meeting of ACRS Radiation Protection and Nuclear Materials Subcommittee, December 4, 2012, Rockville, MD.

**Documents Provided to the Subcommittee:**

1. Draft Final RG 4.22, "*Decommissioning Planning for Operations*," USNRC, December 2012 (ML12158A361)
2. *Decommissioning Planning: Final Rule*, U.S. NRC, Federal Register, Volume 76, No. 117, June 17, 2011

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title:                   Advisory Committee on Reactor Safeguards  
                              Radiation Protection and Materials

Docket Number:   (n/a)

Location:            Rockville, Maryland

Date:                 Tuesday, December 4, 2012

Work Order No.:    NRC-2065

Pages 1-76

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RADIATION PROTECTION AND NUCLEAR MATERIALS

SUBCOMMITTEE

+ + + + +

TUESDAY

DECEMBER 4, 2012

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear  
Regulatory Commission, Two White Flint North, Room  
T2B3, 11545 Rockville Pike, at 1:00 p.m., Michael T.  
Ryan, Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL T. RYAN, Chairman

J. SAM ARMIJO

HAROLD B. RAY

JOHN D. SIEBER

GORDON R. SKILLMAN

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NRC STAFF PRESENT:

DEREK WIDMAYER, Designated Federal Official

JAMES SHEPHERD

STEVE GARRY

ANDREW PERSINKO

ALSO PRESENT:

RALPH ANDERSON

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T-A-B-L-E O-F C-O-N-T-E-N-T-S

Introduction

Michael Ryan, ACRS . . . . . 4

Staff Presentation: RG-4.22

Decommissioning Planning During Operations

Jim Shepherd, FSME . . . . . 5

Adjourn . . . . . 76

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

1:01 p.m.

CHAIRMAN RYAN: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Radiation Protection and Nuclear Materials.

I'm Michael Ryan, Chairman of the Subcommittee. ACRS members in attendance are Sam Armijo, Dick Skillman, Harold Ray, Jack Sieber.

The purpose of this meeting is to discuss the final draft Regulatory Guide 4.22, Decommissioning Planning During Operations. The draft final Reg Guide provides staff recommendations on meeting new decommissioning planning requirements made final last year. The Subcommittee will gather information, analyze relevant issues of fact and formulate proposed positions and actions as appropriate. The full Committee will consider this matter this Thursday during its December full Committee meeting.

The meeting this afternoon is open. Rules for conduct of and participation in the meeting have been published in the *Federal Register* as part of the notice of this meeting.

Derek Widmayer is the designated federal

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1 official for this meeting.

2 A transcript of the meeting is being  
3 kept and will be made available on the Web,  
4 therefore it is requested that speakers first  
5 identify themselves and speak with sufficient  
6 clarity and volume so they can be readily heard.

7 We have received a request for time to  
8 make an oral statement from the Nuclear Energy  
9 Institute and will make time for these comments at  
10 the end of the staff presentation especially.

11 Thank you.

12 We'll now proceed to the meeting and I  
13 call upon James Shepherd, senior project manager,  
14 FSME, to open the proceedings.

15  MR. SHEPHERD: Thank you, Dr. Ryan.  
16 I'll begin with a brief history of how we got to  
17 this place, talk about the development of the  
18 important rules of the guidance and how we're going  
19 about implementing the guidance.

20 Early on we had the Manhattan  
21 Engineering District, the Atomic Energy Act  
22 originally written in 1946 that, among other things,  
23 established the predecessor to this Committee.  
24 General Eisenhower in his Atoms for Peace Program  
25 led to the revision of the 1954 version of the

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1 Atomic Energy Act. One of the first things of  
2 import to us that the Commission did was 20.304.  
3 20.304 allows for significant burial, 1,000 times  
4 the amount in Appendix C up to 12 times a year.  
5 And, oh, by the way, keep good records in case we  
6 ever ask, which we didn't. That amounts to about a  
7 curie a year in the ground, four foot pillars, six  
8 foot ditches apart.

9 Reorganization Act of 1974 separated the  
10 NRC from the Atomic Energy Commission. One of the  
11 first things the new NRC did was public Reg Guide  
12 1.86, Termination of Operating Licenses for Nuclear  
13 Reactors. In addition to what was in the ground  
14 under 20.304, they could have what was listed in  
15 Table 1, which is also in fuel cycle 83-23,  
16 nominally 5,000 dpm per 100 square centimeters. A  
17 regional inspector goes out and looks at with a  
18 meter and the Commission can terminate the license.

19 In 1981, the Commission decided that  
20 20.304 was not sufficient control. It was revoked.  
21 It was replaced with a Branch Technical Position  
22 that allowed for on-site disposal of uranium and  
23 thorium, options 1 through 4, depending on the  
24 status of the daughter products. Options 3 and 4  
25 required a deed restriction to say that the land

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1 should be used for industrial use only. Note there  
2 is a 500 millirem public dose, which was the public  
3 dose limit at that time. For the unrestricted  
4 release it's 170 millirem, which is roughly a third  
5 of 500 rounded up.

6 In 1989, GAO audited the NRC's License  
7 Termination and Decommissioning Program and  
8 concluded that about a half a dozen license  
9 terminations should not have been made. There was  
10 not adequate control over contamination records at  
11 the licensed facilities and that nowhere did the NRC  
12 or anyone else require groundwater monitoring.

13 In response -- well, further they said  
14 that therefore we should require comprehensive  
15 surveys, including the groundwater. We should  
16 require licensees to retain records for at least 10  
17 years and that there should be coherent federal  
18 residual radiation standard.

19 MR. WIDMAYER: Hey, Jim, with the half  
20 dozen improper license terminations, were those all  
21 reactors?

22 MR. SHEPHERD: I don't remember.

23 MR. WIDMAYER: Okay.

24 MR. SHEPHERD: I don't think so. In  
25 response, actually almost on a separate track, Part

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1 20 was being revised to the then-new ICRP 26/30,  
2 which lowered the public dose limit to 100 millirem.  
3 We looked at all 130,000 license terminations that  
4 had occurred since the inception of the Agency in  
5 1946. About 150 of them were suspect. We did a  
6 much more detailed review of those and concluded  
7 that about three dozen of them should not have been  
8 terminated because they did not meet the release  
9 criteria.

10 So what should the release criteria be?  
11 At that time we said, all right, we'll take the  
12 Branch Technical Position Options 1 and 2, which is  
13 the unrestricted release criteria, Reg Guide 1.86 or  
14 FC 83-23, Table 1, the 5,000 dpm EPA drinking water  
15 standards for groundwater contamination.

16 MEMBER SKILLMAN: On that previous  
17 slide, please, would you give us an idea of what  
18 types of licenses are in those 130,000?

19 MR. SHEPHERD: Everything you can think  
20 of. Reactors, material, medical facilities. I  
21 don't think we terminated any uranium recovery at  
22 that point, but everything that we had licensed  
23 since 1946, basically.

24 CHAIRMAN RYAN: And does that the  
25 Agreement State licensees as well?

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1 MR. SHEPHERD: Yes.

2 CHAIRMAN RYAN: That's a big one, trying  
3 to cover that, as well as authorized to the  
4 Agreement States.

5 MR. SHEPHERD: Right, under the  
6 Agreement State Program, there are about 23,000  
7 licensees that we oversee between the federal and  
8 state agreements. They tend to have mostly the  
9 medical application licenses. We tend to have the  
10 fuel cycle reactor, the larger licenses.

11 MEMBER SKILLMAN: Material licenses.

12 CHAIRMAN RYAN: There is one other  
13 category before us, and that is the sealed source  
14 users for down-hole auging and anything else  
15 radiography tend to be the Agreement States as  
16 opposed to an NRC license.

17 MEMBER SKILLMAN: Okay. Thank you.

18 MR. SHEPHERD: We also said that  
19 licensees should start remediation within 24 months  
20 of non-use; this did apply to the previous 20.304  
21 burials, and that they should finish within 18  
22 months or at such time as we approved in a  
23 decommissioning plan.

24 We said once we agreed that they had  
25 cleaned up, we would not come back and require them

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1 to do anymore work unless additional contamination  
2 was found of which we were not aware at the time  
3 that we terminated the license.

4 We formed a Memorandum of Understanding  
5 with EPA under which we agreed to do consulting.  
6 There is a table in that memorandum that has  
7 concentrations of various nuclides. It's based on  
8 the EPA Red Book approach to limiting the occurrence  
9 of excess cancers to 10 to minus 6 or less. Some of  
10 those calculate to less than 25 millirem. Some of  
11 them calculate to more.

12 And we developed what's called the  
13 License Termination Rule. We did this through what  
14 we called enhanced participatory rulemaking. Mike  
15 Weber, whom I'm sure some of you know, and Chip  
16 Cameron, formerly of OGC, held a series of meetings  
17 around the country to attempt to obtain a consensus  
18 as to what the decommissioning criteria should be.  
19 They basically got three opinions, one being the  
20 only thing acceptable is background. Another being  
21 there's no way you can ever reach background within  
22 any reasonable cost, therefore you should just fill  
23 it with concrete, put a wire fence around it and  
24 leave it. And the third was the industry saying  
25 this property is very valuable. We're never going

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1 to release it, so we don't have to have release  
2 criteria. And then there was the EPA that said 15  
3 millirem was a good idea, so we took 100 divided by  
4 4 and came up with 25. Same sound methodology we  
5 used to divide by 3 for the 500.

6 So what does the License Termination  
7 Rule say? It used dose-base criteria. Remember the  
8 Branch Technical Position was on concentration. It  
9 requires contribution from all of the sources and  
10 all of the pathways. It reopened the concept of  
11 restricted release, which we did away with at the  
12 beginning of the SDMP on the old Branch Technical  
13 Position, at which everybody said, oh, great, we  
14 don't need to clean up. We can hire a rent-a-cop to  
15 watch it forever, which doesn't really work. The  
16 Statements of Consideration says the durability of  
17 the institutional control must be comparable to the  
18 durability of the hazard.

19 Most of the sites that were interested  
20 in restricted release contained uranium and thorium  
21 which has a half-life roughly equal to the expected  
22 life of the sun. So the idea that we had initially  
23 was say someone had a large volume of cobalt-60, you  
24 now, 10 half lives. We expect it to be down to the  
25 level that it could be dealt with. So half a

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1 century is not bad, but for uranium and thorium no  
2 one has yet successfully managed to get a restricted  
3 release license.

4 CHAIRMAN RYAN: But uranium is more  
5 chemically toxic than it is radio-toxic, so it's --

6 MR. SHEPHERD: Oh, absolutely.

7 CHAIRMAN RYAN: -- dangerous based on  
8 its chemistry, not on its radiological properties.

9 MR. SHEPHERD: Well, from our  
10 perspective it's based on the radiological  
11 properties. I mean, you're right, the real hazard  
12 is chemical. It's not radiological.

13 CHAIRMAN RYAN: Well, the limit we use  
14 is based on its chemical properties, not the fact  
15 that it's radioactive.

16 MR. SHEPHERD: And we also said that new  
17 applicants must minimize contamination through  
18 design and operation of the new facilities. We got  
19 a number of comments that said why didn't you apply  
20 that to existing facilities? And the answer at that  
21 time was we didn't really want to require existing  
22 facilities to go back and do major reconstruction of  
23 their facility. That wasn't entirely satisfactory,  
24 but you'll see it comes up again in a few minutes.

25 A couple of years later the Commission

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1 directed us to review the implementation of the  
2 License Termination Rule. In particular they wanted  
3 us to look at restricted use becoming more user-  
4 friendly, which as I explained we've not been  
5 altogether successful at.

6 We respond in a Commission paper in the  
7 summer of 2003, looking not only at restricted  
8 release, but 11 other ideas such as realistic land  
9 use scenarios, soil mixing to meet disposal criteria  
10 and two of them on prevention of legacy sites, one  
11 financial assurance to do two things: Make the  
12 instruments more viable from the NRC perspective in  
13 the case of financial distress of the licensees; or  
14 to put it bluntly, to put us in a better position in  
15 the case of bankruptcy, and to identify the amount  
16 of residual contamination that was actually present  
17 on the site so that they could have a  
18 decommissioning fund that would in fact be able to  
19 clean it all up.

20 From that we began the Decommissioning  
21 Planning Rule with the idea of limiting  
22 environmental contamination both from existing  
23 facilities and new facilities, monitoring the site,  
24 including sub-surface, keeping the decommissioning  
25 records and updating the financial assurance, which

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1 you recall goes back as far as the GAO report.

2 We began with a work shop. We had a  
3 three or four-day work shop in Shady Grove in 2005.  
4 And then we began interacting with this Committee  
5 shortly thereafter. Generally the Committee was  
6 favorably disposed towards our ideas and were very  
7 helpful in helping us formulate how to implement  
8 them. One of the things is groundwater monitoring  
9 should be a prime consideration in the guidance.

10 We developed draft guidance for comment  
11 in 2005. The draft rule was en route to the  
12 Commission in 2005 when Braidwood occurred. We put  
13 a stop on the rule in order for the Liquid Release  
14 Lessons Learned Task Force formed by the Executive  
15 Director to complete its work to ensure that we  
16 didn't create some kind of artificial conflict.

17 With this Committee again a few months  
18 later in March, the panel that reviewed that agreed  
19 that we had incorporated the comments to that date.  
20 The Committee recognized the relationship between  
21 the modeling and the monitoring that we have in  
22 there. We continued to refine the rule and to  
23 interact with the Committee and put guidance on  
24 early detection and the idea of early remediation as  
25 a way of avoiding excessive costs.

