

1 UNITED STATES OF AMERICA  
2 NUCLEAR REGULATORY COMMISSION

3 \*\*\*

4 PUBLIC WORKSHOP TO DEVELOP AN SRP  
5 FOR DECOMMISSIONING

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7  
8 U.S.NRC

9 11545 Rockville Pike, Auditorium

10 Rockville, MD

11  
12 Friday, March 19, 1999

13  
14 The above-mentioned workshop commenced, pursuant to notice,  
15 at 8:34 a.m.

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

[8:34 a.m.]

MR. MCKENNEY: My name is Chris McKenney and I am luckily in charge of ALARA and so today we are going to talk about what does it mean by the fact that we have ALARA mentioned in the decommissioning rule and what does the NRC foresee implementing it.

At first, I am just going to go through an overview this morning and then we are going to get more in a roundtable open discussion on trying to go through some methods, discuss problems and possibilities of approaches.

First, I am going to go through the background of ALARA. Most of you probably are familiar with ALARA, especially those in the reactor industry. It's been in operation since mid-'70s. I am going to then go on to how we view the ALARA approach in decommissioning and then we are going to go through how to decide on ALARA goals, what is reasonable, what is unreasonable, and go through specifically the 4006 method that was put forth by Research.

The ALARA concept is that you try to, to the extent possible, reduce any radiation risks to either members of the public, to occupational, but by doing this you do not incur additional risks from any other means or costs in this case also. It doesn't mean that you have to continue cleaning up something forever just to get that little half a millirem dose savings on a potential dose far in the future when you could be incurring lots of occupational dose.

The thing is it says that reasonably achievable is part of it, which is very subjective and in Reg Guide 8.8, paragraph 78 had the definition of "reasonably achievable" as being to not only consider the doses but also consider the state of technology and economics of any action you are deciding to do, including non-radiation hazards which for occupational when Part 20 changed in '94 when the biggest example was

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1 respirator protection, where for some people, for some conditions it was  
2 better to have people go into places with airborne radioactivity without  
3 respirators because the overall savings in both dose and hazard to the  
4 workers was actually less because without a respirator they are able to  
5 do their work faster than they were with a respirator and there wasn't  
6 the stress, heat stress and other things on the body.

7 I split up the dose reduction into about five different  
8 areas. They go pretty well down the list of being preplanning to  
9 on-the-spot analysis, on-the-spot work. You can either have dose  
10 reduction by design -- most of these examples of course are  
11 occupational, operational sort of considerations but you can design your  
12 facility, design your source term, design it so that you are not going  
13 to incur risk or dose.

14 Examples are reducing your nickel content and metals put  
15 around in your reactor building to reduce the Cobalt-60 production.

16 The one that is probably more common to most people is of  
17 course the administrative controls. That is the easiest thing to  
18 implement on the large scale and it can change with time and it is a  
19 major reliance in NRC's regulations on training, signs, labelling,  
20 preplanning, dry-runs, and the rest are more on specific sort of areas  
21 but on the dose reduction by protective or preventive measures you can  
22 do either -- make sure that people don't inhale it, make sure it doesn't  
23 get airborne, but it is more of a after-the-fact, after a source term  
24 got released and has a potential of incurring dose.

25 Then there is also dose reduction by accurate radiological  
assessments. This isn't actually reducing dose as much as it is instead  
of overestimating how much dose you gave somebody or somebody incurred  
or somebody could incur that you are trying to be, to the extent  
& possible, more accurate. It allows you to -- accurate area monitoring  
or dose rate surveys prior to a job operation may find things that you

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1 didn't know were out there. The last one is the on-the-spot stuff of  
2 dose reduction during and after a radiological incident -- how do you  
3 perform emergency response, how do you do spill procedures and certain  
4 types of decontamination would be under that.

5 For decommissioning purposes though the two main ones that  
6 you are looking at for most sites are administrative controls and  
7 accurate radiological assessments for decommissioning purposes. The  
8 other ones may come in for occupational but if you do preplanning,  
9 predesign to decide what your proposed option is for decommissioning and  
10 what your ALARA goals are, which is administrative controls, and a  
11 method to review how efficient you are at your remediation during its  
12 time so that you can modify your procedures and modify your methods  
13 during decommissioning, and also doing accurate radiological assessments  
14 so that you are not overestimating how much you may need to clean up or  
15 may not be underestimating where some other risks may be.

16 For some sites where there is going to be more of an onsite  
17 restricted release case, dose reduction by design also comes into play.

18 In the license termination rule it has the words -- this is  
19 only a quote from 1402. It is similar in the other ones too for  
20 restricted release, that the "residual radioactivity has been reduced to  
21 levels that are as low as reasonably achievable. Determination of the  
22 levels which ALARA must take into account, consideration of any  
23 detriments such deaths from transportation accidents, expected to  
24 potentially result from decontamination and waste disposal.

25 To some of us it is a little more specific than it really  
needed to be. It already says in the start of Part 20 that everything  
has to be done in ALARA under Part 20 operations, which include  
decommissioning, but this is specifically that the goal, the final  
situation at your site when you release it or it goes into restricted  
release or unrestricted release, you have made every attempt reasonable

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1 to reduce the residual radioactivity.

2 This is sort of the NRC's view, and mainly mine, but since I  
3 am setting up most of this, on the ALARA approach in decommissioning.  
4 What we really don't want to do is deviate much from the same concepts  
5 we do in occupational. We don't want to make you have a completely  
6 different ALARA program for remediation that you do for your  
7 occupational workers right now, so what we are really looking for is a  
8 program management oriented process that you have a preferred  
9 alternative that you have looked at, you have looked at different  
10 alternatives before you start remedial action. You do reviews either on  
11 a scheduled basis of figuring out how efficient your method is or maybe  
12 on an area basis if it deviates much from what you consider to be the  
13 general condition of your plant at the start of remediation, and that is  
14 also that there is basically a similarity between radiation work permits  
15 used in occupational where that is a deviation from your standard  
16 operating procedure you set out what you need to do for a specific area.

17 Those situations will also truly occur in remediation where  
18 you said generally the site has so much contamination or has these  
19 hazards but certain areas on your site obviously have different  
20 configurations and what you said was the remedial action for the entire  
21 site won't necessarily work for this small area.

22 The preferred remedial action alternative -- this is  
23 established as a proposal, as part of the decommissioning plan. You put  
24 forth a proposed action and actually need to look at, need to compare  
25 some alternatives to it.

26 The analysis is really bases as everybody realizes when you  
27 have such a general sort of program, it's going to be based on  
28 generalization of the site conditions, and that is why we are  
29 considering -- what we want to have review and implementation during the  
30 cleanup.

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1 Preferred alternative is selected based in part on cost  
2 benefit analyses or because a lot of things are indeterminate or you may  
3 be driven by other reasons of course, your preferred alternative may be  
4 selected truly because of other reasons, but usually we want to see --  
5 there's an assumption that the cost benefit analyses in part support  
6 that preferred alternative.

7 The alternative establishes basically -- it shouldn't say  
8 "mode" here, it should be "goal" -- what our decommissioning goal for  
9 your site is, whether it is unrestricted release, restricted, or a mix,  
10 being that you are going to have unrestricted release on parts of your  
11 site and then you are going to try to do restricted release for a  
12 limited section.

13 The alternative establishes the cleanup criteria to meet the  
14 dose limit. Now this is if you have selected a decommissioning goal of  
15 unrestricted release, you need to meet the 25 millirem dose limit.  
16 Costs don't become a part of that part. There's a difference in that  
17 the NRC can use cost benefit analyses to look at dose reductions below a  
18 dose limit but they don't look at costs to achieve the dose limit.

19 Then also the alternative establishes basically what your  
20 ALARA goals are underneath the dose limit. They may be very similar to  
21 your dose limit if that is already achieving the decommissioning --  
22 achieving the dose limit will already -- that there's no more activities  
23 you could do that are cost effective to clean up the site, so these last  
24 two may be close but in some cases they are quite different.

25 Review during implementation -- this is really similar to  
what we do in radiation safety in a lot of other areas. We require  
reviews of procedures anyways on an annual basis or more often.

Basically it is just saying that you don't just design your alternative,  
go about it, do it, and then at the end find out what the heck happened?

You go back and you look and you said that you are so

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1 efficient in a certain cleanup that you would be able to remove 50 or 60  
2 percent of contamination from this area in this method. Well, that may  
3 have been optimistic or that may have been pessimistic and you can see  
4 and modify your decommissioning remedial action by looking at how  
5 everything is going.

6 By looking at the actual process you can see whether you are  
7 going to be able to attain the goal that you initially set out or do you  
8 need to revise your goals or do you need to even consider a different  
9 remedial action because you are not going to achieve what you thought  
10 you were? It is forward-looking instead of wait until the end and  
11 having to do everything over.

12 It modifies, as necessary or possible, the overall  
13 decommissioning plan to achieve both the decommissioning objectives and  
14 the ALARA considerations. This may be -- it is currently under  
15 consideration of how far people can modify their decommissioning plans  
16 without having to come in with a license amendment.

17 Some of you, especially in the materials area, are very used  
18 to having very prescriptive requirements and not being able to do much  
19 without doing a license amendment. Reactors have had 5059 and other  
20 modifications they have been able to do. Uranium recovery facilities  
21 have a similar thing now, but we are going to attempt to make it more  
22 performance-based and that people will be able to make modifications in  
23 their remedial actions.

24 Now if you decide to change goals between -- you send in a  
25 decommissioning plan with unrestricted release and then you decide to  
restrict the release because you find out there is no way you are going  
to meet it, that is definitely going to require a license amendment.

At least right now because of the length of decommissioning  
and stuff, I would guess that at a minimum you would want to be doing  
review check-up on the overall site basis on a semi-annual basis.

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1           Radiation Work Permits -- okay. This is similar to the  
2 philosophy behind Operational Radiation Work Permits, which are  
3 deviations from standard operating procedures based on very specific  
4 conditions. It is just recognizing that your entire site is not a  
5 generalization. You have got areas that are hard to get to, involve  
6 removing a lot of -- you can't get people behind -- like because of a  
7 wall, a pipe configuration you are not going to be able to do the same  
8 thing you decided to do other places, that there's other hazards  
9 involved in doing what you said for the remedial action for that area  
10 such as oxygen concerns if it is a confined space and other things.

11           Generally it is based on information not known or  
12 necessarily realized -- it can be based on information not known or  
13 realized at the time of planning. It was just that you were not looking  
14 at every specific condition at the site to figure out if the remedial  
15 action was always going to work, but it doesn't really require  
16 modification of the entire decommissioning plan because it is not a full  
17 site or full large area change in how you are going to do things.

18           The big question is when we get done, how do we determine if  
19 we meet both the 25 millirem and ALARA. The 25 millirem dose limits are  
20 with your restricted release you have got all the other dose limits to  
21 deal with. Then you need to meet the dose limits. Now there is not  
22 much strict adherence to the ALARA limits. This is not going to be a  
23 hindsight calculation. We are going to look to see did you have  
24 management control, did you review your remediation during and take the  
25 necessary steps during remediation to reduce the residual radioactivity  
as far as possible.

          You don't need to meet your initial ALARA goal. You don't  
even need to meet your medium ones. You just need to meet -- you  
definitely need to meet the dose limit and you need to have shown that  
you took, that there was every opportunity for modifications or review

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1 was taken, that there was oversight, that you didn't just start it off  
2 and go for five years, clean up, and then look at the end and say, oh,  
3 we didn't meet anything -- which was the concern of a lot of people when  
4 they saw it in the regulations, that ALARA would be a hindsight  
5 calculation, that people could come at the end of decommissioning and  
6 say, "Well, you didn't clean it up enough" -- you could have used this  
7 method, you could have used that method. Your initial decommissioning  
8 plan was way too optimistic for that and you should have shipped it  
9 offsite -- or whatever -- but that is not what we intend.

10 Now what is reasonable? It's very gray, it's very fluid.  
11 It depends on what you want. We weren't trying to make it as much --  
12 it's much more of an optimization step than a complication. It is a  
13 balance of the "cost and benefits," sort of in quotes because they are  
14 not necessarily true costs or necessarily are true benefits in a  
15 tangible sort of way.

16 We're proceeding below the dose limit for the alternative of  
17 release that you select at your site.

18 It also should be noted that you are going to have to do a  
19 similar ALARA calculation on any restricted -- if you decide on a  
20 restricted release, you are going to have to do a cost-benefit analysis  
21 on why you can't achieve unrestricted release, which is a similar  
22 calculation but it is just a different type of -- it is just a different  
23 one of your options along with your preferred option you'll go through.

24 If you decide to do restricted release, one of the options  
25 in the suite of options you put in with your decommissioning plan is  
what it would take to achieve unrestricted release.

Of course, with decommissioning we have a problem a little  
bit in the concepts that we are looking at potential dose to future  
generations based on scenarios that we don't know if they are even going  
to happen, but we are also talking of balancing that with actual dose we

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1 are going to give to people now -- actual costs incurred now.

2 One of the bases for saying you can do that to some extent  
3 is the fact that one of the basic concepts of radiation protection is  
4 that future generations are protected as much as we are today. We don't  
5 do things that will incur a higher risk in the future, to future  
6 generations, than we would accept today or that would require future  
7 generations to modify a site or to redispense of material.

8 Another way that is currently in 4006 to deal with some of  
9 the potential dose versus true cost today is that there is discounting  
10 of money for future doses are discounted down so that basically you  
11 compare if you just put a little bit of money in the bank now if it  
12 would be enough to get rid of a dose 800 years from now on the modeling  
13 you are doing.

14 Not all costs of course or benefits even are tangible,  
15 especially benefits when we are talking potential dose far in the  
16 future. It is not really a tangible thing and it is not necessarily a  
17 true money consideration. There's a lot of other ones, especially even  
18 local real-time, such as good will from the public, being able to get  
19 your site out -- decommissioned and out of there without having to go  
20 through lawsuits, incur extra costs.

21 The regulatory costs of deciding on which goal you are going  
22 through, because the restricted release goal is going to cost you a lot  
23 more money from the NRC from licensing fees and hourly review rates than  
24 an unrestricted release will -- well, let me take that back. Not  
25 necessarily. Depends on how long it takes you to get unrestricted  
releases. It could balance out. With some licensing fees on an annual  
basis, that can be quite a bit to balance out, if you can get out of  
there quicker.

Qualitative versus quantitative comparisons -- both are  
valid. While 4006 does mention a method on doing a quantitative

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1 analysis of the costs and benefits, because not everything is tangible  
2 explanations and justifications of why something wasn't done can also be  
3 done qualitatively.

