ORIGINAL

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: Briefing on Regulatory Responsibilities and Schedules for the High Level Waste Repository Program (Public Meeting)

Location: Rockville, Maryland

Date: Thursday, January 5, 1989

Pages: 1 - 82

Ann Riley & Associates
Court Reporters
1625 I Street, N.W., Suite 921
Washington, D.C. 20006
(202) 293-3950

DISCLAIMER

This is an unofficial transcript of a meeting of the United States Nuclear Regulatory Commission held on 1/5/89 in the Commission's office at One White Flint North, Rockville, Maryland. The meeting was open to public attendance and observation. This transcript has not been reviewed, corrected, or edited, and it may contain inaccuracies.

The transcript is intended solely for general informational purposes. As provided by 10 CFR 9.103, it is not part of the formal or informal record of decision of the matters discussed. Expressions of opinion in this transcript do not necessarily reflect final determination or beliefs. No pleading or other paper may be filed with the Commission in any proceeding as the result of, or addressed to, any statement or argument contained herein, except as the Commission may authorize.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

***

BRIEFING ON REGULATORY RESPONSIBILITIES AND SCHEDULES FOR THE HIGH LEVEL WASTE REPOSITORY PROGRAM

***

PUBLIC MEETING

***

Nuclear Regulatory Commission
One White Flint North
Rockville, Maryland

Thursday, January 5, 1989

The Commission met in open session, pursuant to notice, at 2:00 p.m., the Honorable LANDO W. ZECH, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

LANDO W. ZECH, Chairman of the Commission
KENNETH CARR, Member of the Commission
KENNETH ROGERS, Member of the Commission
JAMES R. CURTISS, Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

S. CHILK

W. PARLER

R. BERNERO

H. THOMPSON

R. BROWNING

J. TAYLOR

P R O C E E D I N G S

[2:00 p.m.]

CHAIRMAN ZECH: Good afternoon, ladies and gentlemen.

Mr. Roberts is attending a funeral of a close personal friend and will not be present with us this afternoon.

This afternoon the Commission will be given an information briefing by the Office of Nuclear Material Safety and Safeguards on regulatory responsibilities and schedules for the high level waste repository program. The briefing will primarily focus on the regulatory strategy that has been summarized in an information paper published in October 1988.

Last month the Commission was briefed separately by the Department of Energy and by the State of Nevada on their perspectives of the program. Subsequently the Department of Energy has met a milestone by submitting the Yucca Mountain Site Characterization Plan for NRC's review, submitted last month. Today the staff will provide a follow-up to those briefings as well.

Again, this is an information meeting. Copies of the slide presentation should be available at the entrance of the meeting room.

Do any of my fellow Commissioners have any opening remarks before we begin? If not, Mr. Taylor, you may proceed.

MR. TAYLOR: Thank you, Mr. Chairman.

I think from the staff side you have already

mentioned the submission of the Site Characterization Plan. That is an important milestone which the Department of Energy did meet its latest commitment to get in by the end of the calendar year and it was received by the staff. I will turn the details of the briefing over to Mr. Thompson.

CHAIRMAN ZECH: Thank you.

Mr. Thompson, you may proceed.

MR. THOMPSON: Thank you, Mr. Chairman.

If I could have Slide No. 2.

[Slide.]

MR. THOMPSON: With respect to the purpose of today's briefing, we are going to address it in the two parts as you identified. One is the follow-up with the State of Nevada and the DOE portion of the briefing, which I will address some of those issues. There are a lot of issues raised. We have kind of focused on what I thought were some of the key ones, and if the Commission would like to have some other ones they would like to focus on, we would be glad to discuss those at that time.

In looking at the key regulatory strategies, we have two aspects of it. One is I would say a lot of the paper focused on the rulemaking, the schedules, some of the key approaches that we are taking to prepare ourselves for our review. Another aspect of it is the performance objectives. This is probably one of the key challenges that are facing the

staff in conducting its review and the licensing aspects of the repository because this is where we will be shifting from our more deterministic approach that we have used for reactors into conducting what I would call a performance objective approach for our licensing determinations, both the staff's determination as well as DOE will have to be prepared to address those types of performance objectives.

Bob Bernero, who I think is the best person I know of to be able to kind of relate that to what we face in the reactor area as well as in ours, will be addressing that to some extent.

CHAIRMAN ZECH: All right.

MR. THOMPSON: So if I could have Slide 3.

[Slide.]

MR. THOMPSON: There were a number of key issues that were raised but one that we felt with the State of Nevada was one that was very important, and that dealt with their role and their level of participation in our meetings. I think it was Malachi Murray who indicated some concerns about being observers in the meetings, and that is the way our activities have been set up at one time, that we wanted to make sure they were always a welcome participant in our meetings.

As part of our activities, we had always welcomed their participation and, in fact, always requested their participation in meetings. In the past where they had not

participated it had been at their wishes to be observers and just to make sure they knew what concerns we were identifying with DOE.

I have asked Bob Browning, who has contacted the state directly, to make sure that they understood that they were clearly welcome participants. To ensure that that is done, we will always include in our technical meetings a time frame where we get specifically the DOE, I mean the State of Nevada or others to present their technical concerns and issues if they have any. It is not always that they expect to have any, but we want to make sure that it is part of our meeting agenda, part of the activities that we expect to fully include them in the consultation process.

I think they understood it. I am not aware of any concerns on their part about that, and I think the technical staff who we had been working with and interfacing with clearly have felt no inhibitions with respect to their participation.

Along the lines the State of Nevada also, I think, submitted -- I guess it was Nye County submitted to the Commission a statement on which they raised some issues. One of the issues they raised was with respect to the full participation of the states and resolution of technical issues, and we certainly intend to include that as part of our program.

I met with representatives of the state liaison program with each of the affected counties -- Nye County, Clark

County and Lincoln County -- recently earlier in December when we were out in the Licensing Board proceedings to make sure I had an opportunity to discuss with them their major concerns, their major issues, and that they understood our regulatory role. We have certain limitations with respect to their issues.

In particular, each of those counties had a major concern with respect to the transportation, so I went clearly and described our role with respect to our rules, regulations and certifications and the approach that I anticipated we would be taking, which would be a more limited role with respect to any site-specific routings of transportation issues since that has been specifically address in the legislation, and that would be properly addressed in DOE's environmental impact statement.

I think they appreciated the opportunity to discuss. They all may wish to address the transportation issue in their own right. I think it was a very useful -- I think each of the three meetings were very constructive and I felt it was very good, but I think it would be very helpful if we continue those types of meetings on a periodic basis probably at least once a year but maybe even more frequently if needed.

With respect to the Department of Energy and Sam Russo's presentation, there were two issues that I wanted to highlight. One dealt with their comments on NRC's ability in

providing comments on the exploratory shaft within 90 days, three months or that time frame.

That was a time frame that had been agreed to that we would make our best efforts to years ago when the approach at that time was they would have the exploratory shaft design information to us several months in advance of the actual site characterization plan. When we identified the problems that DOE was having with providing the complete design verification information with respect to the shaft construction activities, which Bob Browning will be discussing later on, that information, as you were told, is going to be provided to us in parallel. In fact, it is not part of the application yet. It right now will probably not begin until later January, so NRC's ability to complete its review of the shaft construction activities in this three-month time frame is not reasonable.

I met with Mr. Russo when he first came aboard and told him that that schedule was changed, and somehow I'm not sure that quite got to the right people on his staff that that revision was, in fact, going to be done. There is no way that the Commission, I think, would be in a position to sign off on the shaft construction activities in that accelerated fashion.

COMMISSIONER CARR: Does he understand that now?

MR. THOMPSON: He understood it then, I thought, and I wrote him a letter afterwards. In fact, on December 28th I sent him a letter, and I called him up on the letter. So I

don't think there is any doubt in his mind. I do remember when I was out with the Nevada office. I'm not sure the DOE Nevada staff may not still be wanting. What we will do is as we go through our review process if we see any major key technical issues we will identify them early on. We are not going to sit on them for seven months while we are looking at those. So if we have an issue we will identify it as early as we can.

COMMISSIONER CARR: Okay.

MR. THOMPSON: Likewise he had a concern about whether the staff comments were regulatory concerns or the staff opinions. I think we went through that fairly carefully with them that when it is signed out by our project director of licensing, John Linehan, or any individual who is in a management position above him, that reflects a regulatory staff position. Obviously, those positions are subject to appeal and changes as we any regulatory position.

Other concerns that will be addressed in technical meetings are ones which are legitimate technical dialogues when we will raise concerns, but they are not formal in the sense that would be one that would be documented. If we have a meeting, we will have minutes of meetings that will receive management review, and those will clearly establish what will be the official NRC staff positions on those issues.

So with that, there may be some others right now and it may be useful just to go through the briefing.

CHAIRMAN ZECH: Thank you.

MR. THOMPSON: I would like to turn it over now to Bob Browning to focus on what I would say is the key regulatory strategies, and then to Bob Bernero later to discuss the performance assessment aspect.

CHAIRMAN ZECH: You may proceed.

MR. BROWNING: Before I actually start in on my presentation, I would like to introduce some of the key staff people who are the backbone and sinew behind some of the issues we have been working on in the high level waste area. In particular, we will be briefing you on the SECY 88-285, which was the regulatory strategy document which the Commission requested us to submit, and I would like to introduce Mr. Robert Johnson of the staff.

CHAIRMAN ZECH: If you will stand up, please. Thank you.

MR. BROWNING: And Mr. Brian Thomas. They were the key staff people behind the effort to pull that paper together, which turned out to be an extremely worthwhile exercise both for the staff and, hopefully, for the Commission in terms of laying out the schedules under which we are operating, which will have to be flexible and change with time, but at least you can see where we are now, what we are operating to, and you will be able to detect any changes from that baseline.

All of that is entirely consistent with the five-year

plan for the Commission, so it is all consistent: the five-year plan, the budget process. Everything is going to fit together starting from that regulatory framework.

In the quality assurance area, which is one of the key technical concerns behind this whole program, Mr. Jim Kennedy of the staff heads up the QA group, and I would like to recognize his contributions in that effort. In the key area of performance assessment, which Bob Bernero is going to be talking about, I would like to introduce Mr. Seth Coplan, who is the section leader in that particular effort, which is key to understanding and deriving how this whole site should be investigated and the data collected in order to permit performing the ultimate performance assessment.

I would be remiss if I didn't mention the presence of the research staff. Mr. Silberberg is representing Research. They are an absolutely essential element in making the performance assessment capability within the staff work. I have to say the degree of participation and cooperation between our research staff and our licensing staff within the Division of High Level Waste Management is absolutely superb. It couldn't be better. I'm extremely happy with it.

Could I have Slide No. 4, please.

[Slide.]

MR. BROWNING: At the request of the Commission, we did develop SECY 88-285, which lays out the overall strategy

that the staff has been and is continuing to pursue, with key emphasis on the pre-license application phase, which is sometimes referred to as the informal phase. DOE is not a license applicant at this stage, and until they submit the license application, by law and by regulation it was designed to be a relatively informal process by which the staff could provide guidance to DOE with the very close interaction on the technical basis to make sure that this first of a kind undertaking is well understood at the earliest possible stages so that the agency would not be in the position of getting a license application and finding basic fundamental things wrong with it which would require DOE to go back and do extensive work over.

This strategy is laid out in that paper. The key elements of it are to identify uncertainties that are potential licensing issues, determine if there are things that can be done at this stage or during the pre-license application phase to reduce those uncertainties, help ensure that DOE does submit a complete and high quality application, which currently is scheduled for 1995, and ultimately help ensure that the construction authorization decision which the Commission will have to make can be made within the Nuclear Waste Policy Act's requirement of a three-year time period.