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1           The prompt remediation issue is one --  
2           in one of our discussions with the Committee it  
3           became clear to us that it would be difficult, if  
4           not impossible, to write a rule that both covered  
5           the entire spectrum of the 23,000 licensees and at  
6           the same time made allowance for safety issues. For  
7           example, at a nuclear plant at full power, if you go  
8           look at the piping and instrument diagrams, up in  
9           the upper right corner written in two-point font it  
10          says feel route a lot of these things. So you don't  
11          really want somebody with a backhoe out there  
12          digging around while the plant's at full power. You  
13          can create worse problems than you had.

14                 So we moved that concept to the  
15          guidance. In the Staff Requirements Memo, in the  
16          draft Staff Requirements Memo the Commission said we  
17          should make that part of the rule. We told them we  
18          didn't believe that the regulatory basis, technical  
19          basis at that time supported it, so they said, okay,  
20          go write one that does. We now have a separate  
21          effort known as prompt remediation that's a bit of a  
22          tangent to what we're doing here today, but it is  
23          still progressing.

24                 So we issued the draft rule for public  
25          comment in January of '08. We issued a draft

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1 version of the guidance at the same time. We  
2 updated the guidance a year later. The final rule  
3 was published in June of 2011 with an effective date  
4 18 months from the date of publication.

5 In December of 211, we issued the formal  
6 guidance, DG-4014, for public comment. We got a  
7 number of comments which I'll go into in a minute of  
8 a revised guidance based on those comments. We  
9 issued another draft in July for a public meeting  
10 and webinar that we had then. The effective date of  
11 the rule is in a couple of weeks and depending on  
12 the extent of the Committee's comments and comments  
13 from the general counsel. We hope to have the final  
14 guidance in January.

15 MEMBER SIEBER: Could you just a minute  
16 or so -- there's 23,000 licensees, 100 of which are  
17 reactor plants, commercial plants.

18 MR. SHEPHERD: Right.

19 MEMBER SIEBER: But there's a lot of  
20 other ones, like mining facilities and minerals, UF6  
21 enrichment plants.

22 MR. SHEPHERD: There are. We  
23 specifically --

24 MEMBER SIEBER: Yes. Which ones present  
25 the most difficult for unique issues as far as

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1 meeting long-term objectives for the planned use?

2 MR. SHEPHERD: For a variety of  
3 purposes, going back to the License Termination  
4 Rule, we specifically excluded uranium recovery.  
5 That's covered by the Uranium Mill Tailings  
6 Radiation Control Act.

7 MEMBER SIEBER: Okay.

8 MR. SHEPHERD: So it's not subject to  
9 what we're doing here. Those are certainly unique  
10 challenges.

11 MEMBER SIEBER: They are.

12 MR. SHEPHERD: Going forward with that,  
13 the entire fuel cycle beginning with say a Sequoyah  
14 Fuels where they convert yellow cake to uranium  
15 hexafluoride, Metropolis where they have stuff going  
16 up --

17 MEMBER SIEBER: Right.

18 MR. SHEPHERD: -- the stack and  
19 precipitating, Nuclear Fuel Services where they do  
20 reprocessing and --

21 MEMBER SIEBER: Right.

22 MR. SHEPHERD: -- stuff gets spilled in  
23 the ground -- and what we found was those facilities  
24 that have the ability to contaminate groundwater  
25 have the greatest challenge in remediating because

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1 now the stuff can move.

2 MEMBER SIEBER: Okay.

3 MR. SHEPHERD: The --

4 MEMBER SIEBER: What about the licensees  
5 -- and I know the NRC doesn't have very many, but  
6 medical licensees, test reactors, things of that  
7 nature?

8 MR. SHEPHERD: The medical licensees, it  
9 depends. Those that are just using the material in  
10 the sealed sources and that --

11 MEMBER SIEBER: Right.

12 MR. SHEPHERD: -- we do not have much  
13 problem with. Those that are making things like  
14 they're radio tagging pharmaceuticals, they'll have  
15 stuff go up the stack within Part 20 releases, but  
16 it's heavier than air, so it comes back down,  
17 especially if they're using something like carbon-  
18 14, which has a long half-life.

19 MEMBER SIEBER: Yes.

20 MR. SHEPHERD: Over many, many years of  
21 operation it will concentrate on the soil. It can  
22 be moved by weather into the groundwater. So that  
23 aspect of the medical presents a potential problem.

24 MEMBER SIEBER: Yes, and there's other  
25 instances of short-lived radionuclides like

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1 technetium-99 and so forth that are administered to  
2 patients which almost immediately enter the sewer  
3 system.

4 CHAIRMAN RYAN: The 99-m, Jack, is very  
5 short. Six hours. Tech-99 is not used --

6 MEMBER SIEBER: Yes, I understand, but  
7 it's three or four days, and if you have 10,000  
8 people doing it every day, it amounts to --

9 MR. SHEPHERD: Yes, the whole sewer  
10 issue and what do you do what patients is something  
11 that is -- it's outside of this particular effort,  
12 but it is being --

13 MEMBER SIEBER: It's being looked at?

14 MR. SHEPHERD: -- considered and looked  
15 at.

16 MEMBER SIEBER: Okay.

17 MR. SHEPHERD: Because you're right, it  
18 does present a real potential issue.

19 CHAIRMAN RYAN: Iodine's another one  
20 that pops up in the same situation that is similarly  
21 short-lived. Lots of different uses that --

22 MEMBER SIEBER: Iodine is a little  
23 longer half-life, I think.

24 CHAIRMAN RYAN: There's a couple of new  
25 radiopharmaceuticals that actually use a

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1 biologically inert iodine that goes to specific  
2 spots in the body and so forth. So it does get very  
3 complicated. Correct me if I'm --

4 MR. SHEPHERD: Well, the so-called  
5 nuclear stress test --

6 CHAIRMAN RYAN: Well, yes, the stress  
7 test is the same.

8 MEMBER SIEBER: Yes, I've had one of  
9 those.

10 MR. SHEPHERD: Which they use --

11 MEMBER SIEBER: Couldn't get back in the  
12 plant after I had it.

13 MR. SHEPHERD: Now they can stay with  
14 the tech-99 metastable, but --

15 CHAIRMAN RYAN: Yes.

16 MR. SHEPHERD: -- until very recently  
17 they also used thallium.

18 CHAIRMAN RYAN: Thallium, too.

19 MR. SHEPHERD: In fact, I had a boss a  
20 few years ago. I was out a reactor inspection and  
21 he came out for the exit. Opened the door to the  
22 security building, set off that alarm and --

23 CHAIRMAN RYAN: And he exited.

24 MR. SHEPHERD: -- because he'd had the  
25 test two days before.

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1 MEMBER SIEBER: I couldn't get into the  
2 health physics lab for a month because of that.

3 MR. SHEPHERD: Okay. So what did the  
4 rule actually say? On the left the original rule,  
5 the rule today says each licensee shall make  
6 surveys. Starting in two weeks it will say each  
7 licensee shall make surveys including in the  
8 subsurface. The most important part is "that are  
9 reasonable under the circumstances," which we didn't  
10 change.

11 By the way, we added a new 1501(b) that  
12 said keep records of surveys with decommissioning  
13 records that nobody seems to have any particular  
14 problem with. It's this, including the subsurface  
15 that seems to make people the most nervous.

16 MEMBER ARMIJO: From what I read the  
17 argument was inaccessibility -- accessibility to  
18 some areas under --

19 MR. SHEPHERD: Inaccessibility is  
20 another issue.

21 MEMBER ARMIJO: And so this guidance  
22 doesn't --

23 MR. SHEPHERD: Well, let me get into the  
24 guidance in a minute. This is still the rule  
25 language.

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1                   MEMBER ARMIJO: Still the rule doesn't  
2                   -- does or does not require surveys underneath a  
3                   foundation of a power plant.

4                   MR. SHEPHERD: There's no yes or no  
5                   answer. One that comes to mind is Trojan where the  
6                   seal between the floor and the drain in the reactor  
7                   building failed and they were leaking tritiated  
8                   water in with the subsurface. But it was primarily  
9                   volcanic ash. It didn't go anywhere. So when they  
10                  decommissioned, they found it. But certainly it  
11                  wouldn't -- you know, monitoring -- they never would  
12                  have found anything. So we get back to the is it  
13                  reasonable that this stuff is going to cause a  
14                  problem in terms of the cost of decommissioning  
15                  ultimately?

16                 MEMBER ARMIJO: Yes, well, if it was  
17                 just tritium, that wouldn't be a real costly thing  
18                 over time, would it?

19                 MR. SHEPHERD: Right, with tritium --  
20                 Big Rock Point broke a condenser line and dumped,  
21                 they estimated, a million curies of tritium under  
22                 the turbine building. When they started  
23                 decommissioning, they were looking at about 30,000  
24                 picocuries per liter. By the time they finished, it  
25                 was down to about nine, you know, between decay

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1 and --

2 CHAIRMAN RYAN: But tritium is a unique  
3 radionuclide and it is going to instantly disperse  
4 in the hydrogen pool it seeks.

5 MR. SHEPHERD: Right.

6 CHAIRMAN RYAN: Hydrogen atoms exchange  
7 with every molecule they attach to, so it becomes  
8 infinitely diluted in the hydrogen pool it seeks.  
9 That's fairly unusual for radioactive materials to  
10 have that kind of dilution. And plus it's  
11 relatively curie-for-curie, not all of that much of  
12 a dose-intensive radionuclide. So it's --

13 MR. SHEPHERD: Right, it's --

14 CHAIRMAN RYAN: By all reckoning it's a  
15 relatively straightforward one. But the lesson  
16 learned from tritium is not the radiological effect.  
17 The lesson learned is that radioactive material, you  
18 know, in the right chemical form can disperse fairly  
19 readily and fairly widely in the environs. So the  
20 issue --

21 MR. SHEPHERD: And what we find -- and  
22 so it's also relatively easy to find and it serves  
23 as a very good marker for where anything else might  
24 go because it gives you a flow path for the  
25 groundwater.

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1 Existing 20.1101 says licensees need to  
2 have a health and safety monitoring plan and they  
3 need to review that annually and update. And what  
4 we're saying in the guidance is as part of that  
5 update, that annual update, you need to consider  
6 these other things and where they may be reasonable.  
7 So that's the rule.

8 CHAIRMAN RYAN: Where's the guidance,  
9 Jim, tied to tell me what to look at? Can you back  
10 up a just a second, please?

11 This says, "The licensee shall use, to  
12 the extent practical, procedures and engineering  
13 controls based on sound radiation protection  
14 principles to achieve occupational doses to the  
15 public that are ALARA." Okay. That's a big  
16 mouthful what I'm supposed to do. Now you're going  
17 to tell us a little bit more about how I do it?

18 MR. SHEPHERD: Well, the first thing  
19 I'll tell you is we didn't change that.

20 CHAIRMAN RYAN: No, that's --

21 MR. SHEPHERD: This rule has been in  
22 effect since 19 --

23 CHAIRMAN RYAN: -- how you accomplish  
24 some of these goals.

25 MR. SHEPHERD: -- 91.

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1 CHAIRMAN RYAN: Or how you ask licensees  
2 to accomplish the goals?

3 MR. SHEPHERD: There's an inspection  
4 procedure whereby the inspectors go out and review  
5 what the licensees do and see is it reasonable that  
6 they have in fact identified their contamination.  
7 And maybe Steve can add a few words.

8 MR. GARRY: Yes, your question was where  
9 is the guidance on how to implement that.

10 CHAIRMAN RYAN: Yes, Steve, if you don't  
11 mind, just for the record would you tell us who you  
12 are.

13 MR. GARRY: I'm Steve Garry with NRR.  
14 To answer the question was where's the guidance on  
15 how to implement that section of the regulations.  
16 We have two Reg Guides, Reg Guide 8.8 and 8.10. One  
17 is more general ALARA programs and the other is more  
18 specific to power reactors.

19 CHAIRMAN RYAN: Thanks.

20 MR. SHEPHERD: So the guidance says  
21 limit environmental contamination. Keep your place  
22 clean. Clean up messes as you go along. Be aware  
23 of where they are. Be aware of where your  
24 contamination can go. And that's what you need to  
25 look for. So we do reasonable surveys throughout

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1 the facility, meaning where are places that are  
2 likely to have radiological contamination. And  
3 there's even a gee-whiz watch to help you do that.

4 Keep records of the results of that  
5 contamination. That should then be associated with  
6 the cost of decommissioning. And set that money  
7 aside so that when you get to license termination  
8 there's enough money to clean up whatever mess is  
9 there if you haven't cleaned it up already.

10 CHAIRMAN RYAN: If we've got to get to  
11 this, that's great, but I'm always interested in not  
12 -- how do I plan for decommissioning 10, 20, 30, 40  
13 years down the line? What's my motivation to clean  
14 up the mess today and make sure it doesn't become a  
15 bigger mess in 40 years?

16 MR. SHEPHERD: Only that, that it  
17 doesn't become a bigger mess in 40 years, which is  
18 going to cost more.

19 CHAIRMAN RYAN: I didn't ask if it was a  
20 good idea. I said where's the requirement of the  
21 guidance that I should be cleaning up as I go?

22 MR. SHEPHERD: Guidance can't set  
23 requirements.

24 CHAIRMAN RYAN: Okay.

25 MR. SHEPHERD: And the --

1 CHAIRMAN RYAN: So where is the  
2 requirement in the --

3 MR. SHEPHERD: -- simple answer is  
4 today, and even under this rule, there is not a  
5 requirement to clean up soon. As a part of this  
6 thing we call prompt remediation, it goes back to  
7 the Staff Requirements Memo from the draft rule in  
8 2008. We wrote a technical basis that said here are  
9 the considerations to require licensees to clean up  
10 under some conditions. And we said there are two  
11 kinds of dose-based and concentration-based. And we  
12 went that out for comment in June of 2011. We got a  
13 number of comments in -- one from NEI, for example,  
14 said it should be dose-based.