4 R&D commissioning -- 4006 -- 4006 suggests that the  
5 cost-benefit analysis or really cost-benefit analysis is truly the one  
6 method you could really do this with. There's other balances of costs  
7 versus benefits than the method we are talking about here. There's some  
8 other multi-variable sort of comparisons but the 4006 method was trying  
9 to meet these four requirements or these four concepts of being simple,  
10 not biased, usable as a planning tool, and doesn't require special  
11 surveys.

12 In other words, we don't want you to have a tool that is so  
13 complex that it is going to cost you more money to deal with the tool  
14 than it is to clean up the site or to even change and modify something.

15 In a not biased sort of way -- not biased is that we don't  
16 want you to -- you don't have to and we don't want you to overestimate  
17 necessarily the benefits of future dose incurred. I mean it is better  
18 to a realistic dose calculation for both occupational dose and future  
19 dose in doing an ALARA analysis rather than conservative calculations of  
20 future dose.

21 Of course we want it usable as a planning tool since the  
22 entire concept of the NRC's approach here is preplanning and management  
23 and it doesn't require special surveys. In other words, we don't want  
24 you to go out -- you already have to survey the site for final and you  
25 already have to survey the site for site characterization. We don't  
want you or need you to do special surveys to also be involved in this.

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I am going to do the costs first mainly because that one is  
a little easier. Costs can include and are not limited to though the  
occupational dose incurred for doing the remediation between the dose  
limit and the ALARA goal, the occupational risks for nonhazardous, which

1 is nonradiological, which is of course everything from chemicals,  
2 occupational -- just standard occupational worker risks of falling or  
3 lack of oxygen or any other ones.

4 Remediation cost itself, which includes disposal costs,  
5 transportation direct costs which of course is how much it is going to  
6 cost you to ship it, but also the implied risk to the public for having  
7 to ship that material, which is how many possible fatal deaths based on  
8 general statistics would that many truck miles incur.

9 Also, there is the additional public doses that would be  
10 incurred from the remediation effort itself while you are trying to get  
11 to the ALARA goal from the dose limit than would have been not incurred  
12 if you just stopped all operations at that site at that point at the  
13 dose limit -- from fugitive dust and other things.

14 Benefits -- okay. It has been focused a lot on the future  
15 dose averted, which of course is a difficult thing to grasp on in a way.

16 The regulatory costs avoided are also a big, can be a big  
17 issue. There may be an increase in land values. Of course, some sites,  
18 some of our sites are prime industrial land right now anyways and  
19 cleaning them up a little bit more won't even change their, necessarily  
20 their land value.

21 There's aesthetics questions, which is an intangible sort of  
22 possible benefit of removing the building or returning it to pristine  
23 land rather than leaving the buildings there.

24 There is of course reduction in public opposition, which  
25 means everything from just extra public meetings and just dealing with  
phone calls and everything else all the way to of course lawsuits and  
hearings.

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The 4006 method comes out and says let's make all this money  
and we will add it all together and compare it, so the cost, the total  
cost is the summation of the cost of remedial action, the cost of

1 transport and disposal, the cost of nonradiological occupational risks,  
2 and the cost of traffic fatalities during transport, the cost of  
3 occupational exposures, the cost of public exposure including the  
4 non-radiological risks other than traffic fatalities which could be  
5 noise and other things.

6 Other costs, as appropriate for a particular situation, I'll  
7 just say that if you currently incur like a low annual fee from the NRC  
8 and going to an ALARA goal would take you two extra years of cleanup,  
9 that may actually cost -- that is a cost because you are going to incur  
10 two extra years of regulatory costs, whereas as I said it also could be  
11 a cost averted if it is going to be the opposite way, that if you can --  
12 by cleaning it up a little bit more you are going to actually be able to  
13 terminate your license sooner because of other concerns.

14 This is very simple, but the only one that is really  
15 discussed, because it's the only one we really have a handle on, or we  
16 have a better way to make a handle, is the benefits in money from the  
17 dose averted. It is the present worth of the future dose. \$2000 per  
18 person-rem is the NRC's current comparison value and how do you  
19 calculate the present worth, and you have this wonderful equation where  
20 it is actually in terms of rem. The .025 is the 25 millirem standard.  
21 If you were going to another limit you would put in its dose limit, like  
22 the 100 or the 500.

23 The population density -- this is basically a small area  
24 averaging of what the future dose is. You got the population density  
25 per square meter times the total area to give you an effective  
population per year on your facility or site.

Then of course the next one is the dose limit itself, then  
times basically the removal fraction. In other words you can replace  
the .025 times F with whatever dose limit goal you have -- 15 millirem,  
10 millirem, whatever.

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1           Then it is the average concentration you achieved over the  
2 derived concentration guidelines -- no, sorry. It is the average  
3 concentration over the derived concentration guidelines. It's not the  
4 achieved but it is really the average concentration that is currently  
5 there.

6           The monetary discount rate is up in the exponent and below  
7 the exponent, which is 7 percent for short-term, 3 percent for periods  
8 over 100 years. I think I got that right or I may have gotten it  
9 backwards -- 4006 discusses it. it.

10          There is really not much difference if you take the land --  
11 for contaminated land cases where you are doing an analysis and doing  
12 present worth of over 1000 years, using the single discount rate for the  
13 long-term is much different than using a two level -- it's using two  
14 different discount rates for different periods of time.

15          There is also the radiological decay constant of your  
16 nuclides and the number of years. As noted by many including other  
17 members of the Staff, this is a single nuclide and then the question  
18 becomes how do we deal with multiple radionuclides because this deals  
19 only with one, and that's part of the questions we are going to be  
20 talking about later today.

21          Conclusions -- that message is that we are not trying to  
22 change the ALARA philosophy. We want a similar philosophy that is  
23 currently used in operations to be used for license termination.

24          Compliance with ALARA requirements is based in large part on  
25 preplanning and iterative reviews of performance during remediation and  
you modifying your program as necessary to optimize the remediation. In  
general, it is fairly assumed that good practices or housekeeping will  
be done. There is some level of washing the walls and other things that  
& fall out that may or may not be cost-benefit but they are generally  
easy. This is a common thing to see in operational ALARA, that it is

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1 sometimes easier just to do something rather than actually go through  
2 the cost-benefit analysis and argue with somebody.

3 Really we don't -- nothing really difficult is on this  
4 housekeeping, and if you don't want to wash the wall then all you have  
5 to do is do a cost-benefit analysis and justify why you don't want to do  
6 it.

7 Cost-benefit analyses can be used to justify what remedial  
8 actions are not needed and the goals of remedial actions that are used,  
9 and these are goals because, as I said before, the hard and fast limit  
10 is the dose limit and the goals are what you want to achieve.

11 Questions?

12 MR. ROBERTS: Rick Roberts, Rocky Mountain Remediation  
13 Services.

14 I have two questions. The first is is there any case if you  
15 do exceed the DCGL either in a restricted or an unrestricted case that  
16 you would not need to do an ALARA analysis?

17 MR. McKENNEY: If you exceed?

18 MR. ROBERTS: If you exceed and you will do a cleanup is  
19 there any case where you would not do one?

20 MR. McKENNEY: There is consideration of the fact that if  
21 you do, if you are going for unrestricted release in soil cleanup in  
22 general the GEIS said there is almost no way that it is cost effective  
23 to go under the dose limit and that is being considered to just be  
24 already a listing in the thing as just you don't have to do an ALARA  
25 analysis, you just have to state that you are doing soil cleanup for the  
unrestricted goal and it has already been shown in the GEIS that it is  
not cost effective.

MR. ROBERTS: Okay. The second question is if you do meet  
the DCGL do you need to do an ALARA analysis to say if you need to  
remediate even further below the DCGL or can you just say you have met

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1 it and you don't need to go any further?

2 MR. MCKENNEY: If this is at the beginning of  
3 decommissioning you still need to do an ALARA analysis unless it is soil  
4 cleanup again, unrestricted.

5 If it has been shown in the GEIS, the General Environmental  
6 Impact Statement, that it was not cost effective, then there's no ALARA  
7 analysis needed but if it is possible that you could do something, then  
8 even if at the beginning of decommissioning if you met the DCGLs you  
9 should at least do some sort of ALARA analysis to show if you could do  
10 any small amount of cleanup to reduce the residual radioactivity.

11 MR. ROBERTS: Thank you.

12 MR. CULBERTSON: Dave Culbertson and I am here representing  
13 the Fuel Cycle Facilities Forum.

14 My comments, and I think this sets the stage really well for  
15 the exercise we are going to get into later today, I personally have not  
16 been through an ALARA analysis so I can't say I am an expert, but I  
17 am -- we have been involved in this process for a couple years as it has  
18 evolved. I think there's still a good bit of confusion on the whole  
19 concept. Listening to your presentation, Chris, and going through the  
20 outline in my mind there are two things that appear to be surfacing.  
21 One is an ALARA analysis that you go through -- it's a mathematical  
22 calculation -- and separate from that is an ALARA program.

23 It seems that interposed on the decommissioning process is  
24 an ALARA and it isn't clear how all that fits together, in my mind.

25 There are two sections of the Guide, the draft Guide, that  
discussed this as kind of introductory comments. One, upfront, it speaks  
to the ALARA analysis and seems to suggest it is a backward looking  
process. It says "This regulatory position is being developed to  
& provide guidance on methods acceptable to the NRC Staff to demonstrate  
OCI the residual radioactivity has been reduced to levels that are ALARA.  
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1 In addition, it provides Staff positions on acceptable methods to  
2 demonstrate that further reductions in residual radioactivity are not  
3 technically achievable, could cause net public or environmental harm or  
4 are prohibitively expensive."

5 That is in the preliminary discussions and then in the  
6 section on the analysis the opening paragraph says basically the same  
7 thing, that "In order to terminate a license, the licensee must  
8 demonstrate that the dose criteria, subpart (e) have been met, and must  
9 demonstrate whether it is feasible to further reduce the levels."

10 Again, the language in here seems to suggest it is a  
11 backward looking process, whereas the analysis seems to be a forward  
12 looking process.

13 One of the things that I haven't heard mentioned in a long  
14 time, and we have in the past with discussions with the Staff have heard  
15 that the process is also front-end, looking at the limit, and ALARA  
16 could be applied to deciding whether the limits are achievable from a  
17 cost effective standpoint.

18 What I heard you say today was that the limits are set in  
19 stone, that you must meet those, then you apply the ALARA.

20 MR. MCKENNEY: It's more if you have selected a  
21 decommissioning goal of unrestricted release. You have got to meet the  
22 25 millirem, but there is a similar -- there is basically an ALARA  
23 analysis or a cost effect -- not an ALARA analysis. There is a cost  
24 benefit analysis in your options, in your remediation options of when  
25 you select a restricted release goal as your goal to meet, then you are  
going to meet either the 100 millirem or the 500 millirem, but you have  
got to show why it is not cost-effective to meet unrestricted release  
conditions.

So to clean up down to 25, which is not necessarily the  
same -- and that is taking into account how hard it is to meet the

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1 limits.

2 MR. CULBERTSON: Okay.

3 MR. MCKENNEY: And it is just that it is if you selected a  
4 goal that limit is hard and fast unless you make a license --

5 MR. CULBERTSON: The goal is below the limit then.

6 MR. MCKENNEY: Right. Right.

7 MR. CULBERTSON: But is it feasible to select a goal or a  
8 limit that is higher than the established regulatory limit because it  
9 can be shown to be ALARA?

10 MR. MCKENNEY: No.

11 MR. CULBERTSON: That is a suggestion that we have heard in  
12 the past --

13 MR. MCKENNEY: No.

14 MR. CULBERTSON: -- as a possibility.

15 MR. MCKENNEY: Not unless you want to go down the alternate  
16 criteria method, which is fairly vague right now. The NRC does a  
17 top-down approach of regulation in which you meet the limit and then you  
18 try to reduce below that.

19 Some of you have been involved with like the EPA and other  
20 people who do a bottom-up approach and do exemptions, but we are looking  
21 at a top-down. If you decide on a goal of restricted release, there's  
22 of course two levels you get to choose from there, and you may show  
23 that, hey, I can't get -- it is not cost effective to get below 400  
24 millirem and that may be feasible, but you are not going to be able to  
25 come in and say, well the best we can do is 900 millirem.

MR. CULBERTSON: Sure.

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RIL I have no conclusion. I was just saying I think it's going  
EY to be good for the discussion this afternoon.

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ASS MR. MCKENNEY: Yes. We tried to modify 4006 in a number of  
OCI rewrites, try to get it, to switch it from the backward looking  
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1 discussion, because that was the concern, to forward looking, and it is  
2 good have those pointed out for the modification when it goes for its  
3 finalization.

4 MR. POTTER: My name is Tom Potter. I have two quick  
5 comments. One is while I think it's good to have the flexibility for as  
6 realistic assessment of ALARA analysis as you can get, I think there is  
7 room in some cases for bias, provided the bias is in the right  
8 direction, because it can greatly simplify the analysis.

9 MR. MCKENNEY: Right, right. If you overestimate the  
10 benefits, that is not a bad bias because it is conservative. It shows  
11 that you can spend more money to clean up to something, but we are  
12 trying to limit the bias really is what I should have probably said,  
13 that we don't, you don't necessarily have to do bounding analyses for  
14 your benefits analysis to calculate how much dose you are going to save.

15 That is the main point is that you are just trying to limit  
16 the amount of bias on that side.

17 MR. GOLDIN: Eric Goldin, Southern California Edison.

18 While I recognize it is difficult to do cost-benefit  
19 analysis on some of this, the present worth of future dose you are  
20 applying a population density times very small doses and ICRP recommends  
21 doing those kinds of collective dose assessments, so I thought I would  
22 just ask you.

23 MR. MCKENNEY: ICRP-77 doesn't. The current guidance that  
24 is within ICRP that is floating around from Roger Clark based on some  
25 papers he wrote in October -- Roger Clark is the head of the PRPV, which  
is similar to the EPA's -- NCRP for Britain, and he is the head of, he  
has been the head of ICRP before. He is putting forth that they should  
change it to say that you shouldn't do collective dose for  
minuscule individual doses, that it just -- if it is a negligible  
individual dose, then there is no reason to do a collective dose.

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1 But that hasn't been actually said by ICRP. It actually  
2 says in 77 the opposite currently -- so that's the old work, older  
3 process.