Could I have slide 5, please.

[Slide.]

MR. BROWNING: As part of your package, we have included what is labeled in the right-hand lower corner as back-up slides. Unfortunately, we have a scope that doesn't permit projection onto the TV screens, so we provided enough copies for the audience, and from time to time I will refer to those back-up slides for additional amplification of what I am talking about.

With regard to slide No. 5, back-up slide No. 1 in your hand-out is the level 1 schedular milestones that were included in the SECY paper. These are the commitments that are imbedded in the law and in our regulation and in DOE's current production schedule that are the key driving elements of all the prelicensing schedular efforts for subsidiary activities that the agency and DOE are involved in.

I would like to point out that the key driving element in this particular phase -- concentrate on the prelicense application phase -- is the -- sort of up at the middle where you have a flag in the 1995 timeframe, submit license application to construct a repository. All these schedular efforts are designed to permit that to happen and have DOE give us a complete and high quality license application at that time.

Backing up from that, DOE has said in order to start preparing that document, they really need all our guidance in as firm a form as possible by 1992. So we really have to move

back several years from the 1995 timeframe and try to focus all our prelicense activities on the 1992 timeframe.

Referring back to slide No. 5, we have highlighted on the slides that are projected on the screen some of the key schedular elements that are imbedded in this level 1 milestone schedule that was in the SECY paper.

One of the key dates for doing this is the 5/89 date by which DOE wants to start surface preparation for the exploratory shaft. Exploratory shaft is the shaft that would require people access to the depth at which they plan to put the repository.

MR. THOMPSON: Bob, before we move on past that, we might just want to show that DOE did manage to get the tractor trailer truck up here to get the site characterization plan and submit it to us. It's 7000 pages, eight volumes, but they did, I think, a very useful thing, and that was to take all of NRC's concerns and comments and provide a roadmap to where DOE and how DOE had addressed our concerns on that. So I thought they did a very good job in that. Of course, we will have to review and see if we agree with the resolution of the issues. But it certainly has made the regulatory review aspect a good bit better on that.

CHAIRMAN ZECH: Good.

COMMISSIONER CARR: But the design analysis didn't come with that?

MR. BROWNING: Did not come with it.

COMMISSIONER CARR: Did not.

COMMISSIONER CARR: When do you expect it?

MR. BROWNING: Some time before the end of January. At the earliest.

COMMISSIONER CARR: Okay.

MR. BROWNING: With regard to the high level repository milestones, the 7/89 date, we are due to issue the -- I'm sorry, NRC would issue the site characterization analysis. This would include comments on the ESF, as Mr. Thompson mentioned; although, as he also mentioned, if we find any major problems either in the site characterization plan or in the design analysis document, that basically justifies the Title 1 design of the current ES -- the shaft design that's embedded in this document, we would, of course, bring those to DOE's attention at the earliest possible opportunity, independent of the final analysis of the entire site characterization plan.

And, of course, the next date is a key date for DOE as the 11/89 date for starting exploratory shaft construction. As Mr. Russo mentioned, this represents a five-month delay from the original schedule that was included in the draft mission plan amendments earlier this year. That delay was to accommodate the need to have a fully-qualified QA program in place by DOE before they actually started major site

characterization, of which sinking the shaft clearly is a major site characterization step. And I'll get into the QA program in a little bit more detail later.

COMMISSIONER ROGERS: And just before you go on, the SCA, that's based on the site characterization plan?

MR. BROWNING: Yes, that is Staff's analysis of the acceptability of this plan.

COMMISSIONER ROGERS: Okay.

MR. THOMPSON: It's just like a Safety Evaluation Report in the reactor aspects; it will be reviewed, as you know, at your request, by the Advisory Committee, and then it will be presented to the Commission for review prior to formally adopting it, though it will be available in draft form early on.

COMMISSIONER ROGERS: I was just curious as to why you didn't call it the SCPA, instead of the SCA. It would follow more -- that's what it is.

MR. BROWNING: It just happens to be what's in the regulation; that's what it is.

COMMISSIONER ROGERS: I see. I see. Okay.

MR. BROWNING: Continuing on slide No. 6, please, some additional key dates which are a tie-in for subsequent discussion during the presentation.

On December '90, EPA is currently scheduled to reissue the Final Environmental Standard for the high level

waste repository. They are currently projecting they would issue a proposed standard one year from now, and then the final standard by 12/90.

I have already mentioned the 1992 date by which DOE has said they would prefer to have all their guidance issued to them, and that is the date by which we are controlling most of our guidance document generation schedules to.

And by 10/93, DOE would issue the Draft Environmental Impact Statement, and March 1985, submit the license application to construct.

Now one of the key elements of our regulatory strategy was to develop guidance for DOE and, of course, the ultimate level of guidance in our hierarchy of guidance documents is rulemaking, is almost the most resource-intensive, and therefore requires a lot of care and attention to make sure we are focusing that kind of level of resource expenditure on something that really is going to have some benefit in the long run.

As we indicated in the earlier Commission paper, and in the strategy document, the Staff currently has three rulemakings that are actually underway that you should be seeing final rules within the near future.

All of those rules are through the proposed rule stage. They have all received comment, and the Staff has in the final moves to issue them as proposed rules. Two of them,

OGC has the lead, one of which is the negotiated rulemaking on use of the licensing support system. Another is the procedures by which NRC would adopt DOE's environmental impact statement, which we believe is the final rule that we have to issue to bring ourselves in full compliance with the Nuclear Waste Policy Amendments Act, and the last, which hasn't really been included in any of these papers, but which is being handled on a separate time scale, is the disposal of the Class C low level waste, which you should be seeing by -- if we maintain the current schedule, it would be by June '89.

So all of those are currently well identified rulemakings that are well into the rulemaking process, and the Commission should be seeing proposed rules for approval within the next six months.

We also identified seven other proposed rulemakings. We haven't actually committed to make rulemakings on those, but I think our best estimate is that they probably would all be worth doing rulemaking.

One additional element that we want to take into account is we've had our new Center for Nuclear Waste Regulatory Analysis doing an independent review of our regulation and the uncertainties that they see in that -- in our regulation. They are coming up with an independent list of things that they think might warrant consideration for guidance, whether as rulemaking or technical positions or reg

guides, and we want to take that into account in our process of deciding exactly how we can best expend our resources and effort on removing some of the regulatory uncertainties associated with the current regulatory scheme under which this whole program is proceeding.

COMMISSIONER CURTISS: What's the schedule for the center?

MR. BROWNING: The center should be in before the end of this month. They were originally scheduled to get it to us in December. I received a briefing earlier this week on how they were coming, and they've committed to have it before the end of this month. We do want to take that into account, and our time line schedule that was included in the strategy paper will allow us to take that into account, and I think still adhere very closely to the schedules we laid out in the original SECY paper. So I don't -- right now I don't anticipate any delays in our rulemaking effort that we have currently identified that we want to undertake.

Could I have slide No. 7, please.

Now with regard to the DOE QA program, as you are aware from previous briefings and from the briefing that Mr. Russo gave you recently, DOE has committed not to start new site characterization until an approved QA program is in place. That is a monumental job, as would be evidenced if you look at slide No. -- back-up slide No. 3, which is not reproduceable,

apparently, on the screen.

We showed you this organization chart before to illustrate the number of contractors DOE has involved in this process. Each of those contractors has to issue, under the current arrangement, a separate quality assurance plan, and it all has to be consistent with the headquarters plan and the Nevada Project Plan.

There are other activities that have to enter into this, which are not shown on this chart, in order to simplify the point I'm trying to make. For example, this does not show the two glass factories at West Valley and Savannah River where QA is important, and will have to be addressed, but not quite on as urgent a time scale as this effort, and it doesn't yet include the new integrating contractor that DOE would be bringing onboard.

COMMISSIONER CARR: This is Bechtel, et al.?

MR. BROWNING: Bechtel, et al. There are a lot of other contractors that are associated with Bechtel.

COMMISSIONER CARR: Where do they fit in here, between --

MR. BROWNING: I'm not really sure. That's why we didn't show it. I think it's going to report somewhere -- it will report to the headquarters, the top box, the Office of Civilian Radioactive Waste Management, so it would be in that area, rather than down here. But exactly how it's going to

interject into all these other efforts, I really don't know at this stage. That shouldn't affect the immediate implementation of this, because the contract hasn't actually been placed yet, as I understand it. They've just selected who the contractor is going to be --

MR. THOMPSON: Yes. I understand their role really won't take effect until after they've got the site characterization plan approved, and started the exploratory shaft. I think they're going to take a major role after the exploratory shaft has been started.

MR. BROWNING: Now when we say an approved QA program which should be in place, if you'll refer to back-up slide No. 4, this is a chart that was worked out between the Department of Energy and ourselves as an approach for DOE to conclude they had a program in place and for us to interject into that process so we could get to the position to say we agree. It's just an approach, it's not necessarily the only approach for doing this.

This was the approach that was agreed upon in July of last year, and to illustrate where we stand, we blacked in the dots where things have actually happened, so anywhere where you see a black dot is something that happened.

Basically we have approved the DOE programmatic documents, or will very shortly, and we have approved the Nevada Site Project's QA plan. That's a major step, because

all these other plans have to be consistent with that plan, that's the driving plan, and ideally we may not even have to look at the other plans if we were to accept at face value that DOE had made sure they were all consistent. But we have committed to try our best attempt to try to clear that hurdle early in the game, including reviewing the paper. But the devil is in the details, and the details are the contractor's implementing those plans.

So, first of all, the plans aren't really approved and in place, and therefore you can't really run an audit or review to make sure people implemented the plan. If I remember correctly, Commissioner Rogers mentioned in the last briefing the problem of training people. That's an element that has to yet be done, and it's a major effort, because a lot of these facilities are not used to a regulatory quality assurance plan. So DOE has a tremendous challenge ahead of them.

Now if you look at the schedule, this was laid out in order to support the key production step that DOE would like to be able to do, namely sink the exploratory shaft in June of 1989.

As I mentioned earlier, DOE has slipped that five months to allow the full implementation of this particular approach. So if you'll just slide that whole thing over, it would look like there's still -- it's still feasible to do that.

However, the key element is going to be in the implementation stage. So it's a major effort, and I think everybody could judge for themselves, to some extent, whether they'll be able to pull it off or not. If they do, it's going to be an absolutely major achievement.

Right now, I do not see us being in a position of limiting any of this effort, primarily because the Center for Nuclear Waste Regulatory Analysis has been able to provide, if we need it, some additional qualified QA people to help us do the kinds of observation audits and checks that we need to do to pull off our particular part of this production QA schedule, if you will.

MR. THOMPSON: I guess I would comment, though, we did schedule -- you know, have a time sequence in that schedule, because we can't take all eight of them and do it at once.

MR. BROWNING: Yes, you will notice there are about two per month.

MR. THOMPSON: Right. So looking at our resources, though, we can supplement somewhat DOE -- and we were very clear on that -- that we needed some kind of sequencing to be able to review them. Part 1's, we just made a proposal, for instance, that Phoenix and System, et cetera, would be one of the first ones, because it made sense to us, and so we laid out an approach that looked like we put the priority on the ones

that would be needed first, and then work it through.

So that's what we are looking for, but we are concerned because of this slippage -- and I guess we have got a meeting set up fairly soon.