15 And not to put words in your mouth,  
16 Ralph, but I think everything else in Part 20 is  
17 dose-based, therefore this requirement should be  
18 dose-based as well. The staff doesn't necessarily  
19 agree with that because dose is more difficult to  
20 calculate. You have to measure concentration to  
21 start with. But we revised that regulatory basis on  
22 the comments.

23 Then on an entirely different track,  
24 going all the way back to the 2005 Groundwater EDO  
25 Committee, Steve Garry wrote a Commission paper that

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1 said here are a number of things that we are  
2 currently doing related to improving monitoring and  
3 so on. In the Staff Requirements Memo for his  
4 report, it told us to update the regulatory basis,  
5 send it out for public comment again, do a cost-  
6 benefit analysis, a backfit analysis; which is  
7 difficult to do without actual rule language, and  
8 send forward to the Commission a vote paper by the  
9 end of fiscal 2013, so in September.

10 So in the spring we will start setting  
11 up another meeting with the public. Currently it  
12 says there are some limits. Well, you know, what  
13 would we use for limits? One would be 100 millirem.  
14 For example, if a licensee has concentrations that  
15 would result in greater than 100 millirem, clean it  
16 up. Right now the rule doesn't say clean it up. It  
17 just says don't exceed that amount. I'm not sure  
18 how beneficial that is. Another obvious limit would  
19 be 25 millirem. Licensees would certainly say you  
20 can't make us maintain decommissioning site during  
21 the time we're operating. So the answer will be  
22 presumably somewhere in between.

23 In the early rules I had things like  
24 potential for off-site migration in excess of some  
25 number which we haven't defined, but that is still

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1 to be developed. So again the simple answer to your  
2 question is there is not currently a requirement for  
3 early remediation.

4 In the financial assurance guidance  
5 there are some words there about minimizing cost.  
6 In this guidance there are words about minimizing  
7 cost and work, but no firm requirement.

8 MEMBER SKILLMAN: What I find  
9 interesting was this gentleman identified in  
10 response to Dr. Ryan's question how do you implement  
11 this? Regulatory Guides 8.8 and 8.10 give guidance  
12 how do this. If you're in the plant, 8.9 is kind of  
13 a Reg Guide that everybody knows about because  
14 pregnant female worker -- you know, it's kind of  
15 imbedded in the culture.

16 MR. SHEPHERD: Yes.

17 MEMBER SKILLMAN: Training is conducted  
18 on that. Female employees are -- has to read it and  
19 understand it and given the privilege to do whatever  
20 they might wish to do with it. It strikes me as  
21 peculiar that there isn't some energy around 8.8 and  
22 8.10 with that same level of, if you will,  
23 administrative accountability. Because if you're  
24 out 10 years with 30 years to go on your license,  
25 it's time to start thinking about this stuff.

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1                   So where is the pulse to get going?  
2                   Kind of like what Mike was asking about, what kind  
3                   of pushes the licensee to be thinking about this  
4                   other than just bucks? Is it an inspection item?  
5                   Do the residents say, hey, what are you folks doing  
6                   about this tidal wave that's coming at you 30 years  
7                   from now?

8                   MR. GARRY: Okay. This is Steve Garry  
9                   again. I want to clarify the point that was up on  
10                  the screen earlier was the ALARA requirement, and  
11                  that's to do with occupational doses. Okay? So  
12                  that's aimed at occupational doses. And the record  
13                  of the nuclear power industry over the last 20 years  
14                  is that the occupational doses have come down from  
15                  -- well, for PWRs, in round numbers, from 400 rem a  
16                  year down to less than 100 rem a year. They're now  
17                  like 60 rem a year on the average. BWRs have gone  
18                  from 800 rem down to 140 rem. So the record has  
19                  shown that the ALARA and the Reg Guides for ALARA  
20                  and the efforts of the licensees have been very  
21                  successful in the nuclear power business.

22                  MEMBER SKILLMAN: And that's exactly my  
23                  point. So for that type of issue, there's a lot of  
24                  buy-in, traction, willingness to pursue, and clearly  
25                  there are some other pay-offs that come with their

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1 INPO ratings and their E&As and that type of thing.

2 MR. GARRY: Right. Right. Right.

3 MEMBER SKILLMAN: But the idea of  
4 planning now while the plant's operating for future  
5 decommissioning, at least in my view, doesn't have  
6 that same sense of, hey, we better be doing  
7 something now. That's my point.

8 MR. GARRY: Okay.

9 MEMBER SKILLMAN: So what's the pulse  
10 that the licensees hear in terms of you really ought  
11 to be thinking about this? Doesn't have to be an  
12 overriding program, but there is something lying  
13 ahead of you that -- where there's going to be a day  
14 of reckoning. Let's do something about it.

15 MR. GARRY: Yes, you know, I don't know.  
16 Like Jim had said, there's a lot of different types  
17 of licensees. I think that the nuclear power  
18 plants, which is what we look at in NRR are already  
19 minimizing contamination. I mean some of the plants  
20 have done voluntary remediation. The plants have  
21 limited their leaks and spills to where generally  
22 it's limited to tritium. There's a little bit of  
23 particulates, and most of that activity is caught  
24 right in the dirt at the edge of the pipe that  
25 breaks and so forth. In my understanding, there's

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1 not an extensive contamination of anything other  
2 than tritium. And the tritium, you know, as has  
3 been mentioned earlier, has a relatively benign dose  
4 factor associated with it.

5 And the other thing about tritium is  
6 that it is relatively easy to clean up to a standard  
7 simply by pumping, monitoring and discharging. So  
8 there's not a lost of cost as I see it in the  
9 decontamination or remediation of the tritium  
10 because it's simply pumping water back, monitoring  
11 it and discharging it. So I don't think there's a  
12 huge financial load from what I understand at  
13 nuclear power plants.

14 MEMBER SKILLMAN: Yes, I think that's  
15 right.

16 MR. SHEPHERD: Well, up until Braidwood  
17 my perception of the industry opinion was this is  
18 not a health and safety issue. NRC go away and  
19 leave us alone. Let us do our thing. Following our  
20 task force, and perhaps more importantly the public  
21 outcry of a perceived risk, the industry has taken a  
22 very aggressive stance beginning with the  
23 Groundwater Protection Initiative, followed by the  
24 Underground Piping Initiative, underground tanks.  
25 And so I think the industry is doing a lot of things

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1 today to minimize contamination entirely separate  
2 from what we're doing, and in fact in many cases  
3 requiring more of themselves than we're requiring of  
4 them. And I think by and large it's been effective  
5 in reducing the future cost.

6 CHAIRMAN RYAN: I think it's important,  
7 too. The utilities have done a good job of looking  
8 at their sites from a geohydrologic perspective,  
9 both in terms of groundwater boring and groundwater  
10 monitoring wells. What's the geohydrologic level  
11 for this facility with the plants on it, and those  
12 kinds of things that are done. I think a pretty  
13 good job of trying to understand the environment in  
14 which they sit.

15 MR. SHEPHERD: Right.

16 CHAIRMAN RYAN: So if you understand the  
17 environment in which you sit, you can figure out  
18 where things might go and then proactively monitor  
19 to determine whether or not they're following those  
20 directions and you can mitigate at a stage when  
21 mitigation isn't a crisis, you know, in terms of  
22 work flow and the finances, but something you can  
23 easily address, too, as the plant proceeds on.  
24 Well, some of the older plants had experience. Like  
25 Rowe had some leakage and underground stuff that

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1 they had to deal with ultimately that had a big  
2 impact on the plant. And others have had to deal  
3 with similar circumstances.

4 So, but I think the trend, Dick, is, as  
5 you might suspect is getting a little bit better in  
6 my view, that they're more proactive in trying to  
7 get ahead of those issues, rather than, you know,  
8 reactive of trying to wait until they've got a big  
9 problem.

10 MR. SHEPHERD: Right. Well, remember,  
11 at the beginning of the talk I was talking about the  
12 early mentality. You know, if it doesn't work,  
13 throw it out back. And even some of the industry  
14 saying, well, we're never going to let this land go,  
15 therefore, you know, we don't need to worry about  
16 cleaning it up because it's always going to be ours.  
17 Well, we know now, given the dozen reactors we have,  
18 that many of them are releasing large blocks of  
19 land. So they have changed their mind, if you will,  
20 and thought further ahead in terms of what it takes  
21 to actually do that.

22 MEMBER SKILLMAN: Thank you. Thank you.  
23 Okay.

24 MR. SHEPHERD: Okay. Let me jump ahead  
25 here. So keep track of how much contamination you

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1 find. Make friend with your banker so that you've  
2 got enough to clean it up.

3 On the guidance that went out a year  
4 ago, we got a large number of comments, more than  
5 100, but a number of them divided very nicely into  
6 clusters, which I did rather than attempting to  
7 answer each one of them.

8 Now, the answers are probably not in the  
9 detail that everybody wants. You know, we have this  
10 eternal battle over how specific guidance should be.  
11 We say too much, we're too specific and controlling.  
12 We don't say enough and so on. A lot of the  
13 questions revolve around how many samples do I have  
14 to take and where? The answer is it depends.

15 There was one group of comments that  
16 said we're such great licensees the NRC should  
17 exempt us. We said, no, we're not going to exempt  
18 you, but that doesn't mean you actually have to do  
19 anything. Look at the rule. Look at your facility.  
20 If you don't have a problem, put a note in the file  
21 and don't irritate your banker.

22 There were a couple on restricted  
23 release. Restricted release is not a  
24 decommissioning planning alternative. There are a  
25 couple of things in order to be approved by the NRC.

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1 For restricted release you have to have already  
2 removed as much contamination from the site as you  
3 reasonably can. Set up provisions for legally  
4 enforceable institutional controls, which means that  
5 the licensee would no longer be in control of the  
6 access to the site and that they have in fact  
7 submitted a license termination plan that includes  
8 their interactions with the public on the  
9 acceptability of the institutional controls. These  
10 are things that you can't do during the middle of  
11 operations.

12           Likewise, if we take the idea to a  
13 logical end, specifically the beginning, if someone  
14 came into us and said we want to run this operation  
15 for 10 or 15 or 20 years, and, oh, by the way, we  
16 fully intend to crap this site up so bad we'll never  
17 be able to clean up, I don't think we'd give them a  
18 license. Likewise, if we go to the midpoint at  
19 license renewal, they would have a tough time  
20 convincing us why they should be allowed to continue  
21 to operate rather than to begin cleaning up. So  
22 it's not just an operational consideration. It's a  
23 last resort, if you will.

24           Again, what we found is the  
25 institutional controls is a real issue in terms of

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1 making sure that there is a party whose durability  
2 is comparable to that of the hazard.

3 MEMBER ARMIJO: Do government facilities  
4 have restricted release capability? Are they  
5 allowed to do -- let's say some Hanford contaminated  
6 areas, are they --

7 MR. SHEPHERD: What we've said is the  
8 Federal Government, the state government, and, by  
9 extrapolation from the Uranium Mill Tailing  
10 Radiation Control Act, sovereign Indian nations  
11 could serve as long-term institutional controls.  
12 Nuclear Waste Policy Act, Section 151(b), authorizes  
13 Department of Energy to take these sites from  
14 anybody. It does not compel them to do so and they  
15 have declined that --

16 MEMBER ARMIJO: But if they chose to do  
17 that, they can do it.

18 MR. SHEPHERD: But, yes, Hanford,  
19 Savannah River, Oak Ridge, many of those areas will  
20 remain under federal control, and that meets the  
21 intent of this regulation, even though we don't  
22 actually regulate DOE.

23 MEMBER ARMIJO: Okay.

24 MR. SHEPHERD: In the original guidance  
25 based on some internal comments, I have written

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1 comparisons of NEI 07-07. And the guidance, one of  
2 the comments was that appears to try and incorporate  
3 the industry initiative into the regulatory  
4 framework, which we do not intend to do. So I  
5 removed that. Replaced it with a short statement  
6 that says NEI 07-07 is an acceptable way to meet the  
7 intent of the regulation. I haven't heard anymore  
8 comments, so I believe that resolves the concern  
9 that we were trying to slide things in through the  
10 back door.

11 Then we get into the question of how  
12 much do I, a licensee, have to do? And there are a  
13 lot of variables. How much stuff do you have? How  
14 hot is it? What form is it in? And so the simple  
15 answer, albeit somewhat unsatisfying, it depends.  
16 That each licensee is going to have to make that  
17 decision for themselves.

18 So they said how do we decide that? So  
19 I have been adding into the guidance some risk-based  
20 things to help them make that decision. We have  
21 from the license -- or the consolidated  
22 decommissioning guidance what we call groups of  
23 decommissioning based on the complexity of the site.  
24 And so one can look at the majority of things that  
25 we're going to see are going to fall in a group 3 or

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1 a group 4, into what we call the complex  
2 decommissioning area where they're actually going to  
3 have to worry about additional cost to clean things  
4 up.

5 MEMBER SKILLMAN: Where are these groups  
6 defined, Jim?

7 MR. SHEPHERD: NUREG-1757, Volume 1.

8 MEMBER SKILLMAN: Okay. So this is  
9 actually --

10 MR. SHEPHERD: I picked up that guidance  
11 and stuck it into this guidance also.

12 MEMBER SKILLMAN: So this is a repeat of  
13 regulation in the Reg Guide? Okay. Thank you.

14 MR. SHEPHERD: This is kind of a  
15 qualitative indicator of how much a licensee would  
16 have to do. If for example, they have subsurface  
17 contamination, groundwater contamination, they're  
18 going to have to do a lot more than if they don't.  
19 But it's very difficult to say how much that is.

20 I added an appendix that says here's  
21 some examples of areas. We've got a building.  
22 We've got a surrounding area. We know which way the  
23 wind's blowing and a road. Under the building we've  
24 got a couple of aquifers. So where do I need to  
25 look? Well, we need to look where the potential

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1 sources are. Closer to the source the better.