4 MR. GENOA: Good morning. Paul Genoa with NEI. Chris, I  
5 think you did a nice job in laying out some of this and it occurs to me,  
6 particularly when we got into the soil discussion, that in fact your  
7 GEIS indicated that it may not ever be practical to go below the 25  
8 millirem values to clean up soil, and it occurs to me as we get more  
9 sophisticated in our capabilities and as we start to really start to  
10 assess other risks as we have done for stress to the worker and I mean  
11 it occurs to me as a health physicist right away that the industrial  
12 risks of decommissioning far exceed the radiological risk to the current  
13 occupational workers or to the future.

14 I just pose the question -- what happens if we have a really  
15 bright graduate student goes out and does the true impact statement that  
16 assesses all these doses and we come to the clear conclusion that it is  
17 never ALARA to go below 25 millirem when you start to look at  
18 transportation, industrial risk -- all of these impacts. It may not be  
19 surprising.

20 MR. MCKENNEY: Right. It is not surprising and actually  
21 there's always been that element of whether we can just write off  
22 everything under restrictive release and 25 millirem anyways for those  
23 reasons.

24 The GEIS wasn't as -- how to say it -- as obvious for  
25 building surfaces. It was sort of in the gray area that maybe on your  
site situation it may be possible to go down below 25 millirem for  
building surface, but you're right, it didn't include all risks really  
on the cost side.

26 The other one it hasn't really looked at, which is another  
issue, is groundwater contamination and the possibility if you have an

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1 aquifer that may only be 25 millirem dose but the aquifer is large  
2 enough that the local population could necessarily, a large population  
3 could get that water, then it may be cost effective still at 25 millirem  
4 to clean that up.

5 MS. GOOD: Bev Good, GPU Nuclear. On a couple of occasions  
6 you refer to a decommissioning plan. The decommissioning rule has  
7 eliminated the submittal of a decommissioning plan and we are using  
8 PSDARs so what is your intent by the term "decommissioning plan"?

9 MR. MCKENNEY: That is actually I think the materials  
10 license terminology for it and it is, for reactors or others, whatever  
11 you put forth to say this is how we are going to remediate, this is how  
12 we are going to -- do you guys have to do that at all over in reactor  
13 space?

14 MS. GOOD: No, we submit a PSDAR which suggests if we are  
15 going to select unrestricted release or restricted release but we are  
16 not putting together decommissioning plans which get submitted to the  
17 NRC, nor are we putting together remediation plans that get submitted,  
18 so I guess I am wondering -- it sounds like you are expecting to see  
19 something along the lines of a decommissioning plan.

20 MR. ORLANDO: Nick Orlando. I think that if you look at  
21 what is supposed to -- I think it is either in the license termination  
22 plan or the PSDAR there is a discussion of compliance with Part 20.

23 MS. GOOD: Right.

24 MR. ORLANDO: And I think -- and since Part 20 applies to  
25 both fifty, thirty, forty and seventy licensees that is where you would  
have to make that demonstration.

That is just my opinion, but if you look at the way that I  
think -- and I can't remember which one it is -- but I know either the  
PSDAR or the LTP does say method for demonstrating compliance with Part  
20 and that's what I would take that to mean.

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1 MS. GOOD: Okay, so you are expecting -- I guess our  
2 interpretation, my interpretation was that like particularly for the  
3 PSDARs it is no more than like about a paragraph, so it sounds like what  
4 is being suggested here is more details than just a paragraph.

5 MR. ORLANDO: Yes.

6 MS. GOOD: Okay.

7 MR. ORLANDO: Yes, I think that is a correct statement. We  
8 are suggesting more than a paragraph.

9 MS. GOOD: Thank you.

10 MR. SAITO: Earl Saito, Combustion Engineering.

11 I think you did a really good job, Chris. I hope that your  
12 colleagues not being here means they agree with what you said rather  
13 than disagree.

14 MR. MCKENNEY: No, Steve McGuire, the one who wrote DG-4006,  
15 he decided this was a good week for a vacation so --

16 MR. SAITO: Okay. I have two comments here. One is  
17 licensing cost, and you talk about it as being a benefit in cost  
18 avoidance. I think that you are going to bias your results that way.

19 If you are looking at two different alternatives, and you  
20 look at the cost of one and you put a cost into it and then in the other  
21 alternative you take a benefit for a licensing cost avoided, you have in  
22 essence taken that twice. You have taken credit for it twice.

23 You should only put it in one place. If you are going to  
24 talk about licensing costs you should put it all in costs.

25 MR. MCKENNEY: Right.

MR. SAITO: If you are talking about cost avoidance from  
licensing you should always put it in benefit. If you put it in both  
places you are going to make a mistake.

MR. MCKENNEY: I don't think it should be in both. I think  
that in certain situations it will be -- they will be averted. In some

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1 situations it would be a situation where the costs, the regulatory  
2 costs, would exceed what you would avoid, so it would be then a cost.

3 It shows up on one side of the calculation or the other. It  
4 doesn't show up in both.

5 MR. SAITO: But when you are doing a set of calculations,  
6 when you are examining different options, you should always put it in  
7 the same place.

8 MR. MCKENNEY: Right.

9 MR. SAITO: Okay. The other comment I had was when you said  
10 that additional survey costs should not be part of an ALARA analysis. I  
11 think that you can't avoid having additional survey costs and that has  
12 to be something that is looked at.

13 If you are bringing yourself down from, say, 25 to 15  
14 millirem, and unless you are saying that my survey is just going to  
15 demonstrate 25 millirem, and that whatever is under that I am not going  
16 to worry about, you have --

17 MR. MCKENNEY: Yes, I understand. That has been an issue  
18 with the Staff for quite awhile, actually, about a year now. Whether  
19 you as part of the ALARA analysis include the costs of the final  
20 demonstration and the difference in the costs of the final survey  
21 basically is what we are saying, that you are going to have to spend a  
22 lot more money to prove what your limit is the lower it gets because of  
23 sampling costs.

24 MR. SAITO: In addition, in characterization there's going  
25 to be a slightly higher cost because if I want to know could I remove 70  
percent of contamination if I go another six inches, that means I need  
to take an additional sample and maybe do more analysis depending on the  
depth and those kinds of things, so you add some cost in there that  
needs to be captured.

MR. MCKENNEY: Right. That may be part of remediation and

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1 if we continue with doing parallel to operations then there is some,  
2 they are allowed to take some degree of cost for the ALARA program  
3 itself in some situations, so I'm doing all that, so it may -- we have  
4 to address that. That is the best I can say right now.

5 MR. SAITO: Okay, thank you.

6 MR. MCKENNEY: What it is going to be I can't say. I agree  
7 with you that some factor should be considered as a cost of part of the  
8 remediation action for going below the dose limit -- both the  
9 characterization and the final survey.

10 MR. SAITO: Thank you.

11 MR. NARDI: Joe Nardi from Westinghouse.

12 Just to keep it in perspective, we have to remember we have  
13 another class of licenses out there that will never come in with a  
14 decommissioning plan, and I am really not quite sure how the ALARA  
15 concept comes in other than a continuation of your operational ALARA  
16 program, and I think that's all you get. You were going to decommission  
17 under your normal practices and you are not going to do anything more  
18 with respect to ALARA for decommissioning.

19 MR. MCKENNEY: Yes, I mean that's why we are trying to keep  
20 it as similar to the operations -- for those that don't need to even,  
21 that -- and there's some materials licensees and some others that don't  
22 need to submit really anything because of the level of licensee that  
23 they still need to show that their regular ALARA program was at least  
24 looking at something regarding cleanup, and they may or may not use cost  
25 benefit analysis or you may or may not use in your operational.

That is why I said that both qualitative and quantitative  
analysis are still acceptable even though DG-4006 discusses to great  
deal quantitative.

MR. MORTON: Henry Morton. Chris, it seems to me like I am  
hearing some confusion with respect to tying limit with the cost-benefit

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1 analysis but I have always thought that you can do a cost-benefit  
2 analysis on its own, independently of what a limit is. It is a matter  
3 of choosing the baseline and from there you can do incremental cost and  
4 incremental benefits and judge those against the balancing factor if it  
5 is a quantitative cost-benefit analysis.

6 So the issue of whether the baseline is the limit seems to  
7 be a confusing issue and again I think the cost-benefit analysis can be  
8 done independently of that. Whether you have to absolutely meet the  
9 remediation limit that is the concentration equivalent of 25 millirem or  
10 concentration equivalent of some other alternate criteria is -- those  
11 are two separate matters I think.

12 The other thing, I think with respect to which side of the  
13 cost or benefit equation you put some of these items on, it seems to me  
14 to be partially a choice of the baseline that is chosen.

15 MR. MCKENNEY: Right.

16 MR. NARDI: Fundamentally that baseline for judging  
17 incremental cost and incremental benefit needs to be looked at from this  
18 is the base and we look forward, so that helps I think in choosing which  
19 side you put that term on.

20 Finally, I think with respect to another comment that was  
21 made with respect to survey costs, it seems to me survey costs for an  
22 increment of cleanup are just as real as the cost of excavation or as  
23 the cost of packaging and disposal, so I don't understand why there is  
24 any consideration of discounting or not allowing survey costs as a part  
25 of an additional increment of cleanup.

MR. MCKENNEY: I hear you. It's just that certain numbers  
-- although there's been a change -- I think that that is an actual cost  
of cleanup, that anything that made a change in your program incurs  
extra costs because you went to a lower concentration, that is a cost  
and should be considered. Otherwise it is biasing the results the other

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1 way.

2 I was just trying to emphasize that meeting the dose limit  
3 is not necessarily a cost-benefit analysis in the broad sense. You take  
4 your baseline in your options when you say this is how my site is now.  
5 I have option one, option two, option three. You do from their baseline  
6 the costs and benefits but when you are comparing them between, if they  
7 have the same goal, like unrestricted release, in effect, the cost of  
8 getting to unrestricted release can be the same or it could be similar  
9 but the cost of getting below may be the big difference.

10 It is just that there is a plain statement in the statements  
11 of consideration that NRC cannot take cost into effect in meeting the  
12 dose limit and applying exemptions, but we can take it into account for  
13 going below a dose limit.

14 MR. CULBERTSON: Could you explain the PSDAR compared to a  
15 decommissioning plan? I have never heard that terminology and I am kind  
16 of confused as to it.

17 MR. MCKENNEY: So am I. I don't work with the reactor side  
18 as much as I work with materials.

19 MS. GOOD: A PSDAR is a Post Shutdown Decommissioning  
20 Activities Report, which is what reactor licenses now need to submit  
21 instead of a complete decommissioning plan, so you are familiar with a  
22 decommissioning plan? Okay, well, all the PSDAR is really approximately  
23 a 12 to 14 page document which is basically an executive summary of the  
24 decommissioning plan.

25 That is all that we are required to submit at this time, and  
then it triggers just a public meeting and not a public hearing and it  
doesn't really get approved by the NRC. It just gets reviewed, and it  
allows you --

MR. MCKENNEY: Are you tied to any of its commitments?

MS. GOOD: You are, but it is a very high level document, so

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1 certainly if you are not going to conduct your decommissioning in  
2 accordance with the PSDAR you are to submit that to the NRC that you are  
3 not doing it in accordance with the PSDAR but the document is a very  
4 high level document so basically with regards to release, you say I am  
5 going to do unrestricted release, I am going to meet, you know, 25  
6 millirem, but you don't go into a lot of details about how you are going  
7 to go about doing that whereas in the old decommissioning plans that we  
8 used to have, you used to go into a little bit more detail about the  
9 techniques that you are going to use and things like that.

10 MR. CULBERTSON: That leads to the next obvious question.  
11 What is the logic then behind requiring a decommissioning plan, which is  
12 a very onerous task for fuel licensees? I don't understand the logic of  
13 not requiring that unilaterally.

14 MR. MCKENNEY: I am similar with you --

15 MR. DARMAN: May I say something? Joe Darman with Maine  
16 Yankee.

17 I think that PSDAR, if I am saying that right, is just the  
18 first step. I am not really sure exactly what that is, but that might  
19 be just like the first step in it, and then what used to be a  
20 decommissioning plan I think now we are calling a License Termination  
21 Plan and we would have all those same requirements as an old  
22 decommissioning plan in a License Termination Plan for the power reactor  
23 side.

24 So there's like two steps -- the PSDAR didn't get rid of the  
25 decommissioning plan. I think it's something above and beyond that.

MR. MCKENNEY: Yes. To me it sounds like if you just did a  
PSDAR that you are incurring a lot of responsibility on the part of our  
inspectors rather than our staff, which tends to have the regions get  
upset, because, see, where we can review a decommissioning plan and  
decide upfront whether things are okay, if it was just a general that

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1 we'll clean up then every time that inspectors have to go out there they  
2 have to figure out everything.

3 MR. NELSON: Dave Nelson, Region III. I am an inspector.

4 I think the idea here was that the reactors submitted PSDARS  
5 is because they have established protection programs and procedures and  
6 et cetera which allows them to do decommissioning work under those  
7 procedures, which may not be the case at a materials licensee.

8 MR. MCKENNEY: Yes. That is also -- we could also in some  
9 of the flexibility here, since we are keeping it with similar to the  
10 ALARA program, some of the same proof of review, preplanning and other  
11 things are going to have to happen in the Radiation Protection Program  
12 in a reactor site as with the materials, and it may be possible to more  
13 generalize even for materials.

14 MR. NELSON: Right, and reactors also decommission under  
15 50.59.

16 MR. MCKENNEY: Right.

17 MR. NELSON: So we review those, so really you are looking  
18 at a facility that has a functioning Radiation Protection Program,  
19 quality assurance, et cetera, plus 50.59, which again may not be the  
20 case at most materials sites.

21 MR. MCKENNEY: Right, basically you have already built in a  
22 review plan, review program that is required.

23 MR. CULBERTSON: This is Dave Culbertson again.

24 This is digressing a little bit and I apologize for raising  
25 the issue, but I know a number of fuel cycle licensees -- well, they all  
as far as I know have safety programs in place. They have procedures in  
place and on an ongoing basis do a lot of the same kinds of activities  
they do during decommissioning -- that is, decontaminate and deconstruct  
a facility inside a building to install new processes, so in that  
respect I think there is no difference and I know there have been some

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1 discussions about that in the past such as when is a decommissioning  
2 plan required, at what point in the process, because much of that work  
3 could be done under an operating license and in many places is being  
4 done under an operating license.

5 As I said earlier, the decommissioning plan is a very, very  
6 onerous and expensive piece of work to have to have in place before you  
7 can start the formal process, so I guess I would like to understand this  
8 whole thing better and this is not the place to do that, but I don't see  
9 a whole lot of differences between the two types of licensees in terms  
10 of applying the regulatory requirements.