MR. BROWNING: But if the schedule not only moves to the right, but also becomes more vertical rather than tilted, we may end up having a problem, and therefore we'd have to try some other approach to accomplish the same means, go to some kind of a sampling plan, if that production data, sinking the shaft, you know, were to stay absolutely fixed.

COMMISSIONER CARR: But on that bullet there that says agree on the new schedule, all we have agreed so far as I understand it, is they don't start their shaft until all this is clean?

MR. THOMPSON: That's right.

MR. BROWNING: Well, if you can work out some other kind of arrangement, so --

MR. THOMPSON: This is one acceptable way to us, to make sure the right programs were in place. There could be some programs that didn't need to be fully implemented, but those parts related to the shaft that needed to be "in place" at the time. So the ideal way to do it is have everything clean, but there is no regulatory requirement because DOE has agreed that we ought not to start major activities on the exploratory shaft until the system is in place to support that

activity.

MR. BROWNING: For example, it may very well make good sense to kind of bite off a piece at a time on key programmatic elements that are necessary to allow something to happen. The sinking the shaft is a very complicated one, and obviously the best approach is to have everything in place, and everybody agree it's perfect before you do it. But the thing that ends up being a problem, you can't really audit the implementation until somebody is doing something. So you got to work out something where you start doing something and check how it's being done. You can't just say, yeah, I want perfect paper, perfect paper. You got to start doing something and check the implementation of it.

I think we are having the meeting on January 25th for DOE to propose how they plan to modify this approach to accommodate the new production schedule. I assume that will be an iterative process of us trying to manage our resources so we can support the effort to the best of our ability. It may end up being that they are going to have to delay some more. That's a possibility.

[Slide.]

MR. BROWNING: The words on this slide are words that should be familiar to the people that went to the session with the Licensing Board in Las Vegas, because these are the same words DOE used to describe the objectives of the site

characterization program.

In this briefing, we will emphasize the last bullet, which is to provide data needed for the performance assessment of the repository system, Mr. Bernero's piece of the presentation will emphasize the importance of that aspect in implementing the site characterization program.

[Slide.]

MR. BROWNING: We have already mentioned that the site characterization plan is in-house. The staff issued its review plan for the plan for taking an integrated technical team to look at this document, incorporating all the lessons learned in doing the review of the draft site characterization plan. We should have a much improved process for reviewing this document compared to the process we had when we reviewed the draft site characterization plan. We learned from that experience.

One of the key things we learned was we could do a better job with integrating all the technical comments. Commenting on the draft SCP. We limited the staff to a two month turn around time on it. Do the best job we can within a two month period. It turns out that amount of time did not allow for adequate or as good as possible technical integration. We have included time in the current review process for a much more thorough technical integration of other technical disciplines challenging the conclusion that one

technical discipline has come up with. I think that is going to result in a much improved review product this time around.

It would be nice if we could just focus our review on how DOE responded to our comments. Fortunately or unfortunately, they made a lot of other changes other than just reacting to our comments. It won't be as focused as just following up on whether they resolved our comments. We are going to have to take a look at the complete document and make sure there aren't new issues that have arisen because of other changes that were made to the document.

COMMISSIONER CURTISS: When you reviewed the SCP and the areas you talked about before where regulatory uncertainties have been identified or may subsequently be identified in the effort at the Center, are there instances where the resolution of the uncertainty would have a bearing on the comment that you either did make on the CDSCP or on the SCP?

MR. BROWNING: Based on the briefing we received, I don't think so. I'd like to reserve judgment on that until we see the final product and we will be factoring that final product into how we review the site characterization plan.

It is unfortunate that getting the Center on line and the production effort aren't on a better track. We have taken steps to try to accelerate the Center to get it on track. The changes to the nuclear waste policy amendments in the Nuclear

Waste Policy Amendments Act are focusing on one site and had an effect of DOE accelerating their process on the Nevada site, at the same time we are converting over all our technical assistance and research work to a new contractor. The timing is unfortunate but that's the world I live in. I think we will be able to get the two on a consistent track.

I honestly don't think so, but I'd like to re-visit that after we get the formal document from the Center.

COMMISSIONER CURTISS: Just one other question on that point. Obviously the schedule for addressing the uncertainties, particularly in the area of rulemaking, is going to take much longer than the time you have to comment on the SCP. If there are areas where the regulations lend themselves to interpretation or there are uncertainties that need to be addressed, is there a process in place to identify those and surface the resolution or choice that is made in your comments on the SCP?

MR. BROWNING: Yes, I think we have actually done that. For example, one of our comments was that DOE was not properly interpreting our regulatory requirement on substantially complete containment for the waste package. We raised that as a comment. In fixing that, they have said they would change it to be consistent with our interpretation. We also identified that because of that inconsistency, we elevated that to a potential rulemaking.

I guess you could argue if DOE agrees with us and does what we think our interpretation is, you could say there isn't a need for rulemaking. Then you at least have DOE and NRC agreeing, but then you have the problem of does the state agree, does the public agree, does the other interested parties agree and therefore, it may tilt you in the direction of deciding to go to rulemaking any way.

COMMISSIONER CURTISS: Rulemaking would make it binding for the hearing, wouldn't it address that issue in a final way?

MR. BROWNING: Right. That's the advantage of the rulemaking. We are told it is the only way you can really expect to eliminate that, in the hearing process.

COMMISSIONER CURTISS: What we should expect to see in these areas where you have identified uncertainties in the earlier October SECY paper, where those have been addressed already, is the staff's recommendation for rulemaking to incorporate the position that you have taken to date on those issues.

MR. BROWNING: That's right.

MR. THOMPSON: One thing the Center is doing is they have the opportunity to interact with DOE, the State of Nevada, identifying these areas of regulatory uncertainty which may be appropriate for rulemaking as part of the process. The process is ongoing and iterative in the sense of do we have a way to

identify these areas of uncertainty. The process is there. We have done it in a less formalized way in identifying the ones we have done to date.

COMMISSIONER CURTISS: Okay.

MR. BROWNING: The only other thing I'd like to highlight on this particular slide is the potential scheduler, appearance of the scheduler problem between ourselves and DOE where DOE wants the comments on the shaft within a 90 day timeframe and our current schedule says they will get them with the site characterization plan analysis, that will come out in the July timeframe. We have already discussed that. If there are any major problems, we will be identifying them to DOE.

I don't think that will end up being a real problem but it may be perceived by the public and other people, newspapers, as a potential disconnect. DOE is saying they want comments within 90 days, if they don't get them within 90 days, they are not going to be able to do anything with them. I think the delay to sink the shaft until November does allow us to get our analysis out in July and we can still factor that in, provided we have identified any major problems independent of the site characterization analysis.

COMMISSIONER CARR: On either the analysis or the plan?

MR. BROWNING: Yes, sir.

[Slide.]

MR. BROWNING: I think we have already touched on most of the information that was to be discussed in connection with this slide. We haven't talked about the acceptance review. Built into the schedule is a four week acceptance review at the front end of receiving the site characterization plan. That would include and will include a review to make sure we will have all the necessary reference documents. I might add in addition to this document, the reference documents fill practically the width of a room down in the basement files. Sometime if you are down there, you can ask them to see all the high level waste references. It is probably the only place that would support the weight of all that documentation.

The importance of that is the site characterization plan, even as voluminous as it is, does not include a lot of the key technical details that you need to know more to understand exactly what is going on. That is why the references are very important.

There is also what is referred to as study plans. These are detailed implementation of the broader kind of requirements that are laid out in the site characterization plan. In order to complete the shaft sinking part of the site characterization plan, they do need to give us something like five study plans that detail the detailed geologic testing that is going to be done in parallel with sinking the first shaft.

The first shaft is not just a production thing to get

down to depth as quickly as possible. It is also a very detailed scientific study as they go down through the first geological layers to the potential repository horizon. I think that is another aspect that we have not yet seen.

COMMISSIONER CARR: When are they going to send those?

MR. BROWNING: That should be this month also. I don't have exact dates.

As Mr. Thompson mentioned, at our request, they gave us a road map so we can follow how they responded to our concerns. I think a quick initial survey through this gives the impression that overall they have been extremely responsive. Again, the details between what they say they have done here and what they have actually done there, as a skeptical regulator, we are going to reserve real judgment until we finish the review.

They also have a more manageable document that kind of describes in a brief overview exactly what the whole document says. This is the kind of thing I like to read because it allows me to figure out what I really want to read in that document and then they actually have a little public handout that describes what the site characterization plan is and how to use it and how to get copies.

I think they have done, as far as we are concerned, they have given us some good tools in order to help us in our

effort on reviewing this plan and at least on a very initial survey of how they have indicated they are going to resolve our concerns, you get the impression they have been responsive.

[Slide.]

MR. BROWNING: This is a bar chart to show how the various elements of the review will take place. The 30 weeks translates to July 28, 1989, to actually issue the document. At the Commission's request, we have scheduled a review by the Advisory Committee on Nuclear Waste of our proposed site characterization analysis. Then we have to incorporate how we have resolved their comments when we send the proposal to you.

We clearly intend to get the Advisory Committee involved early in the process. We think one of the lessons we learned from the last time around was it is very difficult for them to react to something when we have taken a long period of time to produce something and then we hand it to them and say, give us your comments instantaneously.

One effort which DOE is going to help us with is DOE has scheduled a briefing for the Advisory Committee on the document and what is in it so that the Advisory Committee can have whatever independent review they want to do of selected portions of this, kind of going on in parallel with our review. We will not be hitting them cold at the tail end of this process, as you might interpret from this chart.

We also intend to have an interaction with the state

throughout this process on some kind of mutually agreeable time table that will still allow us to meet our production goals.

COMMISSIONER CURTISS: How much time is there for Commission review?

MR. BROWNING: Two weeks.

MR. THOMPSON: We will cut it down if you would like it shorter.

COMMISSIONER CURTISS: I was going to ask is it possible to submit it at the same time that you submit it to the ACNW?

MR. THOMPSON: Sure. The one thing that I think you had previously asked for was to make sure they were involved in the process, so that would be very reasonable to do. We can provide a copy at the same time we go to the ACNW. In fact, we can probably brief you even earlier if you like.

MR. BROWNING: What I just said would go for whatever input you would like to have, to facilitate whatever your review would consist of.

COMMISSIONER CARR: What goes on in the internal QA?

MR. BROWNING: That's things like the technical integration review, management review, independent review of areas that appear to be contentious that the staff at their own level aren't able to resolve. It is that kind of process. If there is any area for squeezing down this thing, that is the area that has a potential.

COMMISSIONER CARR: That is still done by our staff?

MR. BROWNING: Yes, me and my immediate management.

CHAIRMAN ZECH: Proceed.

MR. THOMPSON: It has been said that Bob Bernero has never been at a loss for words. He has recently contracted or contacted laryngitis a bit but I do believe he is sufficiently recovered to be able to proceed. If not, I will be able to give you some support over here.

MR. BERNERO: Thank you. My apologies for the poor voice. This is a subject that I feel an intense interest and concern in, the subject of performance assessment. As I will relate to you a little later as we go on, the analogy to reactor probabilistic risk analysis is very strong and its use in regulation is very important here in the high level waste arena.

To begin the discussion, I'd like to have slide 12, please.

[Slide.]

MR. BERNERO: In order to talk about performance assessment, you really have to talk also about performance standards. They exist. We have performance standards of a quantitative nature and they come from two basic sources, the EPA standard, the regulatory requirements spelled out in 40 CFR Part 191, and then we have corollary requirements that are spelled out in NRC's own regulations, 10 CFR Part 60.