2 Inside we see locations where things  
3 might be dripping underneath stuff, under tanks and  
4 so on. And this is where we start to approach the  
5 accessibility issue. How difficult it is to get  
6 someplace? You know, we have ideal laboratories  
7 where everybody acts the way they're supposed to,  
8 nobody's clumsy, things don't get spilled. We have  
9 real laboratories where things do get spilled and  
10 you need to look at where that stuff might go.  
11 Outdoors, you know, again, where are the likely  
12 places that you might find contamination.

13 For stacks. Stacks can give you all  
14 kinds of interesting challenges. Stuff can go  
15 straight up. It can go sideways. It can waiver up  
16 and down. Some cases it can go more than one  
17 direction at the same time. So you have to  
18 understand both the surface, above surface and the  
19 subsurface to determine where contamination might go  
20 if it's released.

21 Ground sampling. Where is stuff going  
22 to deposit? Where is it going to collect? Where  
23 will it concentrate? One of the problems we have  
24 with subsurface is if you have a single layer,  
25 that's simple. If you've got multiple layers, then

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1 it gets much more complicated.

2 So again, the answer to how many samples  
3 do I have to take is very site-specific.

4 Question comes up of do I have to sample  
5 off site? This came up going back to the original  
6 working group. Our state -- Agreement State  
7 representative on the working group got a facility.  
8 Stuff went up the stack. Came down on both sides of  
9 the fence. He said will this rule help me make them  
10 clean up what's outside the fence? Simple answer is  
11 no. We have the statutory authority, but there's  
12 not a regulation. Statutory authority, in order to  
13 enforce it, there would have to be a definable  
14 threat to public health and safety.

15 So the rule becomes effective in a  
16 couple of weeks. What we're telling the inspectors  
17 is at the next routine inspection look and see if  
18 they've completed their annual update in accordance  
19 with 20.1101. Identify if the licensee has  
20 identified additional sampling of locations. And if  
21 they have, have they put those into their sampling  
22 plan? Doesn't mean they have to have completed it,  
23 just so if they're in the plan.

24 Based on discussions with NEI, we are  
25 developing enforcement discretion to make sure that

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1 people don't get hammered just because they haven't  
2 completed a plan yet.

3 MEMBER SIEBER: Good.

4 CHAIRMAN RYAN: I would think that the  
5 non-utility licensees would also need some kind of a  
6 break-in period to, you know, get a hold of this and  
7 begin to --

8 MR. SHEPHERD: We think everybody does.

9 CHAIRMAN RYAN: Yes, okay.

10 MR. PERSINKO: We're in the process  
11 right now of developing an Enforcement Guidance  
12 Memorandum, an EGM, that would apply to everybody,  
13 but it would permit the inspectors to have  
14 enforcement discretion while the licensees are doing  
15 whatever they have to do to their programs to  
16 implement the rule and the -- and according to the  
17 guidance.

18 CHAIRMAN RYAN: And I'm sure some of --  
19 you know, I can think of ones I know of that  
20 probably are a little bit further along than other  
21 licensees on, you know, first of all, understanding  
22 their site from these points of view; second,  
23 implementing an ongoing program to keep track of  
24 where they are. Is that a fair summary, a fair way  
25 to look at it? Some are maybe not so far along?

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1 MR. PERSINKO: I think you might know --

2 MR. SHEPHERD: Well, I think like most  
3 other things there's a spectrum. We've got a few  
4 that are ahead of the curve. We've got a few that  
5 haven't done anything at all and everyone else is  
6 more or less normally distributed in terms of how  
7 far forward they've gone.

8 CHAIRMAN RYAN: Okay.

9 MR. PERSINKO: But the Enforcement  
10 Guidance Memorandum is not final yet. It's still  
11 being worked internally. It's being looked at by  
12 regions right now as we speak. You know, we hope to  
13 have that in place by the 17th of December when the  
14 rule goes effective. And if not exactly then,  
15 shortly thereafter. And the thinking, it's not  
16 final. The thinking is is that there would be about  
17 a one-year period after the guidance is issued when  
18 the enforcement discretion would --

19 MR. WIDMAYER: Can you tell us who are?

20 MR. PERSINKO: Oh, I'm sorry. My name  
21 is Drew Persinko. I'm the deputy director in the  
22 Division of Waste Management and Environmental  
23 Protection.

24 MR. WIDMAYER: Thank you.

25 MEMBER ARMIJO: Somewhere I read about

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1 that, about the issue of the amount of money in your  
2 decommissioning fund and that you have to update it  
3 based on contamination you find in the course of  
4 operations. How do you decide whether someone has  
5 actually done that adequately?

6 MR. SHEPHERD: It depends on the type of  
7 facility. For nuclear power plants there is a fixed  
8 formula and there is fixed reporting requirements.  
9 And the interesting thing about that is they're  
10 required to have a plan to collect the amount of  
11 money defined in the formula in 10 C.F.R. 50.75(c),  
12 which works out roughly \$400 million.

13 Despite the amount of contamination that  
14 they have, they don't have to change that number.  
15 What they do need to do is -- see, 50.75(f)(4) I  
16 think says at or about five years prior to shutdown  
17 they need to do an updated decommissioning cost  
18 estimate. Not later than two years after shutdown  
19 they must do an actual cost estimate. If that  
20 actual cost estimate exceeds the formula value, then  
21 they have to provide a plan by which they will come  
22 up with the additional funding. They don't actually  
23 have to have it. They just have to have a plan.

24 Typically that plan for the utilities is  
25 they go back to the PUC and collect more money from

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1 their adoring public. And generally the parent  
2 company ends up kicking in some as well. For the  
3 non-reactor facilities we have to look at their --  
4 they're currently required to update their  
5 decommissioning cost estimate every three years, and  
6 we review that. We have a group in the financial  
7 assurance section that looks at all of these  
8 submittals. As a minimum, they need to update the  
9 cost to the change in the Consumer Price Index.

10 When we look at the results through the  
11 inspection process of contamination at the site, one  
12 of the line items in the report that they submit is  
13 something about the amount of contamination that  
14 they have to clean up. So we do review those on a  
15 periodic basis.

16 MEMBER ARMIJO: But they have no  
17 formula. They just --

18 MR. SHEPHERD: That's right.

19 MEMBER ARMIJO: Okay.

20 CHAIRMAN RYAN: Correct me if I'm wrong,  
21 but my own experience in smaller facilities is that  
22 the cost of ultimate disposal of whatever you decide  
23 is the waste you're going to have to deal with is  
24 probably one of the bigger chunks of money that's  
25 involved. Is that fair enough?

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1 MR. SHEPHERD: I think so.

2 CHAIRMAN RYAN: And there's how you dig  
3 it up and box it up and put it all in one place, but  
4 then what costs is the disposal of that. A half a  
5 million --

6 MR. SHEPHERD: Between transportation  
7 and disposal, that amounts to --

8 CHAIRMAN RYAN: Transportation and  
9 disposal add a big huge chunk to the cost. And what  
10 you say is the volume and the curies, the formula to  
11 get to the dollars for that is pretty  
12 straightforward and not in very much argument. So  
13 it's really a matter of what does that facility look  
14 like from a -- do you know where all your  
15 contamination is and have you tracked it and  
16 properly addressed it as your facility has marched  
17 along, or are you going to have some surprises once  
18 you go to decommission it? And that's really the  
19 big swing that can occur that I'm aware of in  
20 facilities.

21 MR. SHEPHERD: And the ones that we have  
22 dealt with traditionally are the ones that are  
23 surprised.

24 CHAIRMAN RYAN: Right.

25 MR. SHEPHERD: Back to the first site I

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1 had when I started working for the NRC up in the  
2 Northeast. They'd spent about three-quarters of a  
3 million dollars and thought they were done. We sent  
4 Oak Ridge up to survey it and they said everything  
5 looks good except you got one hot spot over here on  
6 the wall of this trench. Two million dollars later  
7 they had finished taking out two more trenches that  
8 they didn't know about. So that's the kind of --

9 CHAIRMAN RYAN: Well, that's kind of the  
10 -- to me that's the biggest unknown, is do you have  
11 contamination where you didn't expect it and didn't  
12 know it was --

13 MR. SHEPHERD: Right, which goes back to  
14 early in the presentation --

15 CHAIRMAN RYAN: Right.

16 MR. SHEPHERD: -- where we said, yes,  
17 throw things on the ground. Don't worry about it.

18 CHAIRMAN RYAN: Right.

19 MEMBER SIEBER: Sounds okay, I think.

20  MEMBER RAY: Well, having decommissioned  
21 a plant, let me tell you that there's -- and I don't  
22 think it's ACRS' business, but the financial side  
23 isn't as tidy as it sounds. And I'll tell you, for  
24 example, we adequately funded the plant I  
25 decommissioned, but it was because we multiplied

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1 that number by three. And I know of a plant with  
2 six owners and one of the owners has about three  
3 times what the other five owners have set aside for  
4 its share. So there's a big difference in -- it's  
5 not a surprise either. People know what they're  
6 doing. The biggest worries of merchant generators.  
7 He referred to the PUC. There isn't any PUC when it  
8 comes to merchant plan.

9 MR. SHEPHERD: Right, that's why we had  
10 put that original phrase in the early draft of the  
11 rule, to tie the parent company. We will see what  
12 happens.

13 MEMBER RAY: Well, parent companies have  
14 shields, believe me. If they want to pay, they  
15 will. If they don't, they won't. And the  
16 bankruptcy law is what governs.

17 MR. SHEPHERD: Yes, the formula that we  
18 use I said was around 400 million. The typical cost  
19 that we've seen in reactors we're decommissioning  
20 runs between 500 and five and a quarter.  
21 Connecticut Yankee had a net based on the  
22 information we got from FERC PUC, the licensee. We  
23 estimate they spent around \$950 million to \$960  
24 million before they requested partial site release.  
25 Well, immediately that's not all NRC cost. Well,

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1 fine. Call it anything you want. I got a pot of  
2 money and I got a stack of bills. If they're not  
3 the same, where are you going to get the difference?

4 MEMBER RAY: Right.

5 MR. SHEPHERD: That's the real question.

6 MEMBER RAY: Yes, take a look at San  
7 Onofre. They made it.

8 MR. SHEPHERD: Oh, I know San Onofre  
9 very well. I'm the PM for Unit 1.

10 MEMBER RAY: Well, I was the --

11 MR. SHEPHERD: I know the main concerns.

12 MEMBER RAY: You said that they -- so  
13 the point is that it costs a lot more than you would  
14 set aside, legally required to set aside. It's a  
15 lot more expensive than that. And if you want to do  
16 like Trojan or somebody, just let it sit there  
17 because you don't have any money, then that's what  
18 you do.

19 MR. SHEPHERD: Right.

20 CHAIRMAN RYAN: SIEBER: What about Main  
21 Yankee and Big Rock? How did they come out?

22 MR. SHEPHERD: Big Rock came out a  
23 little under 500, and they collected about three-  
24 quarters of that from the PUC. And their parent  
25 consumers made up the difference. And at that point

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1 they didn't bother to put it into the fund. They  
2 just paid the bill. Maine was about five and a  
3 quarter. And I'm not sure what the split between  
4 the PUC and the parent was on that.

5 → MEMBER SIEBER: Seems to me that Big  
6 Rock, taking into account the difference in size of  
7 the two plant, had more contamination than Maine  
8 Yankee did. Is that correct?

9 MR. SHEPHERD: Yes, it did.

10 MEMBER SIEBER: Yes.

11 MR. SHEPHERD: You know, it was an old  
12 experimental BWR. It had operated for many years  
13 with stainless steel cladding. Like I said, they  
14 had the condenser break that put a bunch of stuff  
15 under the turbine building.

16 MEMBER SIEBER: Right.

17 MR. SHEPHERD: They had a unique  
18 approach to disposing a lot of the material, sending  
19 it to a RCRA-C landfill for the low-level  
20 contamination.

21 MEMBER SIEBER: Yes.

22 MR. SHEPHERD: Their original plan had  
23 been to scabble concrete inside the contamination  
24 building and do the same with it. What they found  
25 background was so high they couldn't get a reading

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1 down to the release limit, so they finally just said  
2 to heck with it.

3 MEMBER SIEBER: Send the whole thing.

4 MR. SHEPHERD: Went in with the dynamite  
5 to loosen it up and boxed it all up and sent it to  
6 Utah.

7 But the size of the plant doesn't seem  
8 to have as a large effect on the cost of  
9 decommissioning as people would think.

10 MEMBER SIEBER: Yes, it's the  
11 contamination.

12 MR. SHEPHERD: -- value is based on no  
13 contamination. These are just the --

14 MEMBER RAY: Have a leaking spent fuel  
15 pool that's imbedded in the ground.

16 MEMBER SIEBER: Well, I was involved in  
17 Shippingport and that one --

18 MR. SHEPHERD: Oh, yes.

19 MEMBER SIEBER: -- had -- it had some  
20 adventures which we knew about during the  
21 operational period. We just didn't realize how  
22 tough it would be to clean up. But otherwise, it  
23 went pretty well.

24 MR. SHEPHERD: Well, if we look at the  
25 leak from Indian Point, which we think was about a

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1 tenth of a gpm -- it doesn't sound like much, but it  
2 would take you about two hours to fill your car up  
3 with gas at that rate --

4 MEMBER SIEBER: Right.

5 MR. SHEPHERD: -- over the life of a  
6 plant; well, over 20 years, the leakage, that's  
7 about 2 million gallons.

8 MEMBER SIEBER: Right.

9 MR. SHEPHERD: You know, a tenth of a  
10 gpm doesn't sound like much, but 2 million gallons  
11 of contaminated material is going to cost you a lot  
12 to clean up.