11 MR. NELSON: This is Bob Nelson. I am with the NRC.

12 We don't have right now here with us either folks, I don't  
13 believe -- I don't see anyone that I recognize from NRR or from our  
14 Reactor Decommissioning Program in NMSS -- so I am a little concerned  
15 about us on the materials side trying to answer questions regarding  
16 PSDARs and what is in them and isn't and what should be and what  
17 shouldn't be, because frankly the people who are here are not involved  
18 with that process, so we are trying to get some folks down here who can  
19 answer those types of questions, and if we can hold those until maybe  
20 later I would appreciate that because I think some of what I have heard  
21 is almost speculation on our part.

22 We are just not -- the people who are trying to answer those  
23 questions aren't involved with the process, so I don't want to give you  
24 wrong answers and I think that may be the way that we are going.

25 MR. DOSTIE: I guess I can finally speak.

MR. MCKENNEY: Yes.

MR. DOSTIE: Pat Dostie, State of Maine.

I just wanted to probably inform you of a possible bias that  
you have in your cost calculations. This has to do with the traffic  
fatalities during transport.

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1 I heard you say -- and that's what the assumption that I had  
2 was, that you were using the general trucking industry as your guide  
3 for, the factor for the fatalities that you can encounter based on the  
4 number of miles you drive.

5 Yet two weeks ago I know I when was at the Regulatory  
6 Information Conference one of the key things that the NRC was promoting  
7 was risk-informed regulation. I think if we are going to go on that  
8 route one of the things we need to take a look at is what is the actual  
9 radioactive waste shipment history, and if you take a look at that it is  
10 much, much better than the general trucking industry.

11 MR. MCKENNEY: All right.

12 MR. DOSTIE: And I think in most cases it brings down the  
13 number to almost zero.

14 MR. MCKENNEY: And similarly some licensees are going to do  
15 rail transport anyways because of where they are shipping the waste to,  
16 and there has always been the consideration of whether you should be --  
17 you should be carrying all the fatalities all the way to that site, when  
18 in their environmental impact statement of operating their facility they  
19 included an analysis of fatalities coming to their site, so it is almost  
20 being counted twice in some ways.

21 MR. GENOA: Paul Genoa with NEI.

22 I wanted to follow up on your comment. These workshops are  
23 very productive but there have been multiple opportunities -- yesterday  
24 we discussed some options for early release of buffer zone that may in  
25 some cases occur during operation and may be in NRR space.

My point is there is an obvious handoff between NRR and  
NMSS. We feel it is really imperative that there's both members  
represented at the table during these workshops for them to be  
productive. We are a little concerned that there may be a lack of  
communication and we would encourage you to try to facilitate that for

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1 us.

2 MR. NELSON: I appreciate that comment. We noted that  
3 internally very early yesterday and we are trying to address that.

4 MR. MCKENNEY: It's been a -- there has been ongoing  
5 dialogues at certain levels. On a management level we are tied in to  
6 pass everything between but just attendance is sometimes difficult or  
7 prioritization of work and everything, but we will talk.

8 Any other questions?

9 MR. GENOA: I just am going to push the envelope a little  
10 bit. What is represented here are people from all over the country that  
11 have spent enormous money and effort to be here to --

12 MR. MCKENNEY: Right.

13 MR. GENOA: -- to participate in your workshop. I don't  
14 think it's too much -- well, just please represent that.

15 MR. MCKENNEY: Yes.

16 MR. GENOA: Thank you.

17 MR. NELSON: Believe me, I understand your concern and I  
18 apologize if we as an agency have not represented ourselves as well as  
19 we should have or could have at this workshop and we are trying to  
20 remedy that.

21 MR. MCKENNEY: Okay. Well -- either we go on a break early  
22 or we move on. It's only, what, 15 minutes early so how about we go on  
23 a break till 10:15.

24 [Recess.]

25 MR. MCKENNEY: Okay. Time to start again but we are going  
to diverge immediately and we are going to -- Nick Orlando brought down  
some slides that discuss some of the differences in --

MR. ORLANDO: Just to maybe clarify a little bit of what we  
were talking about a few minutes ago.

MR. MCKENNEY: On the decommissioning plan versus the PSDAR.

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1 MR. ORLANDO: Just by way of background, there is a  
2 memorandum of understanding that was signed between NMSS, that is  
3 Nuclear Materials Safety and Safeguards, and NRR, Nuclear Reactor  
4 Regulation -- those are the two licensing organizations within NRC. Via  
5 that MOU NMSS has certain responsibilities at reactor facilities.

6 So I have them on a slide here and we can just go down --  
7 NMSS assumes responsibility for review and regulatory oversight once the  
8 spent fuel is out of the pool. We evaluate the License Termination  
9 Plan. We also write the Safety Evaluation Report and environmental  
10 assessment, perform the confirmatory surveys, and license termination  
11 activities and review all of the cost estimates associated with the  
12 decommissioning.

13 In addition we provide technical support to NRR for the  
14 confirmatory surveys or the radiological surveys and characterization,  
15 and then we have some activities that we do for ISFSIs and then we  
16 finally terminate the license.

17 Now our discussion earlier up was what is the interplay or  
18 what impact and what are we talking about here with specifically ALARA  
19 with respect to reactors? I hope everybody can see that. If you will  
20 look down, what I have done is I have written out here what has to be in  
21 the PSDAR, the Post Shutdown Facilities Activities Report, the License  
22 Termination Plan and at the far end the decommissioning plan.

23 If you look down right about here, a couple up from the  
24 bottom, the License Termination Plan and the decommissioning plan both  
25 require that the licensee demonstrate how they complied with 10 CFR Part  
20.

26 If you look in Draft Reg Guide DG-1078 on page 6, and if  
27 anybody is interested who doesn't have this, let me know and I can  
28 probably get some copies made before the end of the day -- and I will  
29 just read very quickly: "If licensee requests unrestricted use per

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1 subpart (e) and the site isn't grandfathered, the LTP should demonstrate  
2 that the residual radioactivity distinguishable from background doesn't  
3 exceed 25 millirem to TEDE to the average member of the critical group.  
4 The LTP should also demonstrate that residual radioactivity has been  
5 reduced to levels that are ALARA" -- As Low As Reasonably Achievable --  
6 "The LTP should describe in detail the methods and assumptions used to  
7 demonstrate compliance with the 25 millirem criteria."

8 So that is the basis I think or the direction for folks in  
9 the reactor world as to where you would make the ALARA demonstrations  
10 that Chris has been talking about.

11 I apologize I didn't get all this, I didn't bring in all  
12 this junk with me earlier up, but if we want to discuss it further, we  
13 can, but just as a point of clarification as to where that would occur,  
14 so it would be in the License Termination Plan. That would be, at least  
15 under the current setup, that would be reviewed by NMSS because that  
16 information would come over to us, so the information we are talking  
17 about today with Chris or Chris is talking about today we would be the  
18 group taking a look at that.

19 With that, unless somebody wants to pursue that further,  
20 which it looks -- Paul, do you or Beverly want to talk about it?

21 [No response.]

22 MR. ORLANDO: Thanks for your indulgence. Again I apologize  
23 for not getting this quicker. I goofed up my leg the other day so I  
24 couldn't run upstairs quite as fast as I wanted to.

25 MR. MCKENNEY: During the break I had more copies of both of  
my presentations put out on the table at the end of break, the last  
minute or two, so anybody who doesn't have one -- a couple of people  
asked me for them -- so unfortunately -- let me see if I can get the  
contrast on this thing to go.

It looked fine on my screen in my office. It just

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1 doesn't -- okay.

2 One of the major problems or points of confusion is what do  
3 we do with -- it's nice to have all this stuff written down but how do  
4 we use it and where are the gaps and what do we do about the problems?

5 So for the rest of this morning we are going to go through  
6 some examples. I have an example in here. It is an open forum though.  
7 We can talk about anything or anybody can set up an example. I think  
8 some of the fuel -- some other people are going to have possibly some  
9 presentations, comments.

10 This is a little more free-form even than it was this  
11 morning, so okay. My analysis actually, I must say this whole thing was  
12 written for me by Steve McGuire before he left, since this was his talk,  
13 but since he decided to go on vacation it is mine, and this is based on  
14 the decommissioning plan, on some of the information from the  
15 decommissioning plan on Sequoyah fuel site down in Gore, Oklahoma.

16 The plan was submitted on the 15th of '98, December 15th of  
17 '98 and we used the numbers out of the Sequoyah Fuels Corporation. This  
18 an illustration of the example and I have to stress that this is not  
19 approval or denial or any decisions related to Sequoyah Fuels itself.

20 Sequoyah Fuel site is, was a conversion facility. They  
21 made -- they took the uranium oxides from the mills either in the form  
22 of dry product or in slurry and processed it up to UF-6 or for some  
23 processes they also had the ability to go to UF-4 and part of their side  
24 processes was they had the ability to make, to releach the uranium if it  
25 was not clean enough for their processes, it had too many other  
contaminants in it, too much thorium, too much molybdenum, vanadium or  
whatever.

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Over the years there have been various things happen  
there -- they have some leaks from the leach area and some settling  
ponds and other things and spills that resulted in that the soil on the

1 site contains very measurable quantities of natural uranium, thorium,  
2 Radium-226, and it is not -- there is no set ratio really from anyplace  
3 on the site to any other place on the site.

4 You might find a localized area that is pretty well set  
5 ratio but not very -- it doesn't go very far before it goes to a  
6 completely different ratio. The affected area, the total effective area  
7 is about 25,000 cubic square meters in area and it is about one meter  
8 thick of depth and of course there are quite a few areas that are a lot  
9 harder, a lot more contaminated than others.

10 It is right next to I-40, and so it has very good rail --  
11 road transportation and there is a rail spur nearby so it has the  
12 ability to do rail. The spur would have to be continued to the site so  
13 either one is actually available possibly for transport.

14 MR. MCKENNEY: The proposal is a mixture. They want to  
15 release most of the site for unrestricted use, but move the rest of the  
16 contamination into a cell -- on-site cell, much like a cell is designed,  
17 and they'll restrict release for that part of the site.

18 The DCGLs in the -- and the ALARA ones in the document are  
19 these that -- the calculated ones are 110 picocuries per gram uranium  
20 is necessary for the 25 millirems is the limit for the unrestricted  
21 areas, so they meet 25 millirems, and then by multiplying before to say  
22 that if you -- that the restricted areas -- now, this is not in the  
23 cell. This is the buffer zone, I take to mean, within the restricted  
24 area, around the cell. And if I'm wrong, somebody correct me. But,  
25 it's that they have a high of 440 and that, of course, they're trying to  
clean up those buffer zone down to 110, and similarly for the other  
numbers. But, they also put in these ALARA goals for 35 picocuries per  
gram for uranium.

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The DCGLs for unrestricted areas were calculated using  
RESRAD to resident farmer using site specific parameters. To some

1 extent, the DCGLs for restricted area were just multiplied by four.  
2 Since we're focusing on ALARA, there's been no attempt to even review or  
3 look at the actual numbers for the dose -- the actual picocuries per  
4 gram for what is needed to meet 25 or meet 100 by either Steve or  
5 myself. So, we're just going to take those on face value for the points  
6 of this illustration.

7 The basis that is stated in their justification for -- or  
8 their method in which they selected their ALARA goals was based -- was  
9 selected based on regulatory guidance and professional judgment. And,  
10 of course, the ALARA goal for the restricted area was set at  
11 concentrations at a dose of 25 millirems individual, and this is again  
12 of the buffer zone. And the plan doesn't discuss how these ALARA values  
13 would be used and whether their goals, whether there are any sort of --  
14 well, how they try to achieve them in total, or at least Steve couldn't  
15 find where it was.

16 Now, area factors is a thing of doing ratios of how high can  
17 a small part be and calculated based on the RESRAD calculation. This is  
18 the various elevated measurement concentrations for different size  
19 areas, which will become important a little later.

20 Okay, back to the other equation that -- actually, this is a  
21 flip of the two cost benefit equations, so you can try to find out what  
22 your ALARA concentration would be in soil. And for the first case,  
23 we're going to do unrestricted areas uranium, mainly because the  
24 equations work for one nuclide.

25 Sequoyah fuels identified six alternatives in its final  
decommission alternatives. We're only going to look at two of their  
alternatives, which is their move to the on-site disposal of soil to  
their preferred option and, of course, the standard move everything off  
the site to Envirocare, in this case.

Okay. Sequoyah estimated that the direct cost for off-site

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1 disposal of all soils with one -- didn't never change that to  
2 picocuries -- 40 micrograms per gram, which is, I think, to be 110  
3 picocuries or 40 -- 440 -- it's 440 -- no, it's 110 -- it's 110 -- \$108  
4 million for -- to move off all the soil. The direct cost for on-site  
5 disposal is estimated to be about 29-30 million. There, of course, are  
6 other costs for the two options.

7 And now, the -- in this one, we're just going to do the  
8 fatalities. And as mentioned to you earlier, we're only using the  
9 general numbers and possibly, it would be better to use the specific  
10 ones for radiological transport. But, for this example, we used these.  
11 And we didn't really consider any other cost, because between the two of  
12 them, at one million -- at 14 -- at an estimated cost of 1.4 million, we  
13 felt that a lot of the other costs would anyways be -- just would be  
14 less than this and that once we go through the analysis, it shows that  
15 the more cost you add doesn't really matter on what the number is. And  
16 the various parameters were from the 4006 and from the site information.

17 And when you use that for off-site disposal, the ALARA  
18 requirement, where cost equals benefits, is about 18,000 picocuries per  
19 gram. That's without including all the other costs of occupational  
20 exposure and everything else. And, also, there's some benefits that  
21 might have been avoided. But, it's so much larger than the EMC, the  
22 elevated measurement concentration, for a single square meter. If this  
23 was their selected site -- selected option, there would be no reason to  
24 move soil off the site -- I mean, under the -- after they cleaned up to  
25 the 25 dose.

26 You do for the on-site disposal, you, again, get a number  
27 that's way -- it's much larger than the elevated measurement  
28 concentrations for one square meter, which says, again, the dose limit  
29 by a cost benefit analysis, the dose -- the concentration to meet the  
30 dose limit is the limiting factor, which is, just as we said this

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1 morning, in a general form, it's always what your answer is going to be  
2 for soil.

3 And so, these are the comparisons, although I don't know why  
4 it's being done. But, that -- they selected -- that the ALARA method in  
5 4006 isn't resulting in anything near what they selected based on  
6 professional judgment of what they could clean up to or what they'd wish  
7 to clean up to. The -- yeah, this basically just says what I said, that  
8 the cost benefit, itself, would not show that there was -- they missed  
9 anything in selecting their ALARA goal; that there's no way -- there's  
10 no reason that the cost benefit analysis would be a point for rejecting  
11 the proposal, assuming that all the numbers are correct.