I mention here in this slide you can see the words that the 40 CFR Part 191 was remanded by the courts and is back being worked on. We have discussed this before with the Commission. I am going to talk about it next. I'll explain why it was remanded and why we think we can continue to work with the standard and with EPA's effort to correct it.

COMMISSIONER CARR: Is that the 12/90 date when we think EPA is going to get the revision out?

MR. THOMPSON: Yes.

MR. BERNERO: Right now, yes.

[Slide.]

MR. BERNERO: If you look at slide 13, these are the key regulatory requirements, the provisions of the EPA standard. First of all, they have limits on radiation dose, pre-closure and it is a familiar term, the 25 rem whole body, they have very specific individual protection and groundwater protection requirements, and if you go into their standard, 40 CFR 191, the individual protection is the 25 millirem per year, however, in the groundwater protection area, the concentration of radionuclides in the groundwater is limited a number of ways, including 4 millirem per year in the groundwater. That was one of the bases for remanding the standard. The court said there is an apparent contradiction there of having two standards.

There was an additional procedural reason for the

remand, that is that the groundwater part of it, the 4 millirem per year part of it, was not in the proposed standard. It appeared in the final standard and the court held there was not adequate opportunity to comment.

The key parts of the requirements are the releases to the accessible environment. In your back-up slides, there is a table, back-up slide number five, far too voluminous to project on the screen, and what that is is the essential character of the EPA standard. You will see it is a table by radionuclide and that table for a pro rata amount of high level waste, it is per thousand metric tons of heavy metal, there are so many curies of each radionuclide that are set as the limit for release over a period of 10,000 years.

The EPA standard has two levels of probability associated with that in order to have a risk aversion built into it. The EPA standard says there shall be no more than one chance in ten of exceeding that table over 10,000 years and in addition, there shall be no more than one chance in 1,000 of coming out ten times higher than that standard.

You see quantitative, specific standards related to time, a very long time. This gives you one of the first and most important sets of performance criteria.

[Slide.]

MR. BERNERO: Let's look at how the NRC's standards are given. NRC has 10 CFR Part 60 which was promulgated by the

Commission years ago and it takes a defense in depth approach and as you saw from the discussion of rulemaking, we will also conform to the final EPA standard. We have a dual approach, a complementary approach of defense in depth for pre-closure and post-closure limits.

The pre-closure limits are relatively straightforward, the limits on releases are the same as in Part 20 and in the EPA standard, and retaining the option to retrieve waste, the nominal period is 50 years after the start of emplacement. Should in the process of emplacement some terrible information be obtained about the physical nature of the repository, the ability to pull the waste out is retained.

More importantly, let's turn to slide 15, please, and look at the post-closure requirements, because these are the tough ones.

[Slide.]

MR. BERNERO: This is where the NRC regulation develops its own set of complementary quantitative performance requirements. The waste package lifetime is defined in our regulations and that waste package lifetime is 300 to 1,000 years. This is the man made part of it, the can.

In addition, our regulations call for substantially complete containment and in that definition, the releases from the engineered barrier system, and this is everything that is man made or man filled, so it could be a can or a multiple

container, and it can also include the physical emplacement of it, perhaps with absorbent materials, clays of some sort. The releases from the engineered barrier system are spelled out, that after 1,000 years of decay, still no more than 10 to the minus five fraction per year of any nuclide will get out, per year. That is a very small fraction. One part in ten to the fifth per year release after taking into account 1,000 years of decay. It is a rather strict limit.

Separately, 10 CFR Part 60 requires that the pre-emplacement groundwater travel time from the disturbed zone, that is where the hole was dug, out to the accessible environment, which is really something like a site boundary, that groundwater travel time shall be a 1,000 years. You can see how this building of layers of a high integrity can, a high integrity engineered barrier system, and a complementary degree of isolation for groundwater travel time, they all build to the essential finding. The essential finding is for the NRC to say this repository promises sufficient isolation of high level waste. That finding is parsed into individual findings, quantitative in nature, that we believe that because the waste package lifetime, the engineered barrier system, the groundwater travel time and each and every one of the EPA standard elements are satisfied.

COMMISSIONER CARR: When does closure occur?

MR. BERNERO: Closure of the repository itself of

course would be over perhaps 20 years or 25 years of emplacement. During the emplacement, as canisters would be say put in a hole, they can be backfilled and galleries backfilled.

COMMISSIONER CARR: The 50 years starts for each one when it goes in or after the --

MR. BERNERO: The 50 years starts at the beginning of emplacement. The Commission can adjust the 50 years. Actually, if you look at a salt repository, we don't have one here, we have tuff, but if you are looking at a salt repository, the creep rate of salt is so high that at the end of 50 years, the whole thing would have puckered back up. You are really mining the stuff out as retrievability.

With the stone, tuff or something like that, it is a much lower rate of creep.

This is the key that we have of fundamental finding of sufficient isolation. It is built on a whole series of regulatory requirements that are quantitative in nature. How do we test these?

[Slide.]

MR. BERNERO: Here in high level waste, we speak of performance assessment and to a fair degree, you can consider it synonymous with what you hear when the reactor industry is being discussed as probabilistic risk assessment, especially the latter part of it, the containment events analysis.

This term "performance assessment," appears

explicitly in the EPA standard and it is basically quantitatively evaluating natural processes and engineered components for system behavior. Remember, in this arena, one looks at what you think is the right scenario but you also have to consider alternative scenarios, because of the long time period involved.

You have to consider the possible sensitivity to changes, vulcanism, seismic activity, climatic changes, things like that.

In order to get a feel for this, there is one back-up slide I'd like to put on the screen in order to use this pointer, back-up slide six. I think you will find it useful if you look at it in your own copy.

[Slide.]

MR. BERNERO: The reason I need it on the screen is to guide your eyes. This is a conceptual hydrogeologic section of the Yucca Mountain repository taken from the consultation draft of the site characterization plan. I've got the arrow over here on the repository horizon, get a feel of that scale, if you will.

That level gallery there that is indicated is where the high level waste is. On this figure, you can see in cartoon depiction, many of the mechanisms that are at work here. You see these little tiny arrows here pointing downward. This represents the groundwater, the rain, the precipitation as

it percolates down through. Remember, this is an unsaturated soil. Yucca Mountain does not have saturation conditions in it. The water is modeled as coming down and penetrating through the soil to go down.

In heavier character, down here you see aquifers, groundwater going below the repository. You see here this barrier, CHnv, CHnz, two distinctions. You recall in the comments on the characterization plan, consultation draft, one of our major objections was the desire of DOE to drill a hole through that. That is the Calico Hills' deposit. We said, you better have a good reason or think carefully about penetrating that barrier, it is a significant barrier, because the groundwater flow is below it and perforation of it can be significant.

Look at the complexity. The geologic age of those two things is not identical. The Calico Hills' deposit is itself not homogeneous. It has a different character. If you look off to the right of this figure, you see all these other discontinuities, their fissures, their cleavage planes, their possible pathways for water and in evaluating the repository, we must have a performance assessment which quantitatively models every feature on this and also considers alternative outcome, alternative sensitivities in order to make those findings we need to make.

We are confident that for 10,000 years, we will meet

these quantitative standards. You can see the complexity of it.

One analogy that comes to mind when I look at this, you may recall, you have discussed this in the reactor arena before, if you look at a containment, a pre-stress, reinforced concrete containment building for a PWR, it is a very complex structure. It has a lot of tendons in it and reinforcing bar and a liner and certain stresses. You know exactly how it was built. You have drawings showing every last reinforcing bar. You know how complex that is to analyze for the physical performance under beyond design basis stress.

Look at this as sort of a pre-stress reinforced concrete containment, only you don't know exactly how it is built. You don't want to excavate the whole thing to find out, you will destroy it in the process. You want to drill carefully, excavate carefully, characterize it sufficiently and then model it not for a short term beyond design basis event, but model it for a 10,000 year period. That gives you a feel for the difference in performance assessment for high level waste and probabilistic analysis for reactors.

[Slide.]

MR. BERNERO: If you go into a performance assessment, you are basically saying what can happen to the repository, what features are there and how does the water flow through and how will the waste behave and how will the waste

corrode the can, so you are going to say what can happen, identify the processes. You are going to combine them into scenarios, determine the likelihood, how likely is it.

I would point out that if you read the EPA standard, it sets those limits that I referred you to in that table. Those limits are set for the future for foreseeable events. The only thing they say in their standard is you don't have to consider human intrusion or unlikely events.

One of our rulemakings is to pin down what is foreseeable and what is unlikely. You must consider the uncertainties in your knowledge and consider alternate scenarios. Once you have that, you consider these probabilities, screen out the implausible ones and then do your predicted models. You use the data you have on the site and you calculate the consequences. You do it from beginning to end. You do it for the waste form in the package. You do it for the engineered barrier system and you do it for transport right through the geological setting out to the accessible environment.

COMMISSIONER CURTISS: Is the linchpin for this what is considered to be an unanticipated process or event or an anticipated process or event?

MR. BERNERO: That is how you are going to screen.

COMMISSIONER CURTISS: That is the first bullet on here?

MR. BERNERO: Well, how likely is it. You are going to screen out what scenarios should be considered to meet the EPA standard and you will also consider the likelihood of other scenarios that could totally upset the thing.

Our rulemaking on how to consider that is an important one, to pin down what are the ground rules for that.

Now, to illustrate this iteration, if you look at back-up slide seven in your package, there is a logic diagram that we have put in that might assist you to see how this chain of thought goes. It is just basically a thought process starting with the mined system description. If you look at that slide, what can happen to the repository and how likely is it comes down through the lefthand blocks, scenario screening. You are identifying scenarios, screening it by probability.

If you want to know what are the consequences, the analytical work of doing that, you go to the righthand block, which is consequence modeling. This is where you plug in your current value for waste form, the waste package subsystem, the materials, the seals and the geosphere. That is there. Where is the water going, how fast is it going, what do you know about it and right out to the biosphere and health effects.

Then, when you compare with the regulatory standards, that is your performance measures right in the middle of that logic diagram.

This describes an iterative process and that

iterative process has to begin right in that document over on the table, the site characterization plan. What you are doing, DOE is doing, is saying for good reason, we think Yucca Mountain is an acceptable repository and the basis of our belief is our first and second and third cut performance assessments that indicate it will provide sufficient isolation, that it has geologic features that with our proposed engineered features, combined, to satisfy the performance requirements.

In order to do that process, the final one for licensing, they have to go into the site characterization plan and develop the logic for this kind of thought process to say, what information do I need about the site and how well do I need to know it, in order to do a sufficient performance assessment later. I do it now. I do an iterative process. An analogy that is useful, this Commission has promulgated rules that say in future, reactors will be designed with probablistic risk assessment. You don't finish the design and walk away from it and have a bunch of wizards come in and assess what the result is. No. In the design process, you assess and you look for vulnerabilities and you strengthen them, you iterate and that is what you have to do here, only the iteration, you have only a limited design variability. The man made part is pretty small.

COMMISSIONER CURTISS: I'm still puzzled by that. How do they do that when so many of our -- if they start it

right there, how do they actually get a fix on it when so many of our key terms and concepts that are sort of the sum and substance of this process aren't defined yet? How do you ask DOE to establish what the disturb zone is or --

MR. BERNERO: In fact, we have regular dialogue with them on that very point, what is the disturb zone, does it start at the surface of the hole or does it go in a few centimeters or millimeters or meters, depending on how the digging caused cracking. We have a dialogue with them. They have to interpret the existing regulatory requirements as best they can and through this review process, we iterate with them to make sure we have a common understanding of the objectives. Where necessary, we develop rulemaking to clarify that. That is why it is important to be able to iterate the thing.