13 MEMBER SIEBER: Yes.

14  CHAIRMAN RYAN: Are we at a spot in the  
15 agenda for NEI? Ralph, you want to make some  
16 comments?

17 MR. ANDERSON: Sure.

18 CHAIRMAN RYAN: Now is a good time. Is  
19 that all right with everybody? All right. Please.

20 MR. ANDERSON: Ralph Anderson with NEI.  
21 I'm not going to revisit the Decommissioning  
22 Planning Rule. If any of you have read our  
23 comments, they're probably the most aggressive  
24 comments that we've made on any proposed rule. But  
25 the rule is the rule.

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1           As far as the guidance is concerned,  
2           which is why I came up here today, can't say a lot  
3           because I'm not sure what's in it. Draft guide was  
4           published late 2010, or '11; excuse me. Comments  
5           were provided in February. I'm make sure that Derek  
6           has a copy of our comments if you want to look at  
7           them --

8                   CHAIRMAN RYAN: Yes, please.

9                   MR. ANDERSON: -- that addressed our  
10           issues on the draft at that time.

11                   We saw a working draft in August; it  
12           wasn't actually published for comment, which  
13           represented in our view a substantial improvement  
14           over the original draft.

15                   I understand; and maybe, Jim, you can  
16           help me with this, that there have been substantive  
17           changes since that time which has been the reason  
18           why we haven't seen another version for comment. Is  
19           that a correct assessment?

20                   MR. SHEPHERD: We could argue the term  
21           "substantive." Certainly there have been a number  
22           of wording changes in there. I don't think the  
23           essence of the guidance has changed significantly.  
24           There's been some reorganization, I think improved  
25           explanation of some things. But, yes, there have

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1       been ongoing comments.

2                   MR. ANDERSON:   Okay.   So I can't comment  
3       on the current version of the guide because I'm not  
4       sure what's in the current version on the guide.

5                   So another comment that requires a  
6       question first.   Up until very recently anyway the  
7       public communicated expectation from the NRC was  
8       that the next draft would also be published for  
9       another round of comment.   That statement's been  
10      made in front of the Commission and other people.  
11      Is that still accurate, or are you planning now to  
12      issue a final guide?

13                  MR. SHEPHERD:   At this point we're  
14      planning to issue a final guide.

15                  MR. ANDERSON:   Okay.   So, you know, one  
16      of my comments --

17                  MR. SHEPHERD:   And it's a trade-off.  
18      One of the comments has been, you know, we need  
19      final guidance before we can figure out how to  
20      implement the rule.

21                  MR. ANDERSON:   Right.

22                  MR. SHEPHERD:   And now that has been the  
23      stronger driver at this point.

24                  MR. ANDERSON:   Right.

25                  MR. SHEPHERD:   The staff opinion is that

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1 the guidance has not changed substantially in the  
2 last year. There's been reorganization. There's  
3 been the added information that -- I'm glad to hear  
4 you think we improved it over the earlier version.

5 MR. ANDERSON: Yes.

6 MR. SHEPHERD: But we think at this  
7 point it was more important to get the final guide  
8 out so people could fully understand what we thought  
9 we wanted in the rule.

10 MR. ANDERSON: Right. Well then the  
11 distinction I would make is not to speak to the  
12 materials licensees themselves, because although we  
13 interact with them and are able to represent to a  
14 certain extent their point of view, the problem  
15 there is the situations are so diverse, it's kind of  
16 difficult to get kind of a collective view there.

17 However, for the fuel cycle facilities,  
18 which is where I think our primary concern has been  
19 on the timing of the guidance; just to try to jump  
20 in on a few points that made earlier, one is we're  
21 dealing with cats and dogs. That's why you don't  
22 have a standard decommissioning formula. Every  
23 facility is absolutely different and unique. There  
24 would be no formula that could cover all the  
25 facilities.

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1                   Likewise, in implementing the  
2                   Decommissioning Planning Rule, we're of a similar  
3                   mind. It's very difficult. And I think Jim has  
4                   experienced this issue. It's pretty hard to put out  
5                   some fairly guidance and say, here, that takes care  
6                   of fuel cycle facilities, because whatever you put  
7                   out is going to apply to this one and not to that  
8                   one. So that's very challenging for them, and that  
9                   also is the source of their consternation. It's  
10                  that they ask me to communicate repeatedly that they  
11                  still don't have a good sense of what the NRC  
12                  expectation is for change from what they currently  
13                  do.

14                  So another comment I would offer is I'd  
15                  like to disavow the notion that once upon a time  
16                  there was a Decommissioning Planning Rule and that  
17                  everyone suddenly realized that they weren't doing  
18                  any monitoring. We've been monitoring during the  
19                  entire lifetime of the plants and of the fuel cycle  
20                  facilities and there's enough documented instances  
21                  of groundwater protection and dealing with states  
22                  and EPA and other people on groundwater issues to  
23                  demonstrate that somehow somebody figured out that  
24                  there was contamination of the groundwater.

25                  What the Decommissioning Planning Rule,

1 in my mind, is is it goes to its purpose of  
2 preventing legacy sites, and therefore it assures  
3 that the types of monitoring that's being done and  
4 the way in which that information is being used  
5 helps assure adequate funding for decommissioning.  
6 So please don't lose sight of that. This isn't a  
7 new monitoring requirement. In fact that's the  
8 basis by which NRC said it is not backfit. If it  
9 was a new monitoring requirement, it's a backfit.  
10 It's reaffirming that you need to be doing  
11 sufficient monitoring to understand your  
12 decommissioning.

13 So I heard a little bit of that here,  
14 too. I just want to convey, understand that we've  
15 always had monitoring programs. They've become more  
16 robust over the years, along with everything else we  
17 do. You know, to the sense now that we're out and  
18 state-of-the-art on this planet, we're doing  
19 groundwater monitoring, subsurface monitoring far  
20 beyond what any other country is doing. In fact a  
21 lot of the countries are looking at us and saying  
22 don't do so much. We're afraid our regulator will  
23 write a decommissioning -- something like that.

24 So, you know, understand that for the  
25 reactors -- and we agree with the comment that's

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1       been made repeatedly that we believe we're already  
2       doing what it is that is probably being expected by  
3       the NRC. We just don't want to see what we're doing  
4       on a voluntary basis become codified, and we've  
5       convinced the Commission that's the way it should be  
6       and the reason that it's not being codified in  
7       guidance or anywhere else is because the Commission  
8       directed that it not be codified. So, you know,  
9       that is the current state of affairs.

10               However, looking at the wording, now  
11       I've got something to take back and talk to people  
12       about. I certainly understand the notion of change  
13       made from the X slide to the one below it. So, you  
14       know, we'll continue to look at it in that way.

15               I would like to offer a thought. It's  
16       just difficult in conjunction with the timing issue.  
17       I personally believe that at some period of time  
18       after we've had guidance on the street, and after  
19       licensees have implemented the guidance, and after  
20       inspectors have inspected the licensees, and we've  
21       all gained some experience and help refine our  
22       understanding of what it is we're trying to  
23       accomplish, it would strike me that logically one  
24       would want to capture all that learning curve and  
25       revisit the guidance, you know? And I'm not

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1 thinking about long periods of time. And perhaps  
2 enforcement discretion itself sets a good period of  
3 time, because you are going to be out -- your  
4 inspectors will be out capturing experience. You  
5 know, they may not be citing people for it, but  
6 they'll be capturing experience.

7           And so I'd like to offer as one comment  
8 to be thinking ahead potentially to some work shop  
9 at some period of time to transition from  
10 enforcement discretion to full enforcement where you  
11 can entertain changes to the guidance.  
12 Unfortunately, I recognize the Agency doesn't have a  
13 smooth easy process for updating something, but I'd  
14 just offer that somewhere in there we ought to think  
15 about that from a process point of view.

16           The second thing I would say is that I  
17 think it will be important to remind the inspectors  
18 in particular that the purpose of the new rule is  
19 not to see if people can do a perfect survey. It's  
20 not see if you can find the atom of radioactivity.  
21 The purpose of the new rule, as stated in the  
22 *Federal Register*, is to avoid legacy sites that  
23 implies a level of contamination and a level of  
24 monitoring that is far removed from some notion of  
25 excellence in monitoring and finding every

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1 radioactive atom. That is not the purpose of the  
2 rule.

3 I think the inspectors themselves are  
4 going to need that. Because we experienced that  
5 when we implemented the Voluntary Groundwater  
6 Protection Initiative. They came to think that we  
7 were looking for every atom of tritium. They didn't  
8 realize what we were looking for was degradation and  
9 leakage of underground systems. That's what we were  
10 looking for so that we could go fix those problems.  
11 And that's why we then implemented a second  
12 initiative behind it to focus specifically on the  
13 integrity of the tanks and the systems. But the  
14 inspectors had lost the focus of what it was we were  
15 out trying to do. So I'd just say that would be an  
16 issue to keep in mind here.

17 MEMBER ARMIJO: That would depend on the  
18 wording in the guidance.

19 MR. ANDERSON: Yes.

20 MEMBER ARMIJO: The wording in the  
21 guidance makes it look like you have to run a  
22 scientific demonstration. That's what the  
23 inspectors will look for. The wording on the  
24 guidance is really general enough. It says, hey,  
25 you know, we don't want a Ph.D. thesis. We want to

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1 just know if this plant is leaking and contaminating  
2 and nobody's paying attention to it.

3 MR. ANDERSON: Yes. And with due  
4 respect to parties present and not, I need to  
5 comment a little bit on the decommissioning  
6 experience that we've had to date. I don't want to  
7 start by saying that everybody is an outlier, but  
8 not every nuclear power plant is sitting on a Marine  
9 base and isn't going to have to decommission to the  
10 standards of San Onofre.

11 I would also say that not every nuclear  
12 power plant at any rate, nor fuel cycle facility,  
13 nor other licensees, are going to have to  
14 decommission to state-set criteria. With all  
15 respect to the Northeast, they do things  
16 differently. Connecticut Yankee decommissioned at  
17 10 millirem a year, not 25 millirem a year. And a  
18 substantial amount of the money that they expended  
19 was not only to achieve that, but it also was over  
20 on the Greenfield side which had nothing to do with  
21 NRC regulation.

22 They had RCRA issues with contaminated  
23 paint. So wherever they had strontium-90,  
24 unfortunately they had RCRA components that required  
25 cleanup far below what the strontium-90 would have

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1 driven as cleanup standards. So they had -- if you  
2 look at the situations that occurred, first of all,  
3 I agree with Jim at his top point, and that is  
4 clearly whatever it is you think you're going to  
5 need to do, you need to fund for it. But I would  
6 disagree that it's NRC's job to make sure that you  
7 fund for all those other things. It's not. That  
8 belongs to other people.

9 MEMBER RAY: Comment on Rancho Seco and  
10 Trojan.

11 MR. ANDERSON: Okay. Rancho Seco's  
12 decommissioning costs -- let's see, I want to say  
13 they came in at 475 million.

14 MEMBER RAY: All right.  
15 So you consider it to be fully decommissioned?

16 MR. ANDERSON: Do I consider Rancho Seco  
17 to be fully decommissioned?

18 MEMBER RAY: Yes.

19 MR. ANDERSON: Under NRC regulations?

20 MEMBER RAY: Yes.

21 MR. ANDERSON: With the exception of  
22 some --

23 MEMBER RAY: But it doesn't have  
24 anything to being on a Marine Corps base. By the  
25 way, it's not a Marine Corps base. But besides that

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1 point, I would just say it depends on what you mean  
2 by "decommissioning." If you mean terminate the  
3 license, I think probably the estimates are not  
4 outliers. But like he said, you stack up all the  
5 costs. And Rancho Seco and Trojan are sitting  
6 there. Terminated the licenses, I believe.

7 MR. SHEPHERD: Rancho has not.

8 MEMBER RAY: Rancho has not?

9 MR. SHEPHERD: No, Rancho has the unique  
10 problem that they did not dispose of their Class B  
11 and C waste --

12 MEMBER RAY: Okay. In any event --

13 MR. SHEPHERD: -- where there was no  
14 disposal available, so they still have a Part 50  
15 license.

16 MEMBER RAYS: Those are just two plants  
17 I know of that ran out of money.

18 MR. PERSINKO: But I believe that the  
19 site itself is released from the license and it's  
20 now shrunk down to --

21 MEMBER RAY: Okay. Sure.

22 MR. PERSINKO: -- Class B, C storage  
23 building.

24 MEMBER RAY: Like an ISFSI or something  
25 like that?

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1 MR. SHEPHERD: Yes, actually Trojan,  
2 Fort St. Vrain and Shoreham are the only licenses  
3 we've terminated. Everybody else has a general Part  
4 72 license that requires the Part 50 to stay in  
5 effect. So, yes, it's --

6 MEMBER RAY: My only point is I'd like  
7 to see the money required to be set aside increased.  
8 I think it would be in the industry's interest if it  
9 were.

10 MR. ANDERSON: But the simple comment I  
11 want to make though is that's not the job of 10  
12 C.F.R. Part 50.

13 MEMBER RAY: It's not the ACRS' job  
14 either, so --

15 MR. ANDERSON: Well, and so -- and it  
16 makes it difficult. One doesn't want to sound --  
17 you can almost reflect on the argument about whether  
18 the rich should be taxed more. Why can't you hand  
19 out all the money to convert our sites to whatever  
20 they're going to do next? Big Rock Point wanted to  
21 be converted to a state park, for instance, which is  
22 why they sent a whole of material to RCRA sites that  
23 they wouldn't have had to dispose of in the first  
24 place. So that was an agreement they made with  
25 their local community. They didn't do that to meet

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1 NRC requirements. They did that because the state  
2 wants to use the area as a recreation facility. And  
3 to do that they wanted to be able to tell people  
4 that virtually all of the detectable radioactivity  
5 was moved away. So every situation is going to  
6 involve unique aspects, is my point.