12 And -- but, that's easy. One nuclide is easy. All the  
13 numbers are single numbers; that's fine. The problem becomes when you  
14 do a mixture, as many people have pointed out ever since this thing came  
15 out. There's two possibilities. One is, of course, if you're real,  
16 real lucky, you've got a constant ratio. And at that point, you can do  
17 -- you can either -- you can figure out the proportional of dose and  
18 figure out what -- which one you're going to control for and which one  
19 you're going to measure when you're cleaning up. And when you clean up  
20 for one, it's going to clean up for all the rest. And you'll be able to  
21 possibly set ALARAs for all that way.

22 For ones without a constant ration, which is reality, an  
23 extension is needed. Now -- or a modification complete to the thing, to  
24 the process. In this case, the proposal is, is that we -- for the first  
25 step, we calculate what -- if they were by themselves, what will be the  
C-ALARA for each nuclide by itself, okay. And in step two, it's a  
comparison just like we did before, where you compare the EMC versus  
your C-ALARA for that nuclide. And if any of the nuclides really are  
well above the DCGL EMC, it's going to say that, overall, the cost  
benefit of cleaning up just about anything is limited by the dose limit.

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1 But if the C-ALARA are less than the DCGL EMCs, the ALARA requirement  
2 could be limiting and it's more of a ratio of how far each of the ALARAs  
3 are under their respective concentrations.

4 Now, what's pictured here, of course, is impractical and  
5 impossible to implement, because, of course, you don't have a constant  
6 ratio. So, how are you going to assure that you're going to get to this  
7 -- whatever this number is for each nuclide? One of the better ones  
8 would be to either figure out what your highest dose contributors are  
9 and control it and clean up for those, which would give you the best  
10 bang for your buck. You'd be able to measure only one or two things,  
11 and you clean everything up -- or you clean up as effective as you can  
12 for ALARA.

13 And Steve put out two examples. If there are three nuclides  
14 that were all about equal dose, then you can do one-third of whatever  
15 their C-ALARA is, as your action level, as, again, action level or  
16 action goal. Of course, you don't need -- as I said before, this is a  
17 goal to clean up to. As long as it's -- as you meet the dose limits,  
18 that's the real, real important thing. And if one nuclide is present at  
19 higher concentrations or provides a higher proportion of the dose, then  
20 you could proportion it, so that that is your main thing you're trying  
21 to clean up and that is what you do. And you focus on that one. And  
22 that's it, because Steve ran into problems.

23 But, that's exactly why we're doing what we're doing today,  
24 is that the question of multiple radio nuclides is -- makes the whole  
25 thing very vague and almost impossible to be -- to quantify the cost  
benefit analyses and that any goal needs to be more of a general goal,  
based on your situation of what are your -- what are the main dose  
contributors and what ones are easier to measure at your facility, what  
& are your ratios. I mean, you've got to weigh quite a few different  
OCI factors of which ones are actually -- might be easier to clean up or  
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1 easier to select out. Unfortunately, there's no clear easy simple  
2 method to do that.

3 And any question -- any comments or questions on ideas or  
4 anything?

5 MR. MORTON: Chris, Henry Morton. There is one thing that  
6 -- additional thing that comes into play here that can be significant or  
7 even controlling. In one case I've looked at, with multiple nuclides in  
8 your EMC series, if you have a case where -- and this was my situation  
9 -- where one of the nuclides consumed perhaps the majority, 70 or 80  
10 percent of the limit, then at a 25 milliren level, the allowable  
11 concentration of the others, in effect, they may be allowed, say, 20  
12 percent of 25 milliren. So if the allowable concentration of those  
13 minor ones is so low, then you might not really be able to differentiate  
14 them from background and measurements.

15 MR. MCKENNEY: Right.

16 MR. MORTON: So, in that case, one is forced to look at the  
17 -- basically, the ratios within the survey units and to use that and  
18 then key on the one that you can measure.

19 MR. MCKENNEY: Yeah, that's one of the difficulties with  
20 trying to figure out what is each ones clean-up criteria you want to do,  
21 especially if one is so dominating that the others then become hardly  
22 able to measure.

23 MR. ROBERTS: Rick Roberts, Rocky Mountain Radiation  
24 Services. On your slide, where you talk about extension of DG-4006 to  
25 mixtures without a fixed concentration ratio --

MR. MCKENNEY: Yeah.

MR. ROBERTS: -- I don't quite understand why you use the  
DCGL EMC in there for your comparison, because that number can change  
& and I don't see how that would relate to your mixture.

MR. MCKENNEY: Sorry, I'm trying to get to that slide.

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1 MR. ROBERTS: It's like the third from the last.

2 MR. MCKENNEY: Of why you're doing the EMC rather than just  
3 the DCGL-W?

4 MR. ROBERTS: Yes.

5 MR. MCKENNEY: Mainly, because -- I think it's because your  
6 highest concentration is, of course, your EMCs. And, generally, if your  
7 C-ALARA exceeds your -- exceeds what your highest allowable  
8 concentration in the smallest unit is, it already exceeds for  
9 everything; where if it only exceeds by a little bit the general value,  
10 you're allowed as the average for the entire site. Some areas of higher  
11 concentration, smaller regions, may still be possible to clean up from a  
12 theoretical cost benefit analysis.

13 Like previously, we had the -- in their case, the DG -- in  
14 Sequoyah's case for uranium, the DCGL-W was 110, but the EMC for one  
15 square meter was 836 picocuries per gram. And if your C-ALARA came in  
16 at 200 picocuries per gram, there may be situations that you can  
17 actually clean up small areas, because your ALARA goal is actually  
18 limiting to your dose goal for a small area.

19 MR. ROBERTS: The ratio you're talking about though -- I  
20 mean, you're saying -- the DCGL EMC is usually much larger than your  
21 DCGL-W.

22 MR. MCKENNEY: Right.

23 MR. ROBERTS: And, therefore, if you have a concentration  
24 that's approaching the DCGL EMC, you will have already gone over, in  
25 many cases, your DCGL-W, which I believe is the ratio -- would be the  
ratio for one, if it were uniformly distributed.

MR. MCKENNEY: Right.

MR. ROBERTS: So, I'm kind of -- I'm still not understanding  
what you're saying.

MR. POTTER: My comment and question is related. I think

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1 it's a mistake to confuse the EMC -- DCGL EMC with what is really  
2 intended to be clean-up implementation concentration limit. The EMC  
3 concentration limit is really a final survey phenomenon and you need to  
4 establish a clean-up implementation concentration limit that's low  
5 enough that you're not going to exceed the EMC on a frequent basis.  
6 But, I would not use the EMC in the planning purposes exclusively to do  
7 that.

8 My gut feeling is that in the planning stages, the ALARA  
9 analysis ought to be based on the DCGL-W. And then when you encounter  
10 -- then you establish a clean-up implementation concentration or a  
11 concentration set to assure that you're going to achieve that with  
12 considerable frequency. And then, if you encounter places during the  
13 clean-up where you exceed that, you know, off it goes or whatever --  
14 with whatever you're going to do with it. The EMC comes into play,  
15 then, at the final survey stage.

16 MR. MCKENNEY: Yeah. I see what you're saying, and that  
17 probably would be the better thing to list there. Whatever your  
18 planning concentration to clean up to meet all of your final surveys and  
19 set it at the DCGL EMC, if you have a -- it may be as much as your  
20 DCGL-W for using the whole site as a factor of one. But, if you were  
21 looking at smaller costs for smaller areas, then you may use your  
22 clean-up goal for a small area, which would be some relationship to the  
23 EMC. But, it wouldn't necessarily be the elevated concentration level.

24 MR. ROBERTS: So, you'll rethink this?

25 MR. MCKENNEY: Yeah.

MR. ROBERTS: Or I'll say to Combustion Engineer, I think  
you picked a real good example here, Chris. For one reason is that when  
you look at these numbers, U-natural radium 226, they're both very  
measurable by gamma spec, which is a very quick measurement you can do.  
But, the thorium 230 is not. The thorium 230 is a very difficult

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1 measurement to make. So, you're, in essence, here where you really need  
2 to make scaling ratios.

3 And I guess the question that's more for the people here  
4 from the reactor side, they might be able to help us out here, in  
5 different parts of the plant, you will have different ratios. Radium  
6 226 may be closely related to thorium 230 than the U-natural, because  
7 it's going to come off in the purification process. You're going to  
8 separate the uranium from the products. You don't want the thorium and  
9 the radium. So, you may want to be keyed in on radium 226, instead of  
10 uranium, when you're trying to make a ratio, and that would be  
11 important. But, it seems analogous to me to a power plant, that runs a  
12 different batch and has different numbers of leakers that occur at  
13 different points in the burn-up cycle, would have different contaminant  
14 ratios, different ratios.

15 How do power plants handle this? Do you have one number  
16 that's good for your plant forever? Is it batched dependent -- is it  
17 fuel batched dependent or is it time dependent? It seems to me this  
18 problem must have been looked at there and it would be a good thing to  
19 move into here.

20 MR. FAUVER: Dave Fauver, RSI. We're currently involved in  
21 a characterization program at Maine Yankee to evaluate mixtures. The  
22 process is essentially two phased. First of all, you try to assess  
23 where your different ratios might be present, based on process knowledge  
24 or characterization information or scoping or whatever. You design your  
25 sampling plan to look at these different areas, try to distinguish if  
they are different. Then what we're thinking about doing is lumping all  
this information together and to see if perhaps, overall, they are close  
enough and the standard deviation is sufficient to perhaps eliminate the  
need to go to separate areas, based on some criteria yet to be chosen.

We might find that it's more useful and advantageous to the

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1 project to split out and use different mixtures in different areas.  
2 That adds an additional complication. So what you would like to do is  
3 to use one mixture and it's only when it's really advantageous and cost  
4 beneficial to move away and use several different areas for identifying  
5 mixture ratios. And then the evaluation is: what is the standard  
6 deviation of your mixture and can you afford to go the 95th percentile,  
7 perhaps, and be conservative and capture all the areas; or are you going  
8 to use a mean and try to justify where your upper percentiles are. So,  
9 it's a combination of sampling approach, as well as how it effects your  
10 remediation, your dose modeling, any other areas where you might be  
11 using these mixtures, to see where you're going to make these splits.

12 And the same things obviously occur at uranium fuel cycle  
13 facilities. You're going to run into the same problems. And it's  
14 essentially a statistical problem, using maybe a DQO or something like  
15 that to define your performance objectives.

16 Does that help?

17 MR. SAITO: Yes. I think that the question there is would  
18 it be acceptable to -- when you start -- prospectively, at the beginning  
19 of the -- at your characterization, you set your ratios and you say  
20 these are my ratios. And then at the final status survey, you take a  
21 couple of samples -- like you said, make sure that it falls within the  
22 statistical variation you expect it to see. But, your DCGLs and  
23 everything are based on your initial characterization data, unless it  
24 goes statistically different in your final status survey.

25 MR. FAUVER: Well, that's what you're trying to answer when  
you move forward to determine your DCGLs. I mean, you'd better be right  
or you're going to have to go back and reassess. And so, that's the  
performance objective for your review of these mixtures. And you need  
to assess the risk of making a mistake and compare that to the cost of  
getting, you know, a million dollars worth of data or the cost of data

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1 collection. And there's no easy way out of that. It's not a black and  
2 white situation. There are decisions to be made, in terms of dollars  
3 spent now versus risk averted in the future, in terms of getting to the  
4 end and looking at your mixture and saying, you know, where are we now  
5 and is it significantly different; does that nullify our assumptions and  
6 our dose assessment.

7 MR. SAITO: Yeah. And the big question is: will the NRC  
8 agree to -- on the final status surveys, say, your ratios are slightly  
9 different, but they're not significantly different than your original,  
10 and it puts you at 1.1 times the DCGL, instead of .9 times the DCGL, and  
11 then all of a sudden, you're back into a clean-up action. That adds a  
12 lot of uncertainty into your work.

13 MR. FAUVER: You know, I can't speak for NRC, but --

14 MR. SAITO: I know you couldn't when you worked here either,  
15 but --

16 [Laughter.]

17 MR. FAUVER: But, my experience was that there would be some  
18 -- a reasonable review of that. And I think you'd have to approach this  
19 thing from an uncertainty perspective: here's the range; here's what  
20 we're looking at; you're going to either use the mean; and here's how it  
21 could be variable, here's how it is variable. And I would argue,  
22 perhaps, to notes, maybe you could argue the mean in that situation. It  
23 depends on how uncertainly is built into your dose model, itself; how  
24 you bring in that into the entire equation. It's a larger question than  
25 simply the mixture. And I think, in part, it depends on how you present  
the information in the first place, whether you lock yourself in or  
whether you use a more broad based risk informed approach to what you're  
doing and then how you commit to then perform checks during your final  
survey or during your remediation activities and what the acceptance  
criteria are for those checks. And that would be the process.

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1 MR. SAITO: But, those, I think, should be agreed upon up  
2 front, rather than go to the final status survey, take your final status  
3 survey, and then say, well, NRC, things are a little bit different now,  
4 we have to --

5 MR. FAUVER: Well, why not? I mean, you're doing your DCG  
6 -- you're doing your dose assessment up front. You're doing your final  
7 survey planning up front. So, it's really part of the same process.

8 MR. MCKENNEY: Right. I think in pre-planning, you would --  
9 you could select a ratio for this, with anything, and your efficiency --  
10 and actually what you're going to clean up to the site and everything  
11 else is going to be re-reviewed all throughout, to see -- in some sort  
12 of method that are you going to actually be able to achieve that.

13 MR. SAITO: That's the scary part, the re-review.

14 MR. MCKENNEY: No, I mean --

15 MR. SAITO: If it's being reviewed against a predetermined  
16 set of conditions with the known variance in your analytical, then  
17 that's -- that would be acceptable. If it's going to be re-reviewed  
18 against this is the hard and fast number --

19 MR. MCKENNEY: No, I'm saying you are re-reviewing while  
20 you're doing inspections, to see if you are entering too much risk into  
21 the fact that at final survey, you're going to have such a ratio that  
22 you're not going to meet the dose criteria.

23 MR. FAUVER: Earl, it's a fact of life. I mean, there's  
24 uncertainty in these assessments and it's the obligation of the licensee  
25 to put that uncertainty on a piece of paper and put it forward and say,  
here's how we're going to treat it; here's how we want to deal with it;  
here's how we want to address this uncertainty and is this acceptable.

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And you need to come up with something that you think is sufficiently a  
low enough risk and argue that point with the NRC, until you come with a  
reasonable compromise of cost versus risk, in terms of moving forward in

1 the project.