COMMISSIONER CARR: You probably won't define the disturb zone until you get through sinking the first shaft, the exploratory shaft. That should tell you how far you disturb it.

MR. BERNERO: No, the disturb zone in this particular case refers to the standard for the 1,000 year groundwater travel time, where do you start to count it. Do you count in the man disturbed part or do you count the natural setting that is undisturbed. That can make a difference. I don't know that it will in this repository, but it can make a difference.

COMMISSIONER CURTISS: It sounds to me like in a

large number of these rulemakings here, what we ought to focus on is an interpretative rule rather than a real notice and comment rulemaking, because we won't be in the position here with this going on that we are really presenting options for the public to comment on and choices to be made between say the definition of the disturbed zone. These decisions are going to be made in the context of review of the SCP and these rules will come back before the Commission and if these decisions are changed at that point, that will, I guess, upset the site characterization apple cart.

MR. BERNERO: It could or it could also -- I would foresee the possibility that it could lead to an interpretation that might be satisfactory to us but not satisfactory to the public or to the state, that there might be an alternate view of defining the disturb zone as 100 meters outside any gallery that has been dug or something, a much more severe interpretation. I think that possibility exists.

It would have been good if we had the luxury of thinking through all these things and setting them all down well in advance of DOE even preparing the site characterization plan.

MR. BROWNING: The other thing to keep in mind, when we wrote the regulation, it was generic. It had to cover all kinds of possible media, all kinds of sites. Now that we are focusing in on a specific site, it becomes more and more

appropriate to take a look at do the original regulatory requirements really match what is technically desirable at this particular site. The one thing to keep in mind, this is an unsaturated zone site and a lot of the early thinking that went into the regulations was always presuming that you would be disposing of the waste in a saturated zone area.

In addition to the iterative process, trying to clarify through an interpretative, this is what we meant when we said it originally, we always have to keep in the back of our minds, we know a lot more now for this particular case than we did when we wrote that regulation and we may very well want to change the regulation, then you clearly have to go through rulemaking.

It is all kinds of variations and extremes. The problem is there is no way we can put the burden on the regulatory staff to resolve all the uncertainties. It is so intertwined with this particular process that you have to be very, very careful on what you pick as the rulemaking. The rule was deliberately designed to be flexible, to allow a lot of room for maneuvering on this first of a kind thing. When you go to rulemaking, you eliminate that degree of flexibility and you better make sure that if you are going to eliminate it, you don't want to open it up later on, because otherwise we are just going through an exercise.

Each one is very, very unique and you have to be very

careful about it.

MR. BERNERO: The performance assessment isn't the only thing that is iterative. It is the understanding of what is really needed, the regulatory process is to a degree iterative as well.

DOE has already started on the performance assessment. In your back-up slide eight, which is right behind that logic diagram, that figure is also taken out of the consultation draft of the site characterization plan, and it is not worth reading. It is the picture of the complexity and I would just point out to you that complex system of logic and relationships and the table right behind of it of available codes just covers the engineered barrier system. It is a piece of the action. It is a very complex thing.

The performance assessment for the high level waste repository is intensive, it is iterative, and it is going to be very expensive. I think that is something the Commission should keep in mind.

[Slide.]

MR. BERNERO: It is important with that in mind for us to say who is responsible for it, who has the lead responsibility. Historically, you may recall or you may have heard the history in the course of your service with the Commission that originally, the AEC and its contractors had the lead in assessing the risk of reactors, in the early days and

early things like WASH-740, in determining governmental actions, Price-Anderson insurance and things like that.

The Atomic Energy Commission is the one that generated the reactor safety study and with the Reorganization Act of 1974, the inheritance of the reactor safety study passed to the NRC.

There is a long tradition in the AEC/NRC chain of being the lead authority on reactor risk assessment. It carries through to this day. You just had a briefing the other day on NUREG-1150, advancing the state-of-the-art in reactor risk assessment.

That same responsibility of leadership rests in high level waste with DOE, not with us. The resources demanded, the use demanded, the importance to the characterization of the site and to the development of a proper license application must be with DOE. They can't do their job without it and we couldn't afford to do it. We can't even dream of the level of resources they have to spend on it.

They have to have that to do their job and our job is to do an independent review of their performance assessment and that is a delicate task. We have to select those areas where we can develop independent confidence or independent ability to judge uncertainties, to weigh uncertainties or to narrow them. That is a difficult task.

[Slide.]

MR. BERNERO: What we are doing and this ties you in with the rulemaking agenda that we have laid before you in the SECY paper discussed earlier, we are trying to refine our regulatory requirements and the technical guidance that goes with it to reduce that uncertainty, so that we have a sharper idea of what is needed, rulemaking wherever we can, for implementation of the EPA standard, for clarification of what is a disturb zone or whatever, technical positions to clarify and amplify, pinning down the issues as best we can.

We are also developing NMSS and research technical assessment capability. We have with the Office of Research a memorandum of understanding between the two offices, to share the technical ability. Remember, the Office of Research carries with it inside a large level of expertise in risk analysis, uncertainty analysis, and in high level waste research. The performance assessment research dates back in the Office of Research almost ten years. A lot of homework was done. A lot of work was done by this agency in evaluating Part 60, in evaluating proposed EPA standards. We have a memorandum of understanding in place to share this talent so that our primary licensing ability is assured and to guide us and help us in selecting what can the NRC do and what will we merely review that DOE does.

This is what we have in mind as we go into the review of DOE documents. We are going to review their site

characterization plan. It has a major portion dedicated to performance assessment, there is one large volume over there on it. We will be reviewing their semi-annual progress reports, other documents, and ultimately we will be reviewing the license application. We will be drawing the Center for Nuclear Waste Regulatory Analysis in on support, but right now our primary focus is having people with NRC badges, NRC staff, in a position to say these findings so crucial to licensing are appropriate. Ultimately, it is the NRC that will say this repository promises adequate isolation of high level waste or it does not. The essential character of that finding is quantitative in support, a very difficult finding.

Let me leave you with that impression. This is a very difficult task. We cannot go in and spend massive amounts of resources to do the job for DOE. They have to do it themselves. We have to provide knowledgeable critique and review of their work and a sufficient body of independent work by us to support the final licensing decision.

MR. THOMPSON: That completes our plan presentation, Mr. Chairman, Commissioners, we would be delighted to respond to any questions you might have on our program.

CHAIRMAN ZECH: Thank you. Questions from my fellow Commissioners? Commissioner Carr?

COMMISSIONER CARR: I guess I don't understand the requirement to take the flexibility out of the Part 60. It

seems to me if they came over and said this is our interpretation of what this means and this is the way we are going to do it, we analyze that and say it is okay, without touching Part 60 at all.

MR. BERNERO: If it is a reasonable interpretation, it depends.

COMMISSIONER CARR: If we don't, then we end up designing it for them.

MR. BERNERO: There is a danger of that but the nature -- Part 60 leaves room, and I didn't touch on this at all, these are the deterministic requirements, if you go into 10 CFR Part 60, it has many, many deterministic traits of a repository that have to be taken into account, and it includes a certain amount of wriggle room, for instance, the waste package lifetime, 300 years to 1,000 years, under what circumstances would you expect more like 1,000, under what circumstances would you --

COMMISSIONER CARR: The further amplification part of this is what bothers me. I don't see why you need to amplify it, if when they submit their design, we agree it meets what we say.

MR. BERNERO: If we agree. It is possible that in the review of their interpretations for regulatory requirements, that we are in complete harmony. As long as it is evident to all, we make it clear. We might want to pin that

down in rulemaking just to establish it clearly well in advance, but that would be a luxury, not a necessity.

COMMISSIONER CURTISS: Isn't it a key point because you all are just a party to the proceeding and I think the point is if the regulation on a particular subject lends itself to uncertainty, I agree with what Ken is saying, we have a regulation in place that permits DOE the flexibility and latitude to design the repository the way they want to, and your task at this point is to say DOE's approach falls within the permissible range of flexibility.

Once having done that, that is not dispositive because it may be the Licensing Board that makes the final judgment and disagrees with your assessment that DOE's approach falls within that range. Isn't the benefit of a regulation after you all reach agreement really that you establish that as a non-litigable fact, the Commission signs off on and it is not contestable in the proceeding?

MR. BERNERO: Exactly.

COMMISSIONER CARR: That is okay but that is site specific.

MR. BERNERO: Or medium specific, it might be. The advantage of it is if it is potentially contentious, how one is interpreting the flexibility of the regulation, that can be set down in regulation well in advance, properly stated, properly ratified and is no longer open to argument in the hearing.

COMMISSIONER CARR: Then I agree with Commissioner Curtiss. I don't know or understand why that would be through their usual routine or rulemaking rather than just say we have already interpreted one rule this year or last year, excuse me.

MR. BERNERO: Depending on the circumstances, we might use a shortened rulemaking approach, administrative approach, but if it is a technical issue that is potentially contentious, it appears to me that we would -- at least it is our assumption you would first propose it and do it in a conventional rulemaking.

MR. PARLER: Mr. Chairman, I would think the Commission would use whatever techniques are appropriate once you analyze what the particular problem is, if you are talking about something that is a gap or needs further explanation in the regulation, you are probably talking about an additional rulemaking. If you talking about what a particular phrase or set of words, set of requirements means, perhaps an interpretative rule, which would avoid perhaps the opportunity for notice and comment might be appropriate.

We would plan, at least in our role, in our advisory role, to try to assist with whatever techniques are available, depending on the circumstances.

Obviously, if an interpretative rule which would be shorter in time period, et cetera, quicker to get to the point to solve the problem, if that technique would be available, we

would strongly recommend that technique be followed.

CHAIRMAN ZECH: Thank you very much. General counsel always has the appropriate comments on matters like that. We appreciate it very much.

COMMISSIONER CARR: On the groundwater protection rule, the 4 millirem per year, is that a flat standard or is that 4 millirem above what is already there?

MR. BERNERO: The way it is phrased in their current standard, it comes out 4 MR per year above what is already there, above the existing background.

COMMISSIONER CARR: It may be higher than that now.

MR. BERNERO: Yes, indeed. The words we get from APA is they are working up a rationale for how to reconcile the 4 millirem per year with the 25 millirem which is for the other pathways and they don't expect to change that. That, of course, is one of the essential elements of the resolution of the remand.

COMMISSIONER CARR: I only have one other problem. It looks like, as the schedule slides down here, and we say we have enough people to handle our work right now, but suddenly the work is all going to come in at one time. Do we have enough budgeted people and money to take care of that?

MR. BROWNING: As we indicated in the SECY paper, we will re-visit this as we get more knowledge as part of the normal budget cycle. In the current budget cycle, we are going

to be taking all the lessons learned into account, but there is no need at this point that we see to try to come in outside of that normal cycle.

MR. THOMPSON: The work that we have to do right now, we can always use more people. I think we have an adequate number of people.

CHAIRMAN ZECH: Commissioner Rogers?

COMMISSIONER ROGERS: I'll jump around a little bit because I have a couple of different questions that relate to different points.

Since we are on this performance assessment, what is the role of the ACNW envisioned in the performance assessment? Will they play a special role?

MR. BERNERO: Not special insofar as unique from their other role. Basically, the ACNW is getting a briefing, if they haven't already had it, we have encouraged them to pay attention to this. They are getting a briefing from DOE on the performance assessment program as in the site characterization plan and thereafter, and they are very much interested in it themselves. Their role will be to comment on that, on the staff's role and advise you as to whether we are doing the rational thing. It is exactly what they have throughout the regulation of high level waste. It is their advice to you on this particular aspect.