7 But the key that I want to make is that  
8 we view under law that NRC's job is to make sure  
9 it's radiologically safe when the license is  
10 terminated and that that's what you mean about  
11 avoiding legacy sites. I'm still hard-pressed to  
12 believe that as a matter of business that there's  
13 any utility out there that's got a secret plan for  
14 how they're going to avoid decommissioning their  
15 facility. I just came out of my wars with the  
16 financial group where that seems to be a held view  
17 that I try to work them through. I just don't think  
18 that's the premise that we need to operate on.

19 But I would say that if we can keep the  
20 Decommissioning Planning Rule and guidance on track  
21 for its purpose, not just here at headquarters, but  
22 out in the regions, and enforcement discretion, it  
23 might create an excellent opportunity to have that  
24 discussion because we won't be arguing about  
25 citations. And I think that's a real benefit of the

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1 direction you guys are going. Let's have the  
2 constructive dialogue and then let's reconsider the  
3 guidance at the end of that period and think about  
4 if there's adjustments we should make.

5           Reg Guide 4.21, which hasn't been talked  
6 about here today, which is the guidance for  
7 applicants, they've always a variant of the  
8 Decommissioning Planning Rule in place that really  
9 benefits -- and some of the people here know this --  
10 it really benefitted from the interactions we have,  
11 from thinking things through, carrying them out and  
12 then actually ending up with a final guide that  
13 people seem to be able to understand. I mean, I  
14 think everyone knows what's clearly expected. So I  
15 just see -- my big exhortation here would be let's  
16 understand that we're doing something new and  
17 different. Let's approach it. I think we have been  
18 approaching it, perhaps with over caution. Maybe  
19 that's why we are beyond the schedule. But let's  
20 take full advantage of where we are and make sure  
21 that what we finally end up with is the right  
22 guidance. That's been our concern all along, is  
23 that the guidance will overreach and then we'll  
24 never be able to come back.

25           So, Jim, it's been a pleasure all this

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1 time working with you and look forward to continuing  
2 to do that. You and I both got a lot of gray, so I  
3 don't know how long that will go on. Be happy to --

4 MR. SHEPHERD: Now, our nominal schedule  
5 for reviewing regulatory guidance is five years. Do  
6 you see that as a useful time frame for what you  
7 were just talking about, or do you see it as  
8 something less than that?

9 MR. ANDERSON: Well, let me suggest  
10 this: In the interim measure -- and again, for the  
11 reactors I think this will be easier than it might  
12 be for the fuel cycle facilities because of their  
13 differences. We already have in mind that towards  
14 the end of that time frame what we might do is write  
15 a new NEI document and bring it back in, not as  
16 conforming with the Reg Guide, but as a alternative  
17 meeting regulation so that we can make those  
18 translations. That thought's already in our head,  
19 that let's gain the experience for a year, because  
20 you can endorse it quicker than you can update the  
21 Reg Guide.

22 CHAIRMAN RYAN: You really want to go  
23 out and exercise what's on the table now in a way  
24 that you can come back and say this is what worked,  
25 this is what didn't.

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1 MR. ANDERSON: Yes. Yes.

2 CHAIRMAN RYAN: Is that a commitment?

3 You're on track to --

4 MR. ANDERSON: It's on our actions of  
5 things to do unless all the other things that are  
6 going on overtake it.

7 CHAIRMAN RYAN: Yes.

8 MR. ANDERSON: You know, we've got an  
9 awful lot on our plate in the radiological area.

10 CHAIRMAN RYAN: Sure. Yes.

11 MR. ANDERSON: But right now the thought  
12 is we would leave NEI 07-07, the Groundwater  
13 Protection Initiative, alone. But the thought is  
14 that we might write something that helps bridge that  
15 to the Decommissioning Planning Rule in a way that  
16 we can avoid future problems of what's required and  
17 what's not required.

18 CHAIRMAN RYAN: Yes.

19 MR. ANDERSON: The inspectors are very  
20 dissatisfied with being asked to look at something  
21 that isn't required. There's been a lot of feedback  
22 from the reactor inspectors -- so the Commission  
23 tells me go out and monitor the Groundwater  
24 Protection Initiative, but don't regulate it. And  
25 they don't know what that means. And I don't know

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1 what that means. The Decommissioning Planning Rule  
2 is going to be in kind of a similar space. Yes,  
3 what you're doing meets my expectations, but also  
4 I've been told not to regulate what you're doing.  
5 It's going to create a conundrum for the inspectors.  
6 You know, as soon as somebody tries to write a  
7 citation against a voluntary initiative, it will be  
8 very challenging for everybody to work their way  
9 through that. So our thought is what we ought to  
10 really do is come up with some stand-alone document,  
11 maybe starting a year after we go through this,  
12 start drafting it, interacting with the NRC and then  
13 get an endorsement. Because I appreciate what you  
14 say, Jim. You're not going to be able to change the  
15 guide that quickly. But that's the direction --

16 MR. SHEPHERD: One of the challenges we  
17 had in the guidance is -- looking at 07-07 there was  
18 a commitment, if you will, from the power industry  
19 to NEI to do certain things. But that same  
20 commitment didn't exist from everybody else --

21 MR. ANDERSON: Right.

22 MR. SHEPHERD: -- both the fuel cycle  
23 and the rest of the material sites. Do you foresee  
24 broadening your scope perhaps in this document that  
25 you're talking about now?

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1                   MR. ANDERSON: Based on the occurrence  
2 we've had at the present, I would say not. And  
3 again, it goes back to the fantastic differences  
4 from one facility to another. Even when you take  
5 two, you know, medical hospitals with robust nuclear  
6 medicine programs, they're just categorically  
7 different in the way they -- you can't come up with  
8 a standard. You know, one of your things showed the  
9 lab and then the static and some stuff coming out.  
10 All I was thinking about is when I was at University  
11 of Colorado and we had our stack that we sent  
12 everything up and our sewer that sent the rest of  
13 it, you know -- but we were categorically different  
14 than the hospital in downtown Denver. So there's  
15 the difficulty. You don't have the same possibility  
16 for arriving at a consensus that we do for NEI and  
17 the reactors.

18                   Even the fuel cycle facilities, we  
19 tried. We actually set out to write a Groundwater  
20 Protection Initiative for the fuel cycle facilities  
21 after we went through this for the reactors. And  
22 everybody gave up, not because they didn't want to,  
23 but because we were going to have to write seven  
24 different initiatives.

25                   CHAIRMAN RYAN: Everything from a dry

1 arid environment to a, you know, saturated --

2 MR. ANDERSON: Yes.

3 CHAIRMAN RYAN: -- you know, wet weather  
4 environment.

5 MR. ANDERSON: Yes.

6 CHAIRMAN RYAN: So it's very difficult  
7 bridging all those gaps.

8 MR. ANDERSON: So as attractive as that  
9 would be, it's not feasible. I mean, you're living  
10 this with trying to write the guidance, so you know  
11 what I'm talking about.

12 Anyway, I appreciate the opportunity to  
13 make some comments.

14 Final thought for Michael and a few  
15 other people on the group. Right now using the  
16 formula amount, the so-called required minimum  
17 funding for decommissioning, 50 percent of the --  
18 it's increased over the years. It's on an  
19 increasing trend. Right now 51 percent of the cost  
20 is waste disposal of the formula itself. So if you  
21 calculate the minimum, 51 percent of that is waste  
22 disposal. And with the next change that's taking  
23 place, that will go up to I think 56 or 57 percent.  
24 Over time it's slowly becoming -- decommissioning is  
25 simply a large waste disposal project and on the

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1 side you're doing a few other things. It's  
2 significant.

3 CHAIRMAN RYAN: It's going to go up even  
4 more as the days go by.

5 MR. ANDERSON: It's significant.

6 CHAIRMAN RYAN: Yes.

7 MR. ANDERSON: Thank you.

8 CHAIRMAN RYAN: Great. Thank you,  
9 Ralph.

10 Any comments or questions?

11 (No audible response.)

12 CHAIRMAN RYAN: So I guess on our  
13 schedule we've got a full Committee meeting  
14 Thursday.

15 MR. WIDMAYER: Thursday for one hour.

16 CHAIRMAN RYAN: For one hour. And we'll  
17 probably -- and we appreciate if you would think of  
18 coming for a few comments there.

19 MR. ANDERSON: Yes, Janet Schlueter will  
20 be there.

21 CHAIRMAN RYAN: Okay.

22 MR. ANDERSON: But she actually  
23 represents fuel cycle facilities.

24 MR. WIDMAYER: If you'd use the  
25 microphone, Ralph.

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1 MR. ANDERSON: Oh, I'm sorry. Oh, yes.  
2 Janet Schlueter from NEI will be at that meeting.

3 MEMBER ARMIJO: Are we commenting on the  
4 final guidance, or are we commenting on the draft  
5 guidance?

6 MR. WIDMAYER: No, it's final.

7 MEMBER ARMIJO: What we've received to  
8 review is the final?

9 MR. WIDMAYER: That's what they want to  
10 go out with, yes.

11 MEMBER ARMIJO: Okay. But the public  
12 hasn't seen it?

13 MR. O'DONNELL: Mike?

14 CHAIRMAN RYAN: Yes?

15 MR. O'DONNELL: I just want to --

16 CHAIRMAN RYAN: I'm sorry.

17 MR. O'DONNELL: It's Edward O'Donnell on  
18 the Regulatory Guide Development Branch, the Office  
19 of Research.

20 Just want to respond to Ralph's  
21 suggestion about review of the guides. The current  
22 policy in the Regulatory Guide Development Branch is  
23 to review the guides every five years. And this is  
24 the idea of our branch chief, Thomas Boyce, and also  
25 Michael Case, the division director. So we have

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1 this process that every five years we'll look at  
2 them. Might be declared acceptable as is, or maybe  
3 worthy of revising. Revising takes about 18 months  
4 or so. So, Ralph, we do have that process now in  
5 place.

6 CHAIRMAN RYAN: So just to be clear, for  
7 this particular guidance it is at the status of  
8 entering a revision or --

9 MR. O'DONNELL: Well, this one here, if  
10 it does file this year, which is, you know, 2012,  
11 2017 we'd have a formal process of looking at it,  
12 unless something came up that, you know -- perhaps,  
13 you know, a letter from the outside or something  
14 that says, hey, we got a problem with this thing.

15 CHAIRMAN RYAN: Okay.

16 MR. O'DONNELL: And then we'd have to  
17 look at it. If the letter made sense, then we'd  
18 start doing it.

19 CHAIRMAN RYAN: Okay.

20 MR. O'DONNELL: But the labor, as I  
21 said, takes about 18 months or so.

22 CHAIRMAN RYAN: Okay. All right. Thank  
23 you. Anything else?

24 (No audible response.)

25 CHAIRMAN RYAN: I guess I would ask the

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1 folks here, members that are present from the  
2 SubCommittee meeting, what their thoughts are on a  
3 letter for the full Committee. Should we write a  
4 letter or draft a letter for the full Committee's  
5 consideration?

6 MEMBER SIEBER: I don't think you need  
7 one.

8 CHAIRMAN RYAN: Okay. No, Harold?

9 MEMBER RAY: No.

10 CHAIRMAN RYAN: Sam?

11 MEMBER ARMIJO: No, I don't think  
12 there's really a need.

13 CHAIRMAN RYAN: Okay. Dick?

14 MEMBER SKILLMAN: No, I don't think a  
15 letter is necessary.

16 CHAIRMAN RYAN: Okay. Good. So we'll  
17 have a briefing at a full Committee. We will not  
18 plan a letter moving forward, but we'll stay abreast  
19 of the issues.

20 MR. WIDMAYER: I think what we'll do is  
21 -- we're responding to a memo from research for  
22 formal review.

23 CHAIRMAN RYAN: Right.

24 MR. WIDMAYER: So we'll send a Hackett-  
25 gram like we do at the other Reg Guides.

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1 CHAIRMAN RYAN: Right. Right. Yes,  
2 I'll give a note to the staff and we'll do that.  
3 Okay? Very good. Any other comments or questions?

4 (No audible response.)

5 CHAIRMAN RYAN: I'd like to thank staff  
6 for a very thorough formal briefing. And I want to  
7 thank Ralph in particular for taking time out of his  
8 busy schedule to give us his insights, which were  
9 very, very helpful. Glad to have on the record.  
10 Thank you very much.

11 And anybody else?

12 (No audible response.)

13 CHAIRMAN RYAN: That being said, the  
14 Subcommittee is adjourned. Thank you very much.

15 (Whereupon, the interview was concluded  
16 at 2:34 p.m.)

17

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19

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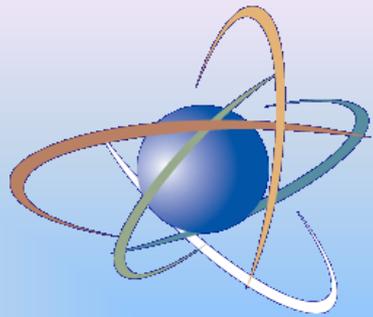
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UNITED STATES NUCLEAR REGULATORY COMMISSION

*Protecting People and the Environment*

# DEVELOPMENT OF THE DECOMMISSIONING PLANNING RULE AND GUIDANCE

**J. C. Shepherd**  
**FSME, DWMEP**

# OUTLINE

- HISTORY
- THE RULE
- THE GUIDANCE
- THE IMPLEMENTATION

# HISTORY THE FIRST

## ✘ EARLY YEARS

- + Manhattan Engineering District
- + Atomic Energy Act of **1946** (PL 79-585)
- + “Atoms for Peace”
- + Atomic Energy Act of **1954** (PL 83-703)
- ✘ 10 CFR 20.304 (1957)
  - Burial of certain quantities of radioactive waste in soil, **without prior approval** (22 FR 548)

# 10 CFR 20.304

***Tuesday, January 29, 1957***

**§ 20.304 Disposal by burial in soil. No licensee shall dispose of licensed material by burial in soil unless:**

**(a) The total quantity of licensed and other radioactive materials buried at any one location and time does not exceed, at the time of burial, 1,000 times the amount specified in Appendix C of this part; and**

**(b) Burial is at a minimum depth of four feet; and**

**(c) Successive burials are separated by distances of at least six feet and not more than 12 burials are made in any year.**

# HISTORY THE SECOND

## ✘ The NRC

### + Energy Reorganization Act of 1974

- ✘ in the public interest that the licensing and related regulatory functions of the AEC be separated ....