2 MR. SAITO: Yes, but if we agree that at the beginning that  
3 there's a ratio of thorium 230 -- 226, that's say, 2:1, plus or minus  
4 .2:1, and at the end -- and we agree that that's what is out at the site  
5 right now. All right, we come back later in the process and it's now  
6 1.9 in our final status survey. That puts us up over the DCGL limit.  
7 Well, we're really not over the limit compared to what -- in the  
8 uncertainty of the measurement.

9 MR. FAUVER: Well, you're going to have to define that, I  
10 believe, in the plan going in. And you're going to have to try to  
11 determine what you think your risk is for making the estimate that  
12 you're proposing, what you think the risk is in bounding the limits for  
13 assessing the final configuration after remediation. It's really -- and  
14 then you're going to have to get the approval of NRC, in terms of those  
15 numbers that you proposed. It's a process and it's the obligation of  
16 the licensee to lay that out. And it's not -- you either have to set a  
17 number or not.

18 I mean, whether we like it or not, there are some bounds in  
19 these proposals to move forward. And what we're trying to avoid is --  
20 as a licensee is trying to avoid and NRC is trying to avoid, is having  
21 those bounds be so broad and so conservative that you can't move  
22 forward. And so, there's some range that you have to work in. But to  
23 get an approval, you have to have some kind of criteria to move forward.  
24 It's -- some hard lines will likely be drawn and it's just a risk  
25 assessment project.

MR. SAITO: You may have 95 percent uncertainty on your  
model and 95 percent uncertainty on your measurement and not be at --  
really at a five millirem limit, instead of a 25 millirem limit.

MR. FAUVER: Oh, I would say that that was -- would be  
something that you would then discuss in your decommissioning plan, in

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1 terms of your uncertainty analysis: how does the source term roll into  
2 the mixture assessment, roll into the dose assessment, into the final  
3 survey decision criteria. All these things are interrelated.

4 MR. GENOA: Paul Genoa, NEI. I was just going to comment on  
5 some of our experience to date and I agree with these comments that have  
6 been made. From a practical point of view, we immediately looked into,  
7 for a waste acceptance, in part 61 criteria, you know, how many  
8 different types of ratio mixtures do we have that are really important  
9 to characterizing our low-level waste. And early in the program, you  
10 know, we sampled everything and, you know, we developed all these  
11 different ratios and all these different scaling factors.

12 But the truth is, as we've accumulated data over time and as  
13 we have identified the outliers and the analytical technique and the  
14 sampling technique and everything else, we've documented in some EPRI  
15 reports that, really, the range of those scaling factors have come  
16 closer and closer and closer and that, in fact, that many of them are  
17 generic across the industry, many of them are generic plant by plant,  
18 and many of them are generic waste stream by waste stream. So, the  
19 point being that those ratios may, in fact, be much smaller than what we  
20 thought. And for practical purposes, I agree with you, that we want to  
21 be establishing, looking for an opportunity to limit -- for calculation  
22 purposes, limit the variability of those ratios as much as possible.

23 Beyond that, some of the things we've learned, and I don't  
24 know if it was covered in Carol's presentation yesterday, but some of  
25 the things we have learned in the embedded pipe issues are that, in  
fact, it doesn't really matter what was deposited on the pipe early in  
life. In fact, much of that is either scoured off or ion exchanged out.

And so fundamentally, what may have happened early in life with failed  
& fuel doesn't appear to impact the actual source term on the pipes later  
in life. And then -- I thought and forgot the third point. If it comes

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1 to me, I'll get back to you. Thanks.

2 MR. MORTON: With respect to this earlier point, it seems to  
3 me that as far as I can tell, the regulation and the guidance wouldn't  
4 and seems to me shouldn't keep a licensee from taking one of two  
5 approaches, and either, I think, should be acceptable.

6 One, to characterize the sources that you expect to remain  
7 after clean-up. Get the ratios and get approval for DCGLs that you will  
8 clean up to up-front. Or, alternatively, to expect to show compliance  
9 by taking your -- in effect, your final status survey data for which  
10 then you presumably know as best you can measure or predict the ratio on  
11 the basis of some previous characterization measurements and calculate  
12 the doses and test compliance with those on a survey unit by survey unit  
13 basis.

14 It seems to me the question is: which of those two  
15 alternatives does the licensee propose and get approval for in the  
16 decommission plan.

17 MR. GENOA: Paul Genoa. I remember the third point, and  
18 that being that it is going to be challenging enough to do a good job  
19 deterring these isotopic concentrations prior to decommissioning, while  
20 the activities are as high as possible. And it's going to be clearly  
21 challenging, as we saw in the re-suspension work being done, to  
22 determine what those ratios are after clean-up. I mean, you just aren't  
23 going to be able to, in many cases.

24 MR. MORTON: I think there's a two pronged problem here.  
25 One is that at the -- in the final status survey data, the  
concentrations of minor nuclides may be so low that you really can't  
measure them distinguishably from background and, thus, have to key on  
the ones you can measure.

On the other hand, in the characterization data, the  
material that you ship off site, especially for, say, material sites

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1 with a lot of soil contamination, in which the material that is shipped  
2 off site, some of the higher concentration material might not be quite  
3 the ratio that you would expect to have at the end, after you have  
4 shipped that off and the ratio and the residual might not be quite the  
5 same. So, I think there's going to have to be a balancing of these two,  
6 because if you can't see it at final survey, you have to depend on some  
7 -- the ratios and some higher concentrations that you can measure.

8 MR. MCKENNEY: Oh. Video -- how do you turn that on?

9 [Pause.]

10 MR. CULBERSON: Dave Culberson, again. Using this example,  
11 what does the NRC see as the role of this ALARA analysis and the ALARA  
12 approach for the remainder of this decommissioning? This is way up  
13 front. It's in the -- it's providing input to the decommissioning  
14 planning efforts. And now, let's say, they made a submittal. It's  
15 approved for what? What becomes the role of this ALARA philosophy from  
16 here on out in the process? Is it applied -- you mentioned earlier that  
17 it's an iterative process that licensee revisits. How does that, then  
18 -- I mean, that's obviously going to impact the decommissioning planning  
19 and the decommissioning methods that have already been approved, etc.

20 MR. MCKENNEY: That's where we -- again, we bring it back to  
21 -- there needs to be some level of review. It may not be a revisitation  
22 of the numbers or anything like that. It may be, again, on more of a  
23 risk analysis, of whether we'll be able to meet it, are we still within  
24 our bounds of what we're looking at, or is there a new method -- another  
25 method that may be more practical to decommission with. Instead of  
washing or something, you just want to scavel instead, and just skip a  
couple of steps.

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It's -- the ALARA is sort of a meld between -- of selecting  
the right option or whatever you appear to be the right option, which  
also could include deciding on how you want to lay out your ratios; what

1 you want to lay out for different nuclides; which ones you're going to  
2 focus on; which ones you're going to rely on, being in certain levels at  
3 the end, because you're not going to be able to measure them.

4 And during the process, you're just going to have to do some  
5 visitation. I mean, it's just common sense that you don't want to just  
6 start out and then go all the way to end and figure out if you did  
7 everything right. And that's all we're saying for ALARA, is that  
8 there's some management -- some sort of program management, just like  
9 the ALARA program in Occupational.

10 MR. CULBERSON: Let me expand on that a little bit, because  
11 I think one of the concerns that I've heard expressed and looking at it  
12 from the fuel cycle side, that the big swingers, in terms of cost, come  
13 into soil and to a degree building, rubble disposal. So, revisiting and  
14 recalculating how much you got to move and having it remobilized to take  
15 out another six inches or to take out to a lower concentration results,  
16 that's where the big concerns are, I think. Whether you scavel or  
17 whether or wash is usually an insignificant cost, I would say, in the  
18 total big picture. It's the big swingers at the end that may result in  
19 having more or less.

20 I mean, you get -- for example, get through the process and  
21 decide maybe it would have been better to put a cell on site or having  
22 to change in midstream. That's where, I think, a lot of licensees might  
23 be a little nervous, having to revisit, if it's going to go through  
24 another analysis and have to justify and not taking additional actions.

25 MR. MCKENNEY: Well -- and these mid-course reviews, or  
whatever, are not to be -- are not going to be submitted to the NRC,  
unless they're involved in an actual license amendment. So, your level  
of review may be -- depends on the level of risk you want to entail to  
the final setup of your site.

You know, you can re-review the cost estimates. Maybe you

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1 don't review that, you just review the efficiencies you're using and do  
2 some method. You can propose in your decommissioning plan or your  
3 general philosophy of how you're going to review this stuff. And that's  
4 what we're going to be looking for, is how are you going to review this.  
5 And it's not going to be the same for every licensee. It's going to be  
6 -- as long as this is the responsibility in the management chain and a  
7 responsibility in the program to try to optimize the decommissioning in  
8 whatever way that's decided. That's really the philosophy that we're  
9 trying to stick in here for ALARA.

10 MR. BHAT: Tom Bhat from the US Army. We are concentrating  
11 a lot on this ALARA concept and we are doing a lot of critical modeling  
12 and uncertainties in all these things. It is fine and dandy if it's a  
13 gamma image that suggest C-137 or COBOL 60 or any of them, which can do  
14 with the gamma spectroscopy analysis. But when it comes to strontium 90  
15 soil or uranium soil in a low concentration, it's so difficult to  
16 analyze. I still come across with laboratories which can do this,  
17 because the cost is very prohibitive, especially in strontium 90 soil,  
18 as well as uranium soil. It's very difficult to get uranium in water or  
19 uranium in urine samples in low level.

20 And I think the Government has to spend extra money, rather  
21 than just spending millions of in critical modeling, to come out with an  
22 analytical technique, which are more realistic in the analysis of it,  
23 especially strontium 90 and uranium, rather than all critical modeling  
24 and uncertainty analysis. Otherwise, it will be garbage in, garbage  
25 out, in this modeling cost, because your strontium 90 and uranium are  
the two challenging things in all these reactor sites. All these are  
national type problems.

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MR. FAUVER: Dave Fauver, RSI. Related to the ALARA issue,  
I think what industry needs is some kind of either an inspection  
procedure or something related to the regional work, as to how the

1 regions and the inspectors are going to come out and check for ALARA  
2 compliance. I don't believe there's a requirement that the final survey  
3 report, which is the only actual submittal required after the  
4 decommissioning plan approval or license determination plan approval, to  
5 discuss ALARA in any way. What that, I think, comes down to is that the  
6 ALARA compliance is going to be determined during inspection.

7 If that's the case, then to resolve this issue about are we  
8 in double jeopardy of doing the analysis up front and getting caught at  
9 the back end, the inspection procedure would be a good place to put  
10 those kind of requirements in, at least so industry has an idea of how  
11 this ALARA compliance is going to be performed by NRC. And then I  
12 suppose there's some obligation by -- on the licensee to document some  
13 way that that process has unfolded, as described in the decommissioning  
14 plan or license termination plan discussion of ALARA. But, I believe,  
15 it's going to be in the inspection and there should be an inspection  
16 procedure that could reduce some of this risk that we're talking about.

17 MR. SAITO: Earl Saito, Combustion Engineer. I'm a little  
18 confused here again from Dave's comment and from what you were saying  
19 earlier. The ALARA, as applying to the workers at the site, would still  
20 be inspected, as it would under Part 50 or Part 70 licensee by the NRC  
21 inspector coming in; is that correct?

22 MR. MCKENNEY: Yes.

23 MR. SAITO: Or is there going to be a new ALARA standard  
24 that we'll have to meet at that point?

25 MR. MCKENNEY: No. For occupational, he's saying that he --  
that the current stuff on what they review for occupational may be out  
there in procedures, but what he's looking for is an extension of that  
to discuss what they'd be looking for of your decommissioning ones  
related to cleaning up.

MR. SAITO: Okay. Can I take a couple of minutes now and

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1 show the slides I was going to show after lunch, because it looks like  
2 we're running ahead? Or do you want to --

3 MR. MCKENNEY: That's fine.

4 MR. SAITO: -- put that off until later? I think we'll kind  
5 of address what I'm looking at here.

6 MR. FAUVER: Well, you know, the other choice is to simply  
7 make a declaration that it will not be revisited after the approval of  
8 the decommissioning plan. That's another option. That could be easier.

9 MR. MCKENNEY: Yeah.

10 MR. SAITO: Well, it comes down to approving actions versus  
11 approving results. If you're approving an action, then you have one set  
12 of inspection. If you're proving results, then, yes, you need a lot  
13 more guidance.

14 MR. FAUVER: Action?

15 MR. SAITO: Yes.

16 MR. FAUVER: Action is philosophy.

17 MR. SAITO: I believe the key to this is actions. All they  
18 have to do is you have to show that you've performed the actions, if any  
19 were required.

20 MR. MCKENNEY: Right.

21 [Pause.]

22 MR. SAITO: What I've been struggling with is how to make a  
23 practical use of the ALARA concept and what we can do to use the  
24 guidance. And so the first think I wanted to look at was if I look at  
25 the benefit and the cost and put in similar to what Chris did a couple  
of minutes ago, put the numbers in at 25 millirens for uranium and 1,000  
years, the one over -- 1-e term goes to zero, so basically, you're 1/r  
there.

And then look at the cost, and looking at just one cost, the  
net public harm, I threw out the term "per worker dose," because if you

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1 can only get 15 milliren as a resident farmer, it's going to be pretty  
2 tough to get any dose as an occupational worker, once you get to the  
3 DCGL. Above that, there's a different -- that's a different case. But,  
4 once you're down to the point of am I going to go further, that dose, to  
5 me, seems trivial.

6 So, I looked at the shipping traffic accidents and came up  
7 with a number and then benefit to the different removal fractions. So,  
8 if at five centimeters of removal, I can remove 10 percent of the  
9 contamination, up to 90 percent of the contamination, then you can look  
10 at concentration versus DCGL and decide whether that action is  
11 appropriate. So, I already have agreed that I'm going to go down to the  
12 DCGL.

13 Now, if I take off another two inches or five centimeters,  
14 if I can get 60 percent of the contamination gone there, I'm right about  
15 at break-even. I should probably really strongly consider either doing  
16 that or adding -- or looking at adding more to it, making sure that I  
17 have the cost benefit done correctly.

18 So, now, this is what I'm talking about. When you're  
19 judging actions rather than results, in my characterization, I say that  
20 I can take off two centimeters -- or two inches or five centimeters of  
21 soil. In the left-hand column, it's two -- you know, basically, it's  
22 going down in inches, because I have hard times dealing with metric --  
23 when I'm out there talking to a backhoe driver, I tell him to take an  
24 inch off and they can do that -- an inch, two inch, or up to six inches  
25 or seven inches, and then residual contamination.