I think they are keenly aware of the dramatic

difference between the reactor -- the reactor risk assessment, we have never licensed, and we have even said, don't ever license to a safety goal. We use it in backfit analysis. We use it as a supplement. Here, we are going to license with it. They are keenly aware of that. I think you can count on them for some weighty advice on it.

COMMISSIONER ROGERS: There are only three people. The amount of work that they could take on in connection with this whole project could be overwhelming.

MR. BERNERO: Yes, I think they are aware of that, too.

COMMISSIONER ROGERS: The question is where they might use their resources best. I was just curious as to whether they would have thought about prioritizing their efforts and whether they are focusing at all on performance assessment.

MR. BERNERO: I can say from their agenda that they are focusing on high level waste performance assessment. How they are going to deal with it, whether they are going to try to use their consultants or draw on other members of the ACRS as they have a way of doing, how they are going to do that, I would have to defer to them. You would have to ask Dr. Mohler.

COMMISSIONER ROGERS: Just to turn back to our own activities, when do you expect an integrated level four detailed schedule for organizational activities to be

available?

MR. THOMPSON: We had a meeting, I guess it was yesterday, that set out the review schedule for the site characterization plan. I think -- I don't know if it got quite down to the integrated level four schedule.

MR. BROWNING: I'm not sure it is relating to the level four. It is the level of detail beyond what we have shown you in the Commission paper, for key elements like the site characterization plan, we have that kind of schedule. You obviously could have visibility of it, if you want.

MR. THOMPSON: When they are going to do the review, what the criteria for the review are, that is spelled out in what we call the SCP review plan. That is available now. That is the key guideline, the focus we are going to do of the site characterization plan. That is available now.

COMMISSIONER ROGERS: For all activities?

MR. THOMPSON: For the activities associated, for the site characterization plan review.

COMMISSIONER ROGERS: How do you see the whole project beyond that?

MR. BROWNING: The other piece would be the rulemaking efforts, and they would be developed on a rulemaking by rulemaking basis, and that is still in the developmental stage. I would expect one of the key lead potential rulemakings is the definition on anticipated and unanticipated

events. I would think that within the next two months, we could have a detailed schedule that you could use as a guide for the kind of scheduling we would be doing on the rulemaking efforts. That is the one I'm focusing on, the lead effort, to see what it takes and that would be one where we could work very closely with OGC to see the extent to which we could use, you know, efficient ways of accomplishing the same effect as the rulemaking.

COMMISSIONER ROGERS: How dependent are you or do you think you will be on the use of personal computers and the appropriate software?

MR. BROWNING: 100 percent.

COMMISSIONER ROGERS: Do you have enough?

MR. BROWNING: Not right now but we are in the process of getting them.

MR. THOMPSON: Every technical staff, you can use a personal computer, and in our review it is probably even more important, use of the licensing support systems and our interface with the Center. We have looked at trying to prioritize and achieve the level of personal computers for all of our technical staff reviewers and we are taking steps to get there. If we had unlimited money, everybody would have them, but we don't have unlimited money and I have competing organizational needs with other divisions, the Low Level Waste Division and the Material Licensing people need them. We have

a balance in our needs. Given the limited resources that we have, we go through and prioritize and try to make sure those get them who need them first. That is where we are.

COMMISSIONER ROGERS: What does that mean in terms of how adequate that is?

MR. TAYLOR: Is it adequate or isn't it.

MR. BROWNING: If we finish the plan we have laid out to get computers in the hands of the key people, I think it will be adequate.

MR. THOMPSON: We received recently --

MR. TAYLOR: Commitments to each office.

MR. THOMPSON: A fairly substantial number that are being installed now.

MR. BROWNING: We just got seven. For example, this whole pile of paper, at least the text part of it, DOE is going to give us an electron format, and it would be extremely useful if everybody had a desktop computer rather than sorting through all this paper, if they could draw that up on their computer and start using it. A lot of people like me are going to have to really be educated, because I unfortunately like paper. If you have ever been in my office, it is obvious. I'm not sure I am going to be able to make the connection.

COMMISSIONER ROGERS: My experience with personal computers, you get both, you get paper and the screen. It doesn't really eliminate the paper totally.

MR. THOMPSON: I will go back and take a look at that.

COMMISSIONER ROGERS: From the standpoint of being able to manage, track, keep track of things, it appears to me that may be a very important tool here.

MR. THOMPSON: Just to keep up with and control the Center with all the key people that are interfacing with that need to have them.

COMMISSIONER ROGERS: You have mentioned the Center. Just a couple of questions about the Center. What is it doing right now? What is it doing besides the program architecture system, the PAS system they have been working on? Are they exploring performance assessment methodologies?

MR. BERNERO: They are just beginning. For instance, we just had an ad hoc briefing which I asked for on some FAAS uncertainty analysis, FAAS probablistic performance assessment, variations on the theme of how to deal with large uncertainty bands and narrow them down quickly. They are beginning to work on that. They generated a small report on that. I looked at it. I had sufficient interest that I called for a briefing and got a good one.

COMMISSIONER ROGERS: What is the status of their staffing?

MR. BROWNING: They are still slightly behind their projection. I don't remember the numbers offhand, but

something on the order of 38 versus 42 or 43, in terms of where they should be versus what they have. They are also behind on some of the key technical disciplines. During the end of the year performance evaluation and fee determination, those are areas we have identified to them that they need to concentrate on. They are well aware of it and they are doing a lot of good things to try and do that, but the kind of people we want and need are in short supply. An awful lot of those kinds of people are being consumed up into the hazardous waste area. I presume this integrating contractor that DOE has, unless they already have all those people on hand, will be looking for the same kind of people.

We keep trying to be tough and saying we want it to happen but in the real world, it is extremely difficult for them to get the kind of key people they need.

Another area where they have been making a lot of progress is getting some of the key research programs underway. Our research people have a very active interface with them in getting some of the transfer of work from other activities into the Center underway.

MR. THOMPSON: Mel might want to give a quick --

CHAIRMAN ZECH: Would you come to the microphone, please, and identify yourself for the Reporter.

MR. SILBERBERG: Mel Silberberg, Office of Research. Right now the Center has started four programs in four

different areas. One in the waste package area, we call integrated waste package experiments, which involves corrosion and dealing with information applicable to the 1,000 year time period that Mr. Bernero mentioned for the waste package.

Another is in the area of geochemistry, dealing with the uncertainties in the geochemical environment that would be at the repository, which has a bearing on the corrosion.

Another program just starting is in the area of thermal hydrologics, dealing with the interaction of the heat, the heat load from the waste package on the environment in the repository.

The fourth area has to do with rock mechanics and seismic effects, understanding what might be the effects of seismic loads on both the rock structure and the structure itself, the repository structure itself, what the possible criteria is one would have to look at for judging the seismic performance of the site and the repository.

Those are the four areas. As their new start scheduled later this year, which gets into the hydrology area and the hydrogeology area, the Center is in the process of seeking staff that in fact have that kind of background. In the geosciences, that is the area they are trying to bring on right now, in order to match with our schedule for that new work.

COMMISSIONER ROGERS: That is the one they have been

working on from the very beginning, isn't it?

MR. SILBERBERG: Tuff; yes.

MR. THOMPSON: Yes.

MR. BROWNING: In the area of helping us review the SCP, we did not place any fiscal year 1989 contracts to help us with this other than the Center. We had some fiscal year 1988 money left over in I think about two fairly limited contractor areas that may be necessary to help us do this review. To the extent we need outside technical assistance to do this, we will be tasking the Center to do that also. That is a very near term production effort to help us on an immediate regulatory need.

The program architecture work based on the preliminary briefing I had of the product that is going to come out this month will give us a very good head start on making sure that we are focusing our regulatory pro-active work on the right things and the scope of them right. It is not just a theoretical sense, it is going to have some practical feedback into that particular effort.

As I mentioned in the briefing, that should be coming in this month. I think that probably will result, if anything, either in an increase in the number of rulemakings that might be potential candidates for rulemakings, but it also might give us some input on how we can group them together and accomplish, rather than have a whole bunch of isolated rulemakings, cover

an area more succinctly in one particular area.

I see an immediate payoff in the rulemaking area out of that first accelerated piece where we asked them, rather than do the whole thing, do the piece related to the site characteristics for us and then to get a feel for how useful that whole exercise really was and is there going to be any payoff for it. I think the evidence is starting to come in that it is going to have a payoff in our regulatory guidance generation arena.

COMMISSIONER ROGERS: Do you have any feeling about the sort of cross calibration between what you thought would be required in the way of rulemaking and what they are coming up with?

MR. BROWNING: I think it is fairly close. There were a couple of things where they detected some potential differences between what the Nuclear Waste Policy Act says and what our Part 60 says. I wasn't personally aware. We have not yet had a chance to discuss that with our OGC staff, at least I haven't. We have asked them to take a look at it. It didn't strike me as being a real knock out thing that we have to rush off and do right away. It is something that we may very well have been aware of, but I just personally wasn't aware of it.

MR. PARLER: The distinctions, if there are any, should be minimal because after the Waste Policy Act was passed in 1982, the Part 60 regulations which preceded that Act were

conformed, if my recollection is correct, to comply with the Waste Policy Act. After the recent 1987 amendments, the regulations were conformed again.

COMMISSIONER CARR: I might say that I'm more interested in the quality of the people they hire out there than I am in the speed with which they get them on board.

MR. BROWNING: They are also. That is why they have been resisting the production pressure.

MR. THOMPSON: They are doing some other work in the transportation risk area for us, to update the general environmental impact statement to support our regulations. That was really written when we had a major reprocessing and we need to upgrade that activity. They are doing some work for us on that right now.

COMMISSIONER ROGERS: Just one other matter. How often does our Waste Management Review Group meet?

MR. BERNERO: It meets on the order of -- I would say it averages out to be about once a month, maybe five weeks.

COMMISSIONER ROGERS: When did it meet last?

MR. BERNERO: The last meeting was about two weeks ago, as I recall.

COMMISSIONER ROGERS: Does that group provide any direct oversight of the Center activities?

MR. BERNERO: Yes and no, in that it reviews what we do as an agency, like the research projects that go out there,

and we have an oversight function in that regard. We don't right now, the Waste Management Review Group does not go out and review the Center performance as such.

MR. THOMPSON: There is a separate approach that we review the Center performance and we award fees, it has participation by the various offices, Research, and Bob Browning heads those activities up. It is a very formalized program that really looks at the Center performance.

COMMISSIONER ROGERS: Thank you very much.

CHAIRMAN ZECH: Commissioner Curtiss?

COMMISSIONER CURTISS: I just have a couple of quick ones. I got most of mine during the presentation.

Going back to the list of topics that were addressed in the SECY paper on the regulatory strategy, 36 of them here and about a third of those are going to be addressed through rulemaking. What kind of approach did you take in deciding which issues ought to be addressed through rulemaking and which ought to be addressed through technical positions and reg guides?

MR. BROWNING: It varies from case to case, but I think one of the primary criteria was the degree of maturity of the issue that would warrant going to rulemaking. Another was the degree of possible contention on the issue, the need to raise something and get it resolved in the public arena versus a technical thing that probably would not receive a lot of

technical contention.

One of the things that should be kept in mind when we talk about the guidance documents at a so-called lower level than rulemaking, it has been our practice and will continue to be our practice to issue those technical guidance documents to the public, notice them in the Federal Register, we target people that have indicated an interest and we specifically target those things to them, and if we don't get an answer, we send a letter saying, we really would like your input. We have a relatively aggressive program of going out and getting public input and key technical knowledgeable input to see whether there is or is not a great deal of technical difference of opinion that would warrant taking that into account.