### + RG 1.86 “Termination of Operating Licenses for Nuclear Reactors” (June ‘74)

- ✘ Prior to release of the premises for unrestricted use, the licensee make a comprehensive survey ... contamination is within the limits specified in Table I (~5000 dpm).
- ✘ Regional Office inspects the facility and verifies ... Commission may terminate the license.

# NRC CHANGES

- + Rescinded 10 CFR 20.304 (45 FR 71761, Jan '81)
- + Issued Branch Technical Position for on-site disposal of uranium and thorium
  - × 2 options for unrestricted release
  - × 2 options for restricted release

# SUMMARY OF MAXIMUM CONCENTRATIONS [PCI/G] PERMITTED UNDER BTP OPTIONS

Kind of Material	Opt 1 <sup>a</sup>	Opt 2 <sup>b</sup>	Opt 3 <sup>c</sup>	Opt 4 <sup>d</sup>
<i>Natural Uranium (U-238 + U-234) with daughters present and in equilibrium</i>	10	-	40	200
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50	-	500
Depleted Uranium - Soluble	35	100	-	1000
Depleted Uranium - Insoluble	35	300	-	3000
Enriched Uranium - Soluble	30	100	-	1000
Enriched Uranium - Insoluble	30	250	-	2500

<sup>a</sup> Based on EPA cleanup standards.

<sup>b</sup> Concentrations based on limiting individual doses to 170 mrem/yr.

<sup>c</sup> Concentration based on limiting equivalent exposure to 0.02 working level or less.

<sup>d</sup> Concentrations based on limiting individual doses to 500 mrem/yr and, in case of natural uranium, limiting exposure to 0.02 working level or less.

# GAO AUDIT

- ✘ GAO audited NRC Decommissioning Program in 1989 (GAO/RCED-89-119)
  - + About half dozen improper license terminations
  - + Lack of control over records
  - + Did not require ground water monitoring

# GAO RECOMMENDATIONS

- ✘ Require comprehensive surveys
- ✘ Require licensees to retain records
- ✘ Develop Federal residual radiation standards

# SITE DECOMMISSIONING MANAGEMENT 1/2

- ✘ Revised Part 20 to ICRP 26/30 in 1991
- ✘ NRC reviewed ~130k license terminations
  - + ~ 150 “suspect” (incomplete paperwork)
  - + ~ 3 dozen should not have been terminated
  - + Established release criteria
    - ✘ BTP Options 1, 2
    - ✘ RG 1.86 Table 1 / FC 83-23
    - ✘ EPA Primary Drinking Water Standards (40 CFR 141)

# SDMP 2/2

## × Timeliness

- + Start remediation within 24 months of “non-use”
- + Finish within 18 months or per approved DP

## × Finality

- + NRC will not require more cleanup
- + MOU with EPA

## × Develop license termination rule

- + “Enhanced participatory rulemaking”

# LICENSE TERMINATION RULE

- Dose-based license termination criteria
  - All residual contamination on site, including subsurface (burials and ground water)
  - Appropriate pathways
- Restricted release
- Applicants minimize contamination by design and operation

# LTR REVIEW

- Commission direct staff review of LTR implementation, primarily to make restricted use more “user friendly”
- Staff response in SECY **03-0069**
  - Restricted use (plus 11 others)
  - **Rulemaking for prevention of legacy sites**
    - **Financial assurance**
    - **Identify residual contamination**

# DECOMMISSIONING PLANNING RULE

- ❑ Limit Environmental Contamination
- ❑ Monitor Site, Including Subsurface
- ❑ Keep Results In Decommissioning Records
- ❑ Update Financial Assurance

# DPR & Guide Development

- Workshop April 2005
- ACNW briefing June 2005
  - Committee supports the issuance of generic guidance implementing the LTR
  - Groundwater monitoring should be a prime consideration in the revised guidance ... address subsurface characterization, monitoring, contingency plans for groundwater contamination

# DEVELOPMENT CON'D

- ❑ Draft guidance for comment Sep 2005
- ❑ Draft Rule *en route* Sep 05 (Braidwood <sup>3</sup>H issue – LLTF)
- ❑ ACNW brief March 2006
  - expert panel unanimously agreed that staff had factored panel's input into proposed guidance.
  - Committee and staff recognize the relationship between modeling and monitoring

# REFINEMENT

- ACNW Brief July 2006
  - staff stressed the importance of adequate financial assurance; coordination with LLTF
  - Committee encourages the NRC staff to draft rulemaking, guidance on contaminant release prevention; early release detection, remediation
  - guidance focused on causes of increased ... decommissioning costs, and how to avoid them

# REFINEMENT CON'D

- ACNW Brief October 2007
  - Committee believes that legacy sites can be prevented through: prevention, and detection of unplanned releases and prompt remediation
  - Committee believes that unplanned releases that could contaminate ground water deserve special attention because large volumes of soil, ground water can be contaminated over time.

# DPR & Guide Schedule

## □ Rule

- Draft Jan 08
- Final Jun11
- Effective Dec 12

## Guidance

- Jan 08 (Draft)
- Jan 09 (Draft)
- Dec 11 (DG-4014)
- Jul 12 (Draft Rev)
- Jan 13? (RG 4.22)

# THE RULE: SURVEYS AND RECORDS

PRE-DPR	DPR
<p>§ 20.1501 General.            (a) Each licensee shall make ... surveys that—</p>	<p>§ 20.1501 General.            (a) Each licensee shall make ... surveys of areas, <b>including the subsurface</b> that--</p>
<p>...            (2) <u>Are reasonable under the circumstances</u> to evaluate—</p>	<p>...            (2) <u>Are reasonable under the circumstances</u> to evaluate--</p>
<p>(b) ... instruments ... are calibrated</p>	<p>(b) ... records from surveys ... of subsurface residual radioactivity ... must be kept with records important to decommissioning ...</p>

# DPR RAD PROTECTION

PRE-DPR	DPR
<p>§ 20.1101 Radiation protection programs.</p> <p>(a) Each licensee shall develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities ...</p>	same
<p>(b) The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that ALARA.</p>	same
<p>(c) The licensee shall periodically (at least annually) review the radiation protection program content and implementation.</p>	same

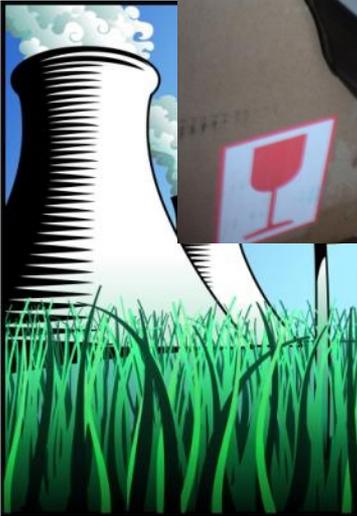
# Limit Environmental Contamination



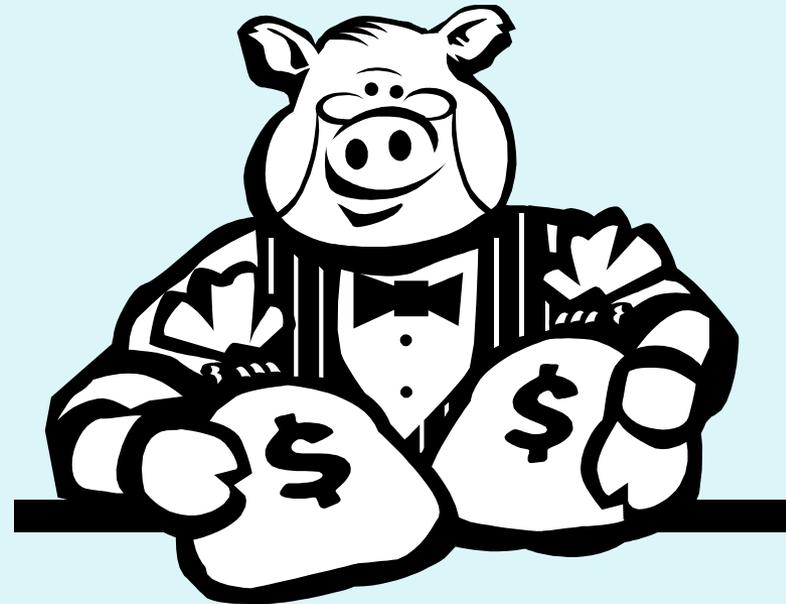
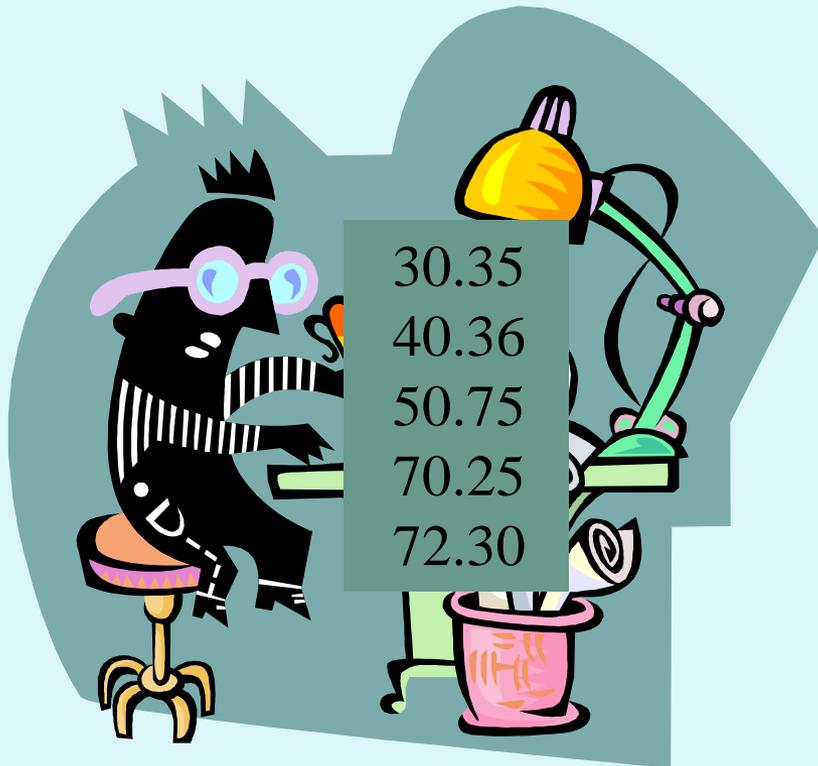
# Limit Contamination (Con'd)



# Do Reasonable Surveys



# Keep Records and Money



# Comments And Responses

- Large Number Received -- > 100
- Divided Into Clusters
  - Not Individual Answers
  - Not Level of Detail Some Wanted
    - Q: How Many Samples Must I Take, Where?
    - A: It Depends

# Comments 1 -- Easy

- We Are Perfect So NRC Should Exempt Us
  - NO
    - \$\$\$ Happens
      - , even to the best
      - Write your own letter to file explaining your perfection
      - Keep on good terms with your banker

# Easy con'd

- Guide Should Address Restricted Release
  - NO -- not an operational consideration
    - §20.1403(a): **demonstrate** that **further reductions** in residual radioactivity ... would result in net public or environmental harm
    - §20.1403(b): **made provisions** for legally enforceable institutional controls ....
    - §20.1403(d): The licensee **has submitted** a decommissioning plan or License Termination Plan to the Commission ....

# Relation to NEI-07-07

- Old

- ~~Staff has reviewed NEI's ... GPI and compared it to the DPR requirements. Based on this review, staff concludes that Objective(s) ... meet DPR objectives. Therefore, nuclear power plant licensees that have implemented NEI's GPI ... have an adequate subsurface monitoring program as part of meeting the requirements of 10 CFR 20.1501(a) and a recordkeeping system in accordance with 10 CFR 20.1501(b).~~

## NEI-07-07 (Con'd)

- New
  - NEI's voluntary Industry Groundwater Protection Initiative (GPI) in NEI 07-07, provides an approach acceptable to the staff to meet the requirements of the DPR.  
*(which is to have enough money to clean it all up)*

# How Much Do I Have To Do

- Function of Potential Releases
  - Volume
    - On Site At A Time
    - Process Throughput
  - Concentration(s)
    - “As Received”
    - In Product
  - Form
    - Gaseous – Particulate
    - Liquid
    - Solid

It Depends !