Well, clearly, if I can only get 10 percent of it going down  
15 centimeters, it's not even worth thinking about; whereas if I can get  
90 percent of it going at an inch or 2.5 centimeters, I should probably  
go out there and take that action. And in my planning, what I'll do is  
I'll go out and take out my -- I'll draw the map at this site and I'll

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1 say, this time, I'm going to go down 17 inches. And if 16 inches would  
2 have made it to -- would have made it down to DCGL, I'm going to add  
3 that additional inch.

4 And that is my ALARA goal. I have added that additional  
5 inch in my measurement. I go out there, I've taken 17 inches out. The  
6 backhoe is gone, everyone else is gone. I go out with my measurement  
7 team. I measure it and I find whether I have met the DCGL or not. If  
8 I've met the DCGL and I have taken the action, then I have performed the  
9 ALARA result. This is doing it prospectively, rather than as part of an  
10 inspection regime. And I think that, to me, is the way that I would  
11 like to do it.

12 MR. FAUVER: I wasn't suggesting that there would be this  
13 ongoing look at the activity in progress. But the only issue is how is  
14 NRC, I think we'd like to know, going to come out and judge compliance  
15 with this ALARA requirement? If you do your 17 inches and the inspector  
16 comes out or whatever, the project manager comes out and says, did you  
17 do your 17 inches? You say, yes. He says, well, why don't you prove it  
18 to me, for example. In the worse case, he asks you that question. Or  
19 is he going to ask that question? I mean, we need to know. If he's  
20 going to ask the question, then we need to write something down on a  
21 piece of paper. If there's going to be a commitment in terms of  
22 inspection, or whatever, that that question won't be asked, then we'll  
23 just, in the plan, conform and move forward and do the 17 inches, then  
24 that's another issue.

25 MR. CULBERSON: Dave Culberson, again. If I hear that  
right, that seems to take us out of the goal arena into a limit arena.  
Then, it's become something that's got to be verified and proven, as  
opposed to a voluntary goal. DCGL is a limit. That's go to be met.  
Does the ALARA goal have to be met, then? Does that become a compliance  
issue?

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1 MR. SAITO: The ALARA action has to be taken, isn't that  
2 correct?

3 THE SPEAKER: Does it?

4 MR. SAITO: If your DCGL plus ALARA, then, yes, you've  
5 committed to taking an ALARA action. Prospectively, you've decided that  
6 taking 17 inches out is an action that I'm going to take. Now, again,  
7 when you get back to the washing, that's a different -- you know, you  
8 say, well, I will wash the wall. But, to me, what I would do is I would  
9 go measure the wall first and find if it's in compliance. Then, I'd  
10 say, well, my ALARA action, I'm going to wash it, and then you wash it  
11 at the end.

12 MR. MCKENNEY: Yeah. If you had said -- like the fraction  
13 was basically that you'd be getting 80 percent removal by doing 17  
14 inches. In theory, if you just did 17 inches, you did an ALARA action.  
15 Whether it was actually 80 percent was -- is not the important part at  
16 the end.

17 MR. FAUVER: We're not going to be nickel and diming people,  
18 because they didn't -- they got below the DCGL, but they didn't get as  
19 far as they thought they would.

20 MR. DARMAN: Joe Darman, Maine Yankee. In your cost  
21 analysis on that, when you figured out how much it was going to cost to  
22 take off that seven inches or whatever, six inches, is that just the  
23 direct cost of that backhoe operator or was it all the indirect costs?

24 MR. SAITO: That's net public harm.

25 MR. DARMAN: Yeah.

MR. SAITO: That's net public harm and that's just looking  
at one very small piece of this. The next part I looked at was to say  
-- was to add some more of the cost then, and taken a different -- a  
slightly different example, saying you went with an on-site burial. If  
you make your decision after, if you're doing it as a retrospective

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1 analysis, rather than a prospective analysis, you have to look at fixed  
2 costs as well.

3 And that's the point of the second thing, is that when you  
4 come in and you say, all right, now, I've taken this action, I've built  
5 a cell, I'll put everything in it, now I want to put another 100 yards  
6 in the cell. Well, putting another 100 yards in the cell is not just  
7 pushing the wall out a little. There's permitting and all the other  
8 stuff, lawyers, the whole bit, and you're add, say, another million  
9 dollars on top of it. That makes it prohibitably expensive to do  
10 anything.

11 If you try to do post-remediation, even at this -- which is  
12 why I put the \$30 a cubic meter, which is extremely -- exceedingly  
13 cheap, but it's a number that looked nice and round to me at the time --  
14 all those degrees up there look good -- as a post-remediation action,  
15 you can't afford to do it. Whereas on the other hand if you look at it  
16 as a pre-remediation action, also notice I went to 100 milliren, because  
17 I'm restricted release in the area anyway, I'm going through all the  
18 restricted release actions and so I'm going to go ahead and go the 100  
19 milliren, I can remove -- it does become cost effective to go a little  
20 bit deeper in areas. And it also makes good sense, if you're building a  
21 cell, to make sure that you get everything for the same reason, at the  
22 end of the day, you don't want to be out there trying to put another  
23 yard -- another couple of hundred yards into your cell that was built  
24 for a certain amount.

25 MR. FAUVER: The key to this thing is after the approval of  
the ALARA approach, what is NRC going to require, in terms of  
demonstrating compliance, if any, because then that requirement, be it  
an inspection procedure or whatever else, is going to drive what the  
licensee puts into their operational procedures to meet that  
requirement.

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1 MR. MORTON: Henry Morton. I think there's a pretty  
2 significant precedent that we ought to keep in mind in trying to judge  
3 what ALARA might be in this case. That is, if we go back to the cost  
4 benefit regulation for power reactor effluence. In that case was a  
5 forward looking planning tool, which we looked at the incremental  
6 reduction in effluent and thus for an incremental effluent treatment.  
7 And when beforehand, it was judged to be cost beneficial or not cost  
8 beneficial to design in another increment of treatment, that decided it.  
9 There was not then later a retrospective inspection to see whether or  
10 not the piece of equipment met a performance goal or limit. There were  
11 the ALARA, in effect, the reports overall, but the actions were  
12 basically -- they were basically a planning action up front.

13 In the case of looking at clean-ups, I think it's partially  
14 a question of what are we looking at as a planning forward looking item  
15 to get approval of. And it looks to me like there can be -- that I can  
16 see a couple of possibilities, either which may come into play in some  
17 individual case. One of those could be: do we take a certain clean-up  
18 action, that is whether it's the proverbial scabbing or whether it's the  
19 proverbial treatment of some kind. Then there's the other part -- the  
20 other one, which could be: what is the cost and what is the benefit of  
21 cleaning up an additional increment that would reduce the residual  
22 concentration to some incremental lower value.

23 It seems to me that those kinds of evaluations, decisions  
24 ought to be made in the decommissioning planning phase. Once they're  
25 made, then that's the basic decision.

MR. MCKENNEY: Well, your validity of all your assumptions  
in the decommissioning preplanning phase also depends on your site  
characterization that goes in. And if you find out a bit in that you  
are not well set on your pre-planning, then maybe there is some  
decommissioning options that you threw out before that now are valid.

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1 MR. MORTON: But, it does presume that you've done the --  
2 done a reasonable characterization. That's correct.

3 I think part of the apprehension is probably maybe the  
4 question of whether after doing the clean up, based on approved DCGLs,  
5 for instance a question is whether the staff and then in reviewing, they  
6 found characterization. They decide to take the characterization data,  
7 which met the DCGLs, put it into D&D and see whether it also, in  
8 addition, beats the limits, as D&D might calculate. And I think part of  
9 the reason for the apprehension there is the difference in the way the  
10 MARSM process has been envisioned and the way the D&D documentation  
11 looks, D&D literally having an NRC report, which is just a forward  
12 calculation, the way the early flowchart was set up in NUREG 1549.

13 MR. MCKENNEY: Right. We're mixing here. No matter what,  
14 your ending final survey has to meet the dose limit. Whether it meets  
15 your DCGLs you started out with, that doesn't matter. That really  
16 doesn't matter, because of the way the limits are set up. It is a  
17 simplification to use DCGLs, because it's simpler for operations. You  
18 can find out things about your site that you had left in pathways at  
19 pre-planning, that aren't -- that you know now, because you took a  
20 little bit more data while you were cleaning up on land use surveys or  
21 whatever, that those follow your modeling.

22 And the dose limit is a performance based dose limit. It's  
23 not a -- the DCGLs are derived from it. It's like -- the effluent  
24 values in Appendix B of Part 20 are not limits. Those are a method, in  
25 which you can use to show compliance with Part 20, public dose limits,  
but you also can show compliance by modeling the individual, itself, at  
100 milliren. So, while the DCGLs are probably the more practical  
method, there are situations that you could jump back to the dose limit  
at the end, and it has to meet the dose limit. That's the basic thing.

MR. BURKLIN: Rich Burklin, Siemens. I like what Henry says

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1 about you planning something up front. But, I'd like to modify that  
2 slightly. You may plan to do action A, thinking it's going to  
3 accomplish a certain goal. But, you need not do the whole site to  
4 evaluate it. You may start action A and then turn out -- it may turn  
5 out that that really doesn't accomplish what you thought it would. And  
6 so at that point, you have reason to stop. So, in that case, you  
7 wouldn't be judged entirely upon whether you did the action or not. You  
8 started the action, you evaluated it, and now you have reason perhaps to  
9 stop.

10 MR. MCKENNEY: That's what I meant by reviews; that there  
11 may be either new information you didn't know about because of your site  
12 characterization, or that your initial clean-up was already more  
13 effective than pre-plans, so you don't need to take extra actions, or  
14 that what you said that you'd spend money to do isn't doing anything  
15 anyways. And those may just be written up and said, you know, you just  
16 don't have -- we're not going to do this action anymore, because it's  
17 not -- we're just putting out money for no benefits.

18 MR. ROBERTS: Rick Roberts. Given these conversations that  
19 have just gone on, I guess I would question the need to do an ALARA  
20 analysis, if you already meet the DCGL. It sounded like before, you had  
21 said you need to assess, even if there is radioactive material present  
22 below the DCGL and if you already meet the DCGL, it would be nice not to  
23 have to do an ALARA analysis to prove that it's okay not to do anything  
24 else. Or is that something that you feel is very important?

25 MR. MCKENNEY: I'll say that the rule says that you have to  
do an ALARA analysis. It really depends; it really depends. The only  
thing -- the one area that the GEIS was very vague on and is really a  
touchy issue is groundwater contamination. You may have something that  
results in a dose of less than 25 millirem to an individual, but you may  
have enough contaminated water down there that is already going into an

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1 aquifer, that is being pumped by a population of 10,000 people and it  
2 won't really reduce the concentrations when it gets pumped. Now, you're  
3 talking different numbers on total benefits of trying to clean something  
4 up, if it's possible to clean up the water.

5 But, there are some situations that it may be possible that  
6 under DCGL -- for soil, I can't see ever a case where it's going to be  
7 better to clean up soil, if it's already under the restricted --  
8 unrestricted release limits and possibly even a little bit above it, if  
9 you're going for restricted release. And for walls, I don't know. But,  
10 there are some vague issues. And they don't have to be extensive. I  
11 mean, a lot of times, when you just add one or two costs in here, you  
12 can show that the benefits of anything are fairly negligible and it's a  
13 five or ten minute calculation -- writeup.

14 MR. CULBERSON: Davie Culberson. A fairly simple question:  
15 do you know if there are any licensee submittals that include multiple  
16 nuclides, two or three or whatever, that have been -- had an ALARA  
17 analysis approved, or are they all pending right now?

18 MR. MCKENNEY: I can't speak for the regions, but I'd say  
19 they are all pending. Yeah, I'd have to say -- there's -- because of  
20 some various things in NRC, apparently, there's very little likelihood  
21 they've been approved, since the rules came out.

22 MR. GOLDIN: I'm just curious, but the Fort Sing Rain's  
23 license was terminated and they certainly had multiple isotope.

24 MR. MCKENNEY: Yeah, but, I mean, that was under a different  
25 rule. That's what I'm saying -- what we're saying, under this rule,  
with ALARA requirements, has there been any licensee. Fort Sing Rain,  
of course, yes, they did. A lot of people have been terminated, but  
60,000 licensees were terminated by 1991 by NRC over the years, and the  
AAC. So, I mean, we've terminated people forever.

But, under the new rule -- okay, to bring it back, the

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1 philosophy or the way we're -- that NRC is looking at this is action  
2 based. You pre-plan. You say we're going to do this. You do. If you  
3 find out you want to change or you find new information that changes  
4 your basis for why you pre-planned significantly, then during  
5 operations, then you might make a slight review. And if you decide to  
6 stop something because it's not working, because you notice it's not  
7 working, then you're going to have to make some statement as to why  
8 you're not doing it from either a qualitative or quantitative  
9 discussion.

10 It's not meant to be extensive. It's not meant to be --  
11 take up all your time to just go out there and remeasure after every  
12 time they scrape something. It's meant to be just part of any  
13 decisionmaking you decided, because the decommissioning isn't going  
14 necessarily the way that you planned it to. That's the basic thing. If  
15 you make any decisions that change the decommissioning plan or your  
16 activities you wanted to do, you just have to make some consideration of  
17 ALARA at that time, too. And that's mainly what we're talking about by  
18 reviews. I mean, you're going to be doing other types of reviews,  
19 obviously, for most situations.

20 MR. FAUVER: Well, that's the statement that concerns me;  
21 that you're saying if you're making changes, then, obviously, you have  
22 to do another ALARA review. If that's the case, then we need to have  
23 some documentation somewhere, either in an inspection procedure or in  
24 DG-4006 or somewhere. We need to lay out what the compliance method is  
25 going to be for NRC on this.

MR. MCKENNEY: It's called justification. I mean, we have  
-- already for 50.59 and other things, you have to have a report for  
changes. I mean, you have to make the decision. You have to write down  
something that you've made a decision on anything. So, the level of  
justification may -- it depends really on what you're changing.