We also record all that. A lot of the steps that were always perceived to be making a rulemaking better than a technical guide, we have actually adopted into the technical guidance documents stage.

All of those will get very intensive outside review by the state, the public interest groups that have indicated an interest in this particular aspect of the program and key activities.

For example, we didn't get comments within the time we asked them on the anticipated and unanticipated, which at the time was a technical guidance document, not a rulemaking. We actually sent letters to EPA and DOE and said, hey, we

really want your comments on this, and we eventually did get it. All that is being factored into the next version which if we continue to follow the proposed rulemaking stage, it would be almost ready to do with a proposed rule.

COMMISSIONER CURTISS: I think that is a healthy process, to see if there is any technical disagreement and in the context of that process, there are major issues that emerge. I also think there is some merit in taking a look at the list and particularly some of these in the technical position lists, repository design, for example, just as a layman, strikes me as a major issue of potentially significant interest, and to see if there is not a way to resolve those issues before we get to the hearing, so those issues through the process of public interaction and give and take that would be available through rulemaking might be put to bed before the hearing, so we don't litigate the uncertainties, so we litigate the acceptability of the repository and not the meaning of a regulation in the hearing.

MR. THOMPSON: I think that is probably the key, as I see it. There are many things that may depend on getting technical information from the site characterization activities and obviously those are going to be the ones, the elements that would likely be part of the hearing. Where we have regulatory uncertainty, those are the ones which I think we have focused on and trying to clarify early on. What we tried to do is

where there is a large amount of uncertainty, either by going out to DOE, the states or whoever, or even amongst our own staff, if there is uncertainty there, can you find an acceptable way and then is it sufficient strength and basis to say not only is this acceptable, it is in fact so appropriate that we ought to make it the requirement, make it a regulation. That is kind of the process we went through, recognizing we have this more detailed systematic review by the Center on the program and architecture, that will kind of give some confidence as to whether or not we may have missed something and in that more deterministic approach.

COMMISSIONER CURTISS: Quick question on the performance assessment. Do we intend to develop our own modeling ability for the unsaturated zone or are we going to use DOE's?

MR. BERNERO: I think it is fair to say at this time that we would have at least one independent model of the unsaturated zone for the transport, but that is a hope.

COMMISSIONER CURTISS: Is that something we would share with DOE so we are all kind of singing from the same hymn book?

MR. BERNERO: This gets into the question of whether we want independent modeling, if we would have a truly independent model. There is a long standing tradition where the staff has less resources than say the industry, where we

want to have a fundamentally different way to analyze something, a fundamentally different technique, even with the expectation that it might not be as precise or it might not be as accurate. It is a way to test independently whether the other model where you are putting the primary reliance is trustworthy. It is another way to validate that model.

I would think that at a minimum, we would want for the unsaturated zone, independent modeling capability. It might not be as ornate or complex, taking in every dotted "i" and crossed "t" that DOE's model might have. I think we need that independence.

COMMISSIONER ROGERS: I would just like to reinforce that position.

MR. THOMPSON: We obviously don't do anything that is not open, as we develop our guidance, it would probably be subject to publication as we go through it.

COMMISSIONER CURTISS: I think it makes a lot of sense to have our own ability to verify the results that DOE is producing through its own model. I think there is also some merit to having everybody know what the models are.

MR. BERNERO: Yes.

MR. THOMPSON: One of the things we have been trying to push is better technical exchange with the ongoing activities, our research and development activities as well as DOE's and the State of Nevada's, et cetera, to make sure people

are aware of where we are headed in programs. Essentially, the money is coming out of the same people, the American people and the American public. They are paying for this through the waste fund, through their taxes, whatever, so there is no use to unnecessarily duplicate. I think it is appropriate to have some independent capability in some of these areas.

COMMISSIONER CURTISS: One final question on DOE's EIS. Have they started a scoping process for that?

MR. BERNERO: I don't know.

MR. BROWNING: I don't know.

MR. THOMPSON: We will find out. I don't know the answer to that.

COMMISSIONER CURTISS: I thought I understood somebody to say earlier the EIS was looking at addressing national transportation issues.

MR. THOMPSON: The aspect of transportation issues with the site specific location routing is one of the things that will be addressed in their environmental impact statement. Whether or not they have gone into the extent of route A, B and C, I do know they are looking at routings, additional rail routings, for example, that could be between 75 miles and 485 miles or something. I know they have different routings available, but I don't know how precise that is right now. I think that may be more conceptual in nature.

CHAIRMAN ZECH: Let me just make one comment and ask

one question. First of all, I think it is awfully important that whereas we are looking at a schedule that is important, that we focus on the quality of the work, that we focus on the quality of the analysis, quality of the expertise that is involved in helping us make decisions.

I think we need to take sufficient time to do a proper analysis and review. Whereas we all know the importance of the schedule, we also must, I think, continually focus on the fact that this is an unique and complex issue, and public health and safety is involved.

If we do it properly and do it right, we will be able to have some confidence in the decisions we make and confidence that we will have a repository that will satisfy the desires of the American people.

I think it is important that we focus on the quality of the work that is done in this whole field.

I guess the question I would ask and have you try to answer for me is the sinking of the exploratory shaft as we all know was postponed for approximately six months. You have indicated and DOE has certainly indicated they are confident the milestones can continue to be met, the major ones.

Thinking about ensuring the fact that we need the time and we need to ensure we have quality work done, what is your evaluation of the slippage as far as our responsibilities are concerned? Can we continue to do our job? Are you

concerned that you are not going to have the time, you are not going to have the ability to put in the proper analysis and review? Do you feel the slippage can be accommodated? What are your views on that? You have given us some of them, but could you elaborate just very briefly?

MR. THOMPSON: I will try to give you mine and maybe turn it over to Bob. I think the key element that I see right now is in two parts. One is this design acceptance analysis, that is the exploratory shaft which was a key element in having a clear understanding of where it is going to be located on the site, what its design is going to be, and they are not going to change that with respect to the activities related to the site characterization plan.

That is why we did the acceptance review and it is why we are looking for that documentation and the absence of that document clearly, I think, is an element of whether or not we can have a schedule that we can commit to, not really commit to but work to in being able to meet a July date. If there is a major change on that document, I don't think we will be able to complete our review in the July timeframe.

On the other hand, DOE's ability to get the QA programs in place, I think that is equally important. That one, I think it is reasonable if they can get the paper in place, and I think it is less reasonable with less assurance that they are going to get the programs actually implemented.

I think there is some cultural shock to some of those people to really start doing their activities on the QA program that is designed to support a licensing type decision, and I am personally concerned and we really stressed that we need to get re-affirmation of where we are headed on those programs with DOE and we have the meeting scheduled on the 25th.

If we don't get agreement on the 25th that there is going to be a reasonable sequencing of that documentation submitted to us and time to get those programs in place, I don't have a high degree of confidence that we won't all squash at the end and we will all be under a lot of time pressures.

Right now, I think there is sufficient time available so we can get our review done, get our comments over to DOE and have QA programs in place before they start major activities in November. I think we probably have what I say is about two months of float time in there. If those schedules slip much past more than two months from now, then I will be personally worried that we will have enough time to do it.

CHAIRMAN ZECH: Mr. Browning?

MR. BROWNING: I would agree. One of the key elements on this design acceptability analysis for the current shaft design is our ability to audit and observe what they are doing as they go through that process. In addition to getting the document, one of the key steps will be do we have early access to that process so we can get some confidence. Putting

on your skeptical regulator hat, they have a strong incentive to justify keeping it the way it is. There is some skepticism that the review process they are going through be tilted to try to make sure it comes out exactly the way it was to start with rather than being an honest to goodness re-visiting of the thing. I think the only way we are going to get a handle on it is to actually observe firsthand some of that process.

CHAIRMAN ZECH: What I am concerned about is just that point, when there is slippage and when things kind of aren't going as fast as they should, that we, the regulator, will be the one that is squeezed. I have a lot of confidence in your ability to work hard and to make good decisions but you have to have the time to do it right. You simply have to have the time to do it right. That is my reason for raising this point now and I've raised it before, as you know.

That is the point I hope you will keep in mind. We expect you to work hard. We expect you to call on all the assistance you might need. You simply must have the time to do it right and the schedule slippage does concern me a bit, just because we are talking times into the year 2000 and perhaps beyond. That doesn't give me great comfort. It seems to me with this unique task ahead of us, complex task ahead of us, it is too easy to have months go by and then not too much happen. We simply must try to fix a schedule. It is important to do that. I think it is very appropriate and necessary. On the

other hand, we need to do it right. It is so important to do the right thing and do it with quality.

I ask you to continue to watch that aspect of it and don't use that as an excuse to put off your work at all but recognize the fact that if there are delays in the process, that could impact on our ability to do the job we have to do and do it right and do it on time. We are going to do it right.

Let me just say on behalf of the Commission how much we appreciate the informative briefing here this afternoon and I also want to thank the high level waste group that is working on this issue as part of the Regulatory Commission. I think the lines of communication are so important to be kept open. I think from what you have told us, they are open. You are making every effort to make sure they are.

I think it is important that the professional relationship which you have obviously established with the State of Nevada, the local governments and the affected Indian tribes as well as the Department of Energy are extremely important. At least my perception is the staff has done a very good job in that regard. I would ask you to continue the good job you are doing in that regard. It is very important. That is some way in my judgment, by keeping those lines of communication open amongst all the affected parties, that we can at least face the problems and address the problems,

perhaps come to resolution and perhaps make up some of the time it is taking with some of these other slippages we have.

Good communications, honest, open, candid communications are very important, I believe, again in this very complex and unique undertaking.

I would ask the staff to continue to keep the Commission informed. I think these series of briefings we have had by the State of Nevada, the DOE people, the staff and others, are very important for the Commission to be informed periodically on this very important issue. I would ask you to continue to do that.

Lastly, I would like to urge you that if there are any major issues that come up, that you think the Commission should be aware of, that the Commission itself should be involved in at an early stage, you don't have to wait for the periodic briefings. I hope you know that, so that you are informing us and we can come to resolution of any policy matters or other matters that do need resolution at the top management level, so we are sure we are doing our job and doing all we can do as far as our responsibilities for licensing eventually this repository.

The decisions we have to make eventually are being made in small pieces as we go along, and we have to be confident they are made correctly, that we haven't made any decisions yet as to whether or not we are going to license that

repository. That is the big decision some day this Commission will have to make. If we see along the way roadblocks, if we see problems, we have to fix those problems and bring them up right away so that we don't go too far down the pike without recognizing that a solution must come forth from some problem that we see.

We have to recognize our responsibilities and make sure, in my judgment, that the eventual decision to be made can be made with confidence. I think it can be if we have done our work along the way very carefully, with quality, taking the time to do it right and we feel confident about it. If not, we have to do something about it and make the other decision. We must call out the problems as soon as we see them and find resolutions to them. If we can't, we have to say that, too.

It is a very important issue. I appreciate very much what the staff is doing in this regard and ask you to continue the fine work you are doing. Remember, keep the Commission informed, not only periodically but whenever you feel it is necessary to get the resolution to any problems that you see as we proceed on this very important issue.

Any other questions or comments?

[No response.]

CHAIRMAN ZECH: Thank you very much for an excellent briefing. We stand adjourned.

[Whereupon, at 4:05 p.m., the briefing was

concluded.]

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: Briefing on Regulatory Responsibilities and Schedules for the High Level Wast Repository

PLACE OF MEETING: Washington, D.C.

DATE OF MEETING: Thursday, January 5, 1989

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

John Trowbridge

John Trowbridge

Ann Riley & Associates, Ltd.

COMMISSION BRIEFING ON REGULATORY RESPONSIBILITIES AND SCHEDULES FOR THE HIGH-LEVEL WASTE REPOSITORY PROGRAM

JANUARY 5, 1989

SLIDE 1

FOLLOW-UP TO RECENT DOE AND NEVADA COMMISSION BRIEFINGS

- O NEVADA
  - OBSERVER VS. PARTICIPANT
- O DOE
  - TIMING OF NRC COMMENTS ON EXPLORATORY SHAFT FACILITY
  - REGULATORY CONCERNS VS. STAFF OPINION

PURPOSE

- O FOLLOW-UP TO NEVADA AND DOE COMMISSION BRIEFINGS
- O BRIEF COMMISSION ON KEY NEAR-TERM ASPECTS OF THE REGULATORY STRATEGY AS DISCUSSED IN SECY-88-285
  - RULEMAKINGS
  - QUALITY ASSURANCE
  - REVIEW OF SITE CHARACTERIZATION PLAN
  - PERFORMANCE ASSESSMENT CAPABILITY

REGULATORY STRATEGY FOR THE HIGH-LEVEL WASTE REPOSITORY PROGRAM

- O STRATEGY DESCRIBED IN SECY-88-285
- O STRATEGY DURING THE PRE-LICENSE APPLICATION PHASE

CURRENT HLW REPOSITORY MILESTONES

- 12/88 DOE ISSUED SITE CHARACTERIZATION PLAN
- 5/89 DOE STARTS SURFACE PREPARATION FOR EXPLORATORY SHAFT FACILITY
- 7/89 NRC ISSUES SITE CHARACTERIZATION ANALYSIS
- 11/89 DOE STARTS EXPLORATORY SHAFT FACILITY CONSTRUCTION

CURRENT HLW REPOSITORY MILESTONES (CONT'D)

- 12/90 EPA REISSUES FINAL STANDARD
- 1992 -- DOE NEEDS GUIDANCE TO BE USED IN PREPARATION OF LICENSE APPLICATION
- 10/93 DOE ISSUES DRAFT ENVIRONMENTAL IMPACT STATEMENT
- 3/95 DOE SUBMITS LICENSE APPLICATION TO CONSTRUCT

DOE QA PROGRAM

- DOE HAS COMMITTED NOT TO START NEW SITE CHARACTERIZATION UNTIL APPROVED QA PROGRAM IS IN PLACE
- STATUS
  - JULY 1988 SCHEDULE HAS SLIPPED
  - NRC AND DOE WILL MEET ON JANUARY 25, 1989 TO AGREE ON NEW SCHEDULE

OBJECTIVES OF SITE CHARACTERIZATION PROGRAM

- ESTABLISH GEOLOGIC, HYDROLOGIC, AND GEOCHEMICAL CONDITIONS AT A CANDIDATE SITE
- PROVIDE DATA NEEDED FOR DESIGN OF THE WASTE PACKAGE AND THE REPOSITORY
- PROVIDE DATA NEEDED FOR PERFORMANCE ASSESSMENT OF THE REPOSITORY SYSTEM

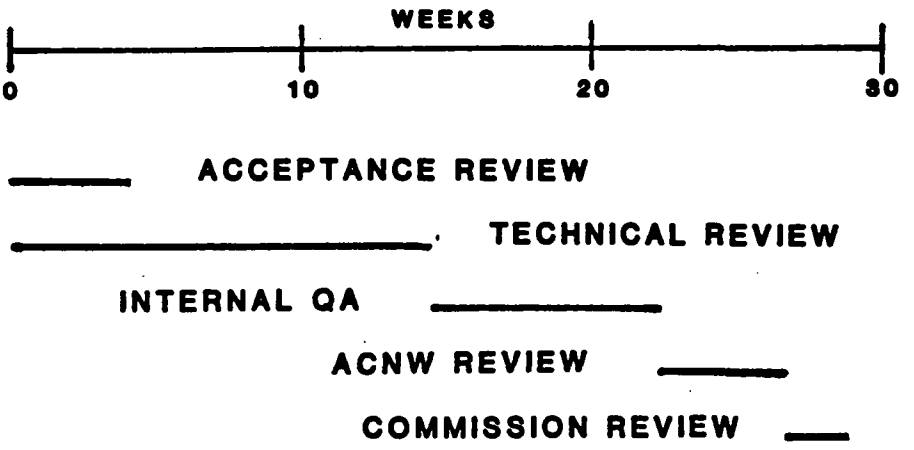
REVIEW OF DOE'S SITE CHARACTERIZATION PLAN (SCP)

- NWPA REQUIRES NRC TO REVIEW DOE'S SCP AND COMMENT
- SCP REVIEW PLAN ISSUED ON 12/12/88
- SCHEDULE TO COMPLETE SCP REVIEW
- COMMENTS IN SITE CHARACTERIZATION ANALYSIS (SCA) PER 10 CFR PART 60

REVIEW OF DOE'S SITE CHARACTERIZATION PLAN (SCP) (CONT'D)

- SCHEDULE TO COMPLETE EXPLORATORY SHAFT FACILITY REVIEW
  - PART OF SCP REVIEW
  - ORIGINAL SCHEDULE WAS 90 DAYS
  - REVISED SCHEDULE IS 7 MONTHS
- ACCEPTANCE REVIEW

SCP REVIEW SCHEDULE



REGULATORY REQUIREMENTS

- EPA HAS PROMULGATED ENVIRONMENTAL STANDARDS IN 40 CFR PART 191 (THESE, IN 1987 WERE VACATED AND REMANDED TO THE EPA FOR FURTHER PROCEEDINGS BY THE U.S. COURT OF APPEALS FOR THE FIRST CIRCUIT)

- NRC HAS PROMULGATED TECHNICAL CRITERIA IN 10 CFR PART 60. (THESE WILL BE BROUGHT INTO CONFORMANCE WITH THE EPA STANDARD WHEN IT BECOMES FINAL)

REGULATORY REQUIREMENTS
(CONTINUED)

- KEY PROVISIONS OF THE EPA STANDARD:
  - -- LIMITS ON THE RADIATION DOSE
  - -- RELEASES TO ACCESSIBLE ENVIRONMENT
  - -- INDIVIDUAL PROTECTION
  - -- GROUNDWATER PROTECTION

REGULATORY REQUIREMENTS (CONTINUED)

- 10 CFR 60 PROVIDES PERFORMANCE OBJECTIVES (CRITERIA)
  - PRE-CLOSURE
    - -- LIMIT ON RELEASES
    - -- OPTION TO RETRIEVE WASTES

REGULATORY REQUIREMENTS (CONTINUED)

- POST-CLOSURE
  - -- WASTE PACKAGE LIFETIME
  - -- RELEASES FROM THE ENGINEERED BARRIERS
  - -- GROUNDWATER TRAVEL TIME
  - -- COMPLIANCE WITH THE EPA STANDARD

DEFINITION OF PERFORMANCE ASSESSMENT

- PERFORMANCE ASSESSMENT IS THE PROCESS OF QUANTITATIVELY EVALUATING THE NATURAL AND ENGINEERED REPOSITORY COMPONENTS AND THE OVERALL REPOSITORY SYSTEM BEHAVIOR, RELATIVE TO THE EPA STANDARD AND PERFORMANCE OBJECTIVES OF 10 CFR PART 60

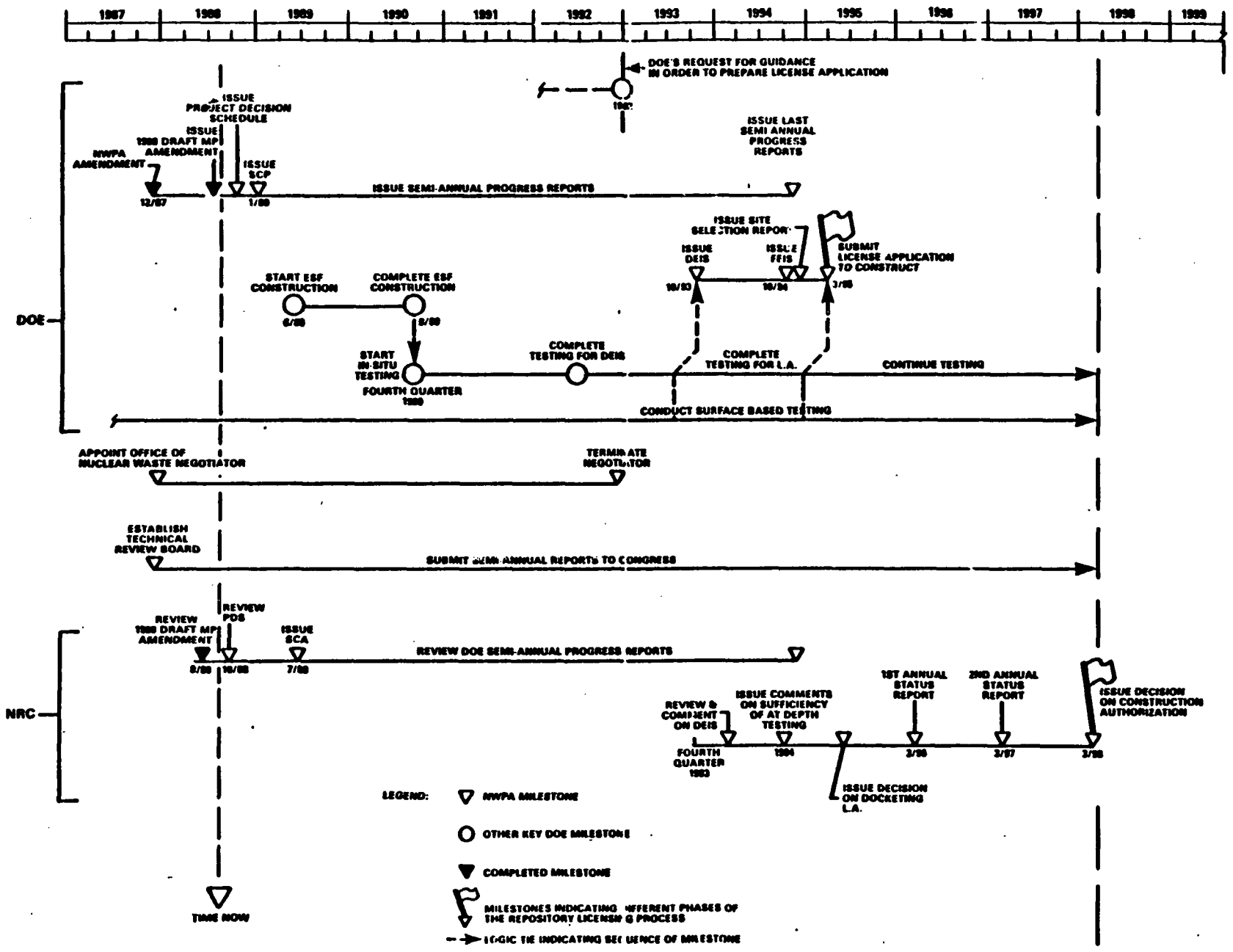
ELEMENTS OF PERFORMANCE ASSESSMENT

- WHAT CAN HAPPEN TO A REPOSITORY?
- HOW LIKELY IS IT?
- WHAT ARE THE CONSEQUENCES?
- COMPARE WITH REGULATORY STANDARDS