# Decommissioning Groups

Group	Brief Description	Examples
1	Licensed material not released to environment, did not cause activation, did not contaminate areas.	used only sealed sources
2	residual radioactivity on building surfaces, soils. site <u>meets the screening criteria</u>	loose radioactive material routinely cleaned up ( R&D)
3	<u>meets the screening criteria</u> , but needs amendment or added procedures to remediate	occasional released within NRC limits (broad scope)

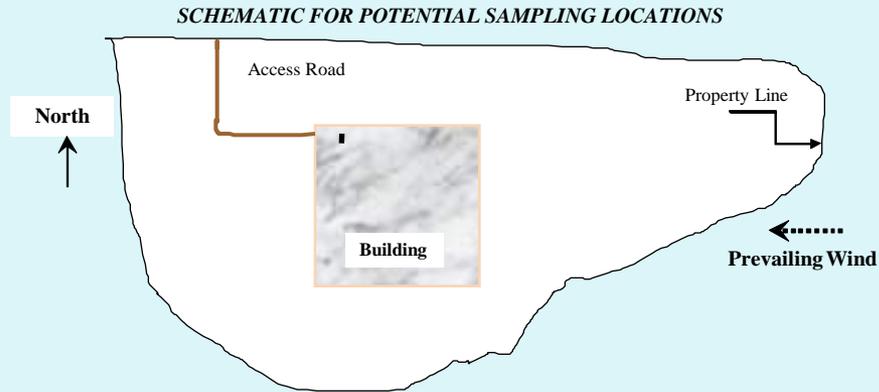
# More Groups

Group	Brief Description	Examples
4	residual radiological contamination of building surfaces or soils, but <b>not</b> ground water. Site meets unrestricted use levels by site-specific dose models	sites released radioactive material within NRC limits; some releases above NRC limits (e.g., waste processors)
5	<b>Group 4 <u>plus</u> ground water</b>	large amounts of loose or dissolved radioactive material on site (e.g., fuel cycle facilities)

# How Much Do I Have to Do

Section	Group	3	4	5
Previous Decommissioning Activities/ spills		<i>1</i>	<i>1</i>	2
Contaminated Structures, Systems, Equipment		2	2	2
Surface Soil, Subsurface Soil Contamination		<i>1</i>	<i>1</i>	3
Surface Water, Ground Water		<i>1</i>	<i>1</i>	3
Decommissioning Cost Estimate		<i>1</i>	2	2

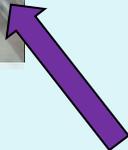
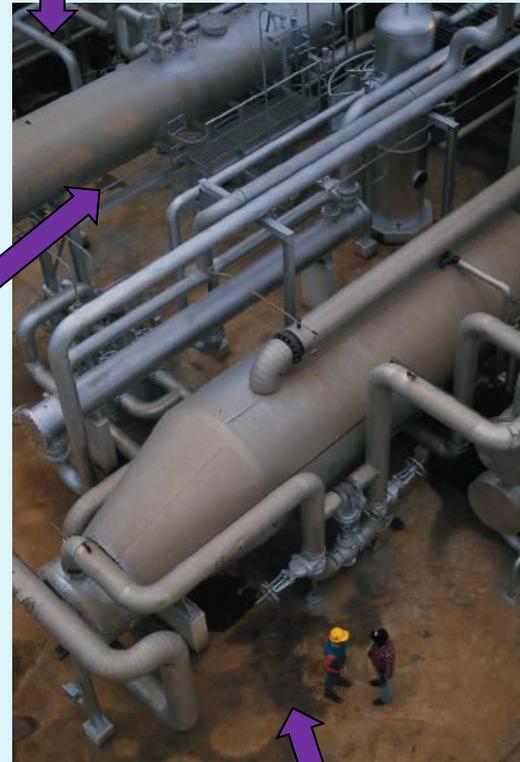
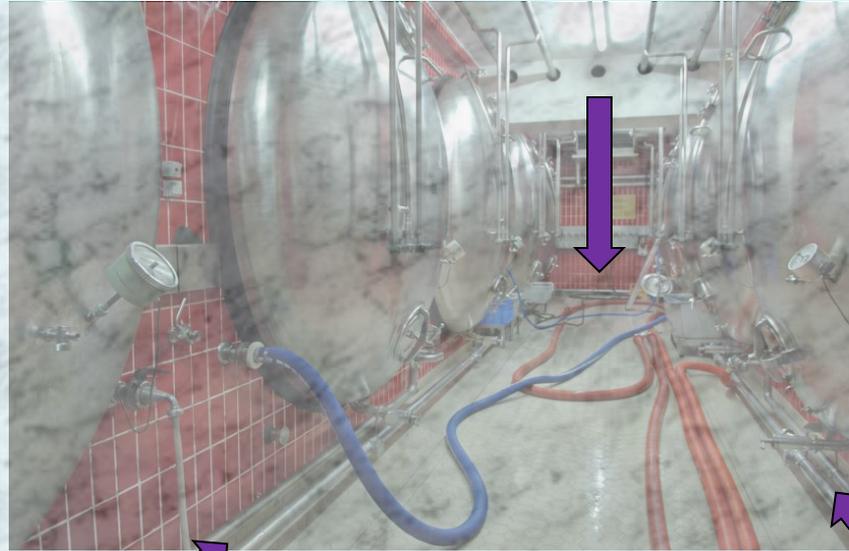
# Determining Where To Sample



# Potential Sources



# Inside Locations



# The Ideal Laboratory

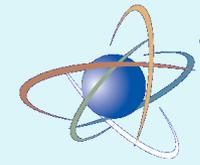


# The Real Laboratory



# Outdoor Surveys



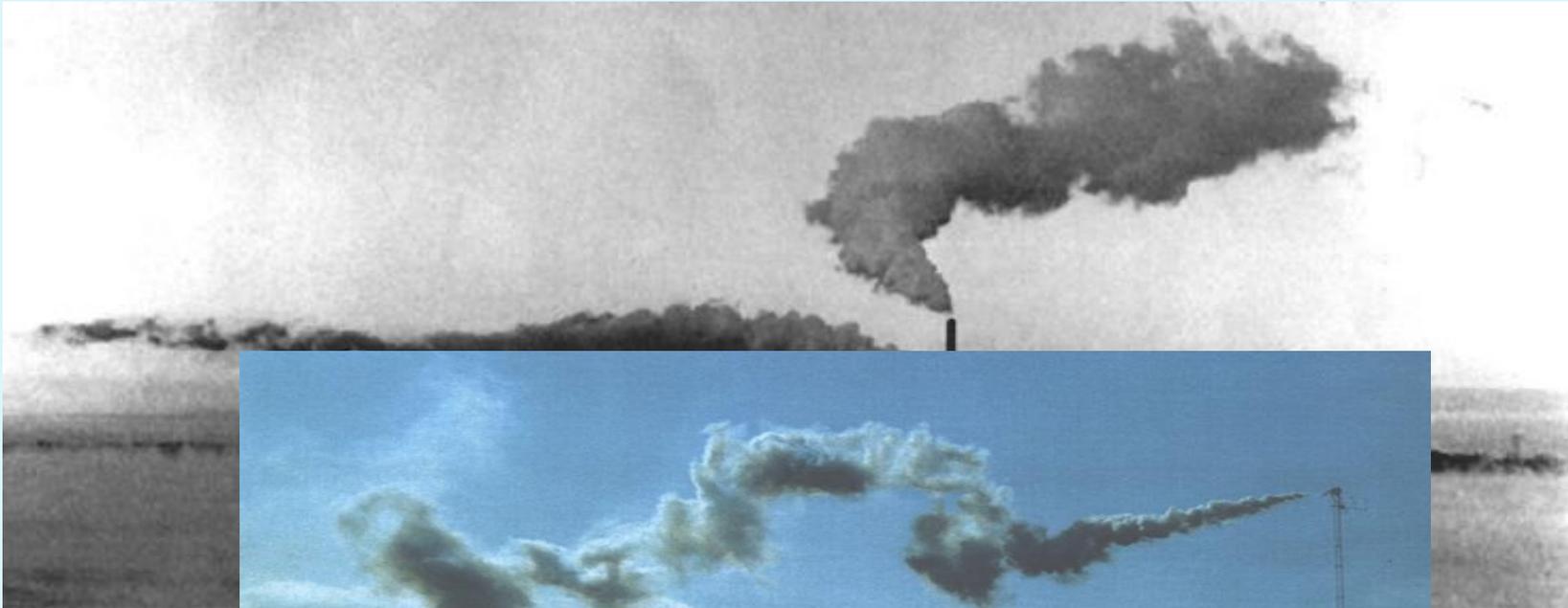


U.S. NRC  
U.S. NUCLEAR REGULATORY COMMISSION  
*Protecting People and the Environment*

# Sampling -- Stack Release Examples

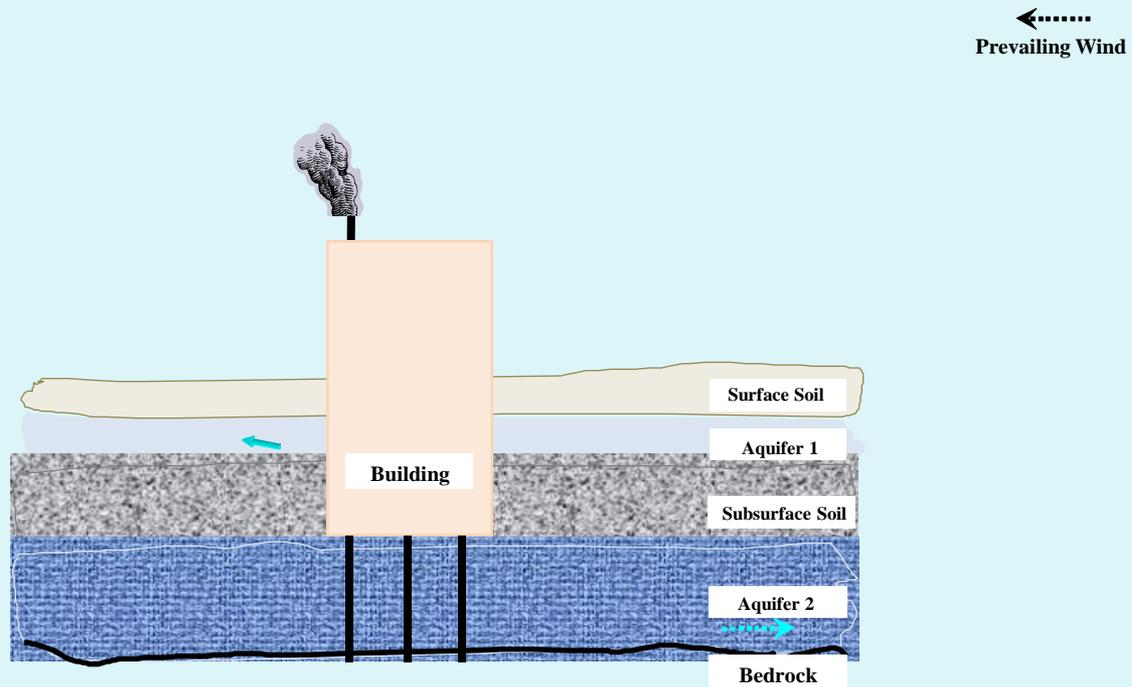


# More Stack Releases



# Outside Ground Sampling

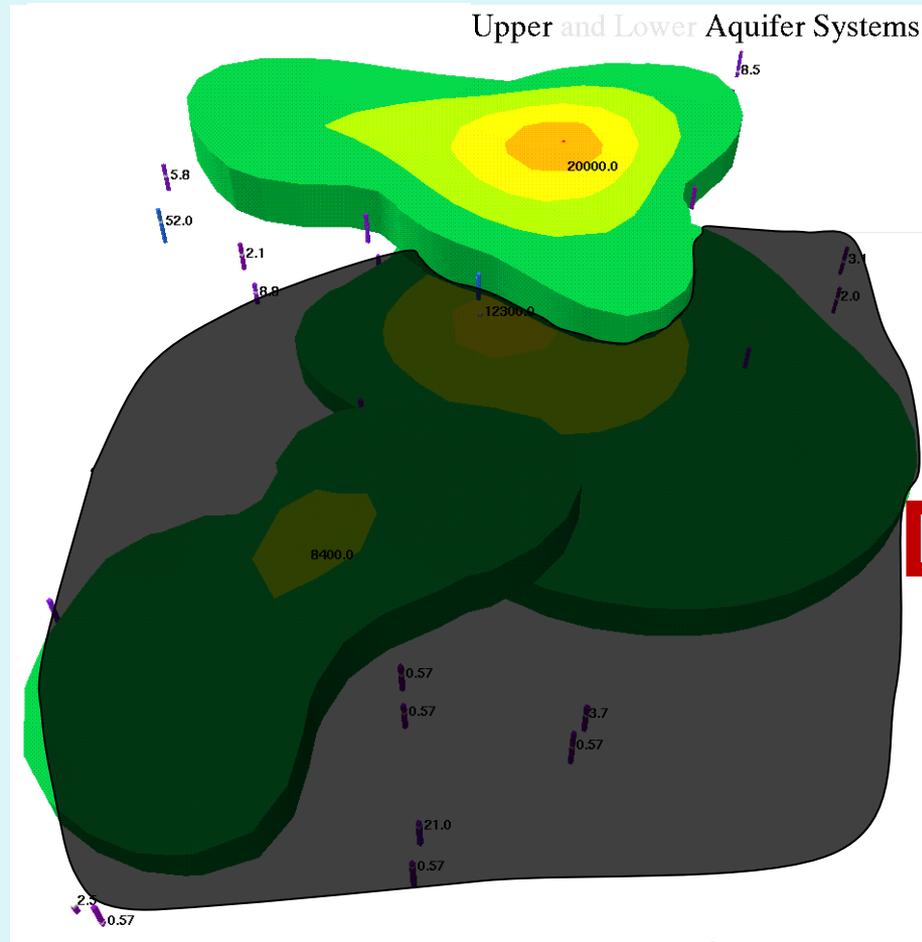
*SCHEMATIC FOR POTENTIAL SAMPLING LOCATIONS*



# Outdoor Surveys



# Subsurface



**It  
Depends  
!**

# Off-Site

- NRC Has Statutory Authority To Protect Public Health And Safety In The AEA
- No Specific Regulations Requiring Licensees To Remediate Off-Site
- Decisions On Site-Specific Basis

# IMPLEMENTATION

- Effective Date of Rule is **December 17**
  - At Next Routine Inspection
    - Licensees Have Completed Annual Update (§20.1101)
    - Identified IF Additional Sampling Locations Required
    - Added New Locations to Plan
- Enforcement Discretion
  - Conducting Sampling For Accessible Areas
  - “Good Faith” Effort To
    - Identify Surrogate Locations For Inaccessible Area
    - Characterize Subsurface

# QUESTIONS



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Dripping Water Wears Through Rock

***NOT***

***THE END***