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1 MR. SAITO: Just following up on what you said, Chris, is  
2 this kind -- I understand it right, if you made something like this,  
3 where you had an action with removal and net public harm, and during --  
4 and this was what's approved, and then when you're taking your actions,  
5 you kind of look at and say, well, am I really hitting where I think I'm  
6 going to hit on removal fraction and then decide whether I should be  
7 taking more or less dirt out by looking at the removal fraction or the  
8 DCGL during. So, that would be something that would be approved by the  
9 NRC, which is this type of matrix -- maybe not this -- probably not this  
10 exact matrix, but this type of matrix would be approved by the NRC. And  
11 then as Dave was saying, the inspection will come out and say, well, I'm  
12 reviewing where I'm now getting -- you know, I'm getting 20 percent  
13 removal fraction; therefore, I could stop my actions; whereas, now, I'm  
14 getting 90 percent removal fractions, I should really be taking off five  
15 inches instead of two-and-a-half, something like that. Is that more  
16 what you're looking at, as far as --

17 MR. MCKENNEY: Right. Yeah, there's some sort of -- if you  
18 come out and you -- when you change procedures every year, you change a  
19 lot of things with ALARA every year in ALARA operations. You have to  
20 write that stuff down already, decisionmaking. It's nothing more than  
21 that. It's just, if you have a matrix like this and we said, yeah, this  
22 is how -- this is the process with what -- or the criteria on what  
23 you're making decisions on what's ALARA or what's not, your action. And  
24 if it starts to show -- and you do some -- you make some midcourse  
25 measurements or something to see how good you're doing in various areas,  
and you find out that you're way low -- you don't get as much removal as  
you have, then we have criteria. You already stated this as, look, it  
doesn't meet what we said was the reason we were doing our action;  
therefore, it curtailed.

MR. SAITO: So, in our decommissioning plan, we'd actually

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1 give you a methodology on how we're going to do our ALARA analysis and  
2 the major highlights of it.

3 MR. MCKENNEY: Right.

4 MR. SAITO: And then as we go through our decommissioning,  
5 we don't have to come to you amendment by amendment saying, you know,  
6 we're going to do this, do that, as long as we're following our outline.  
7 And in that case, I can see Dave's point much more clearly, that I would  
8 want my inspector to understand what I'm doing and what we've agreed to.

9 MR. MCKENNEY: Right. Any other questions or comments?  
10 Otherwise, we'll break until 1:00.

11 [Whereupon, at 11:48 a.m., the workshop was recessed, to  
12 reconvene at 1:00 p.m., this same day.]  
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## A F T E R N O O N   S E S S I O N

[1:00 p.m.]

MR. MCKENNEY: Well, looking at the schedule, we already started before lunch on the last topic that's actually listed on there, which is when to do ALARA calculations. This is a free open discussion by anyone. Or, basically, if there's very few of those discussions, we can go into any other type of ALARA, modeling or other questions even. It's pretty well free and open questions or comments or topics for anybody who wants to bring something up.

MR. BHAT: My name is Ram Bhat. I'm from U.S. Army. We are having a small radiological laboratory, where we did a lot of work on tritium, uranium, and different types of mostly commodities types of work for the Army. And we are trying to move from that building to another building in the same area. And so this building will be occupied by another new tenant and management is forcing us, hey, we need it really badly. We have their things -- rent and all.

And now, what I'm asking is what is the best cost effective way of convincing NRC, hey, here's the best way. Now, we have three things: one is 58-49; another is MARSM; and then you've got the DG-4006. And we are doing this operation there for almost last 50 years. And we are doing a little survey. We have a broad scope license. And we want to do the most cost effective way. And I have my colleague here, Mr. Borschy, he also did a lot of work on Watertown on the uranium plant.

So, can I no go with the newer 58-49? And then, I've got already the historical history. And then I will put up a little plan, thinking that since most of them are clean, I'll do a little -- we've got a lot of fumers and we don't know what has been done to the fumers. And so, I'll take a little scoping survey, doing a little fumers, and then I'll see if the -- if I prove that they're all -- most of them are

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1 -- nothing in the major tanks, then can I do most of them as an affected  
2 and should I submit this plan to NRC or state, go ahead and finish the  
3 survey and then submit to NRC? Or what should I do?

4 We've got two restrictions: one is money; the other, the  
5 time factor, too. They want it within a month or two.

6 MR. MCKENNEY: What region are you with?

7 MR. BHAT: I've got another question, too. Another thing is  
8 meanwhile they are telling us, hey, wait a minute, we've got asbestos.  
9 We're not going to take out the asbestos. Now, should we -- should I  
10 wait until all the survey is done and then go to the asbestos?

11 MR. MCKENNEY: Well, from a practical standpoint, you're  
12 going to have a lot more questions come up if you haven't -- if you  
13 start dealing with something like -- anybody may consider mixed waste.  
14 And that will be from a personal standpoint why I would probably try to  
15 get rid of the radiological issues before I'd start pulling asbestos, if  
16 you're going to do that.

17 Okay. One, you have a tremendous amount of historical  
18 surveys.

19 MR. BHAT: Yes.

20 MR. MCKENNEY: I would, one, lay out from that what are  
21 affected areas or what have a potential to have residual contamination  
22 in them, and that should perform a fairly good basis for your decision  
23 on how to separate.

24 And then, I would start to do your scoping survey of your  
25 other sites, other areas, and invest -- I'm not sure about the MARSM  
versus 58-49 question.

MR. ABU-EID: Can I just ask the question: if you are under  
a general license with the Army and you are working within the domain of  
the general license with the Army, or you have a specific license with  
NRC.

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1 MR. ORLANDO: He said he had a broad scope.

2 MR. BHAT: I have a broad scope license with NRC.

3 MR. ABU-EID: So the broad scope license should be done  
4 within the context of the broad scope license. And the question about  
5 using 58-49 or using MARSM, whether you have the decommissioning plan or  
6 not, if you have the decommissioning plan and you have a license with  
7 NRC that was submitted early, I believe you could follow 58-49. If it's  
8 not, you follow MARSM with the current radiological criteria.

9 MR. BHAT: If I understand properly, we don't have any  
10 decommissioning plan.

11 MR. MCKENNEY: Right.

12 MR. BHAT: So, we don't have --

13 MR. ABU-EID: This is because it's broad license, you mean?

14 MR. MCKENNEY: No, it's because it's just an operating site  
15 and they just want to move.

16 MR. BHAT: We have a license since 1960. And we have a good  
17 historical survey. We have all the license history and everything. We  
18 know which radio nuclide we use and everything. We do regular survey  
19 and I told you that no contamination. And so the only question is now,  
20 how effectually we have to do it and we ought to do quickly. So, we  
21 thought it would be interesting to ask you questions to you people and  
22 see come out what exactly you feel.

23 MR. ABU-EID: Based on the process that you have, if you are  
24 just copying survey and demonstrate that do not expect to have any  
25 contamination or the contamination is within the background limit. And  
looking at the current DCGLs and the general D&D screen, for surface  
contamination, fortunately for beta and gamma, they are quite good -- I  
mean, in your favor. So, you could take a look at those and then you  
will find those most likely you may be able to meet those values.

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For alpha emitters, maybe you are not. Then, you will start

1 saying, okay, can I change the resuspension factor, what are the  
2 conditions. And you may possibly actually change, say, well, I do not  
3 have loose contamination, so I could change the percentage of loose  
4 contamination, instead of 10 percent, currently to something else. And  
5 then discuss with NRC staff and then you calculate your DCGL based on  
6 that specific conditions for your site. You may find yourself that you  
7 meet the criteria.

8 MR. BHAT: Now, where do you -- what is your -- where do I  
9 get the latest DCGL-W for the --

10 MR. ABU-EID: Okay. The DCGLs for surface contamination, we  
11 published, put out just a notice and a table with some common nuclides  
12 for beta and gamma emitters. And those are -- you know, those limits  
13 the -- those are the DCGLs for beta and gamma for surface contamination.  
14 And we are using them.

15 Now, for alpha emitters, unfortunately, we sent out just a  
16 notice that those values, they are very low and they are impractical  
17 sometimes to measure and they are within the fluctuation of the  
18 background. We understand because of the conservatism emitted in  
19 version 1 with the D&D screen code, So what we expect to do, that you do  
20 more analysis and further justification, if you need to go above those  
21 levels.

22 So, if you think that your limit is currently -- if you run  
23 D&D screen and find that you have practically no contamination and all  
24 within the detection limit, so maybe you could demonstrate that you met  
25 the current version of the D&D screen one and you are home free. If  
not, this means you need to do further assessment. Either you assess,  
as I said, the percentage of loose contamination for the soil or you  
assess the specific conditions for those small labs that you have. And  
then the limits -- these DCGLs, they could change. And interaction with  
NRC staff will help you a great deal.

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1 MR. BHAT: And I thought for beta gamma, you can use the  
2 NUREG 1500. That gives a fairly good concentration to --

3 MR. ABU-EID: No. Sorry to say, you are not up to date.  
4 The NUREG 1500 is superseded. It was -- now we have Version 1 of the  
5 D&D screen code. That's the code is for test, if it meets your criteria  
6 or the limits that you have, you believe it's okay. But, we know that  
7 it is conservative for the alpha emitters. So, we know that in advance.  
8 So, the beta and gamma emitters, we publish in a table and we just sent  
9 notice in October and those are the limits that you use.

10 Already the regions, they are using them. They are much  
11 above the value of the surface contamination. They are much above R-G  
12 1.86, which you are familiar with, I'm quite sure.

13 MR. BHAT: What is -- where do we get this D&D? Is it  
14 available now on the Internet?

15 MR. ABU-EID: D&D, yes. D&D screen codes are available on  
16 the Internet and you could acquire this immediately. You can download  
17 it, you know, using the Internet.

18 MR. BHAT: Another question is: is there any criteria how  
19 to measure the fumers and how to -- you know, what you should do? Our  
20 lab in the office, so fumer has to be taken out and thrown out by the  
21 rad waste.

22 MR. ABU-EID: Before releasing it, the surface contamination  
23 I gave you, you can use the surface contamination criteria for that.

24 MR. BHAT: And what about the duct -- how you go in the  
25 inside and take some whites and ducts --

MR. ABU-EID: That's correct; that's correct.

MR. BHAT: And the -- I see. All right; thanks a lot.

MR. ABU-EID: Nick, do you want to say anything?

MR. ORLANDO: Well, first of all, you need to be talking to  
your licensing office, whether that -- if you're in -- you said you were

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1 in Virginia. You need to be clearing all of this through Region 2, all  
2 right. We don't review the licenses up here, so.

3 The other thing is you may have some timeliness issues  
4 related to the -- some issues related to the timeliness rule. If you  
5 decided that you're going to permanently cease operations in that  
6 separate building or outdoor area, you have some notification  
7 requirements you have to make to us.

8 MR. BHAT: Yes, we have informed NRC that we'll be moving to  
9 another building and we are in correspondence with them.

10 MR. ORLANDO: Okay. Will they -- you need to talk to that  
11 office about whether you need to submit a decommissioning plan and what  
12 needs -- if you need to submit a decommissioning plan and what needs to  
13 be in the plan and what they're expecting to see, as far as surveys and  
14 whatnot.

15 MR. BHAT: Okay.

16 MR. ORLANDO: So, while what Bobby said is true about  
17 determining the DCGLs and everything like that, as far as the practical  
18 steps that you need to take next, you definitely need to be talking to  
19 the regional office.

20 MR. BHAT: Yeah. Okay, thank you.

21 MR. MCKENNEY: Anything else? Anybody else?

22 MR. CULBERSON: Dave Culberson. Just a comment regarding  
23 the agendas for this one to perform the ALARA evaluation.

24 MR. MCKENNEY: Yeah.

25 MR. CULBERSON: I know you and I talked about this and Nick  
and I did, as well. Many points that a fuel cycle companies were going  
to make were made this morning. So, we don't -- I'm not aware that  
there's any additional information. Earl had his slides and a lot of  
that discussion, I think, came out this morning, so there may not be a  
lot of additional information to bring out.

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1 MR. MCKENNEY: Anything else?

2 [No response.]

3 MR. MCKENNEY: We're going to cut out early. If there not  
4 any other comments, then I guess we shouldn't even have come back after  
5 lunch.

6 [Laughter.]

7 MR. MCKENNEY: Well --

8 MR. CULBERSON: One last time. Dave Culberson, again.  
9 Before we leave, I just want to thank you on behalf of fuel cycle  
10 facilities forum and fuel cycle members. You and Nick work closely with  
11 us on developing the outline for this. I think it was a good workshop.  
12 I apologize for putting you on the hot seat this morning, but I,  
13 personally, thought it was an excellent discussion. Both days, we  
14 covered a lot of material, a lot of ground. I compliment you on that.  
15 Any additional conversations like this, that feature workshops, we'd be  
16 happy to contribute in any way we can on the fuel cycle side. There are  
17 still very problematic issues from some of the cycle companies.  
18 Anything we can do to help stimulate discussion.

19 MR. MCKENNEY: Nick, what's the topics on the August  
20 meeting, because the June meeting is all groundwater, I think.

21 MR. ORLANDO: Right now, there's possibly three things we'll  
22 be going over, and I guess we need to flush this out over the next six  
23 months. Office of Research has requested the opportunity to come in and  
24 talk about comments that they've received on either D&D or/and the  
25 DG-4006. In addition, we think that there may be some merit in having a  
part of a workshop that discusses surveys. I got that from some of the  
folks in industry. And, finally, the CRCPD, Council of Radiation  
Control Program Directors, requested an opportunity to come in and  
present or participate in a big way in one of the workshops, to bring  
out agreement state issues and give their perspective on things.

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1           Now, I don't know if we can do that in two days or maybe  
2           that's a three day -- or excuse me -- we can do three things in two  
3           days. I mean, there might be enough stuff going on there that perhaps  
4           agreement state half day and comments half day and one day on surveys or  
5           some mix like that. So, I don't know. That's sort of tentative right  
6           now.

7           Any input from anybody, you know, between now and then, I'll  
8           take. You all got my e-mail address. Please, you know, fire it off.

9           MR. MCKENNEY: Yeah. I just point out that the next one we  
10          don't have an agenda for is the August meeting. And June 1 has been  
11          moved from the date that was put out in November and is now --

12          MR. ORLANDO: The 23rd and 24th.

13          MR. MCKENNEY: Twenty-third and twenty-fourth, and it's all  
14          on groundwater issues.

15          MR. ORLANDO: Actually, there's -- the 21st and 22nd,  
16          there's a groundwater workshop going on here.

17          MR. MCKENNEY: Also?

18          MR. ORLANDO: Sort of -- yeah. Both are being run by Tom  
19          Nickleson out of our Office of Research.

20          MR. MCKENNEY: So, you can get drowned with issues, if you  
21          come for long enough?

22          MR. ORLANDO: Yeah, I left some copies of the agendas out  
23          yesterday morning in the back.

24          MR. MCKENNEY: Okay. Well, thank you for coming and for all  
25          your comments.

          [Whereupon, at 1:30 p.m., the workshop was concluded.]

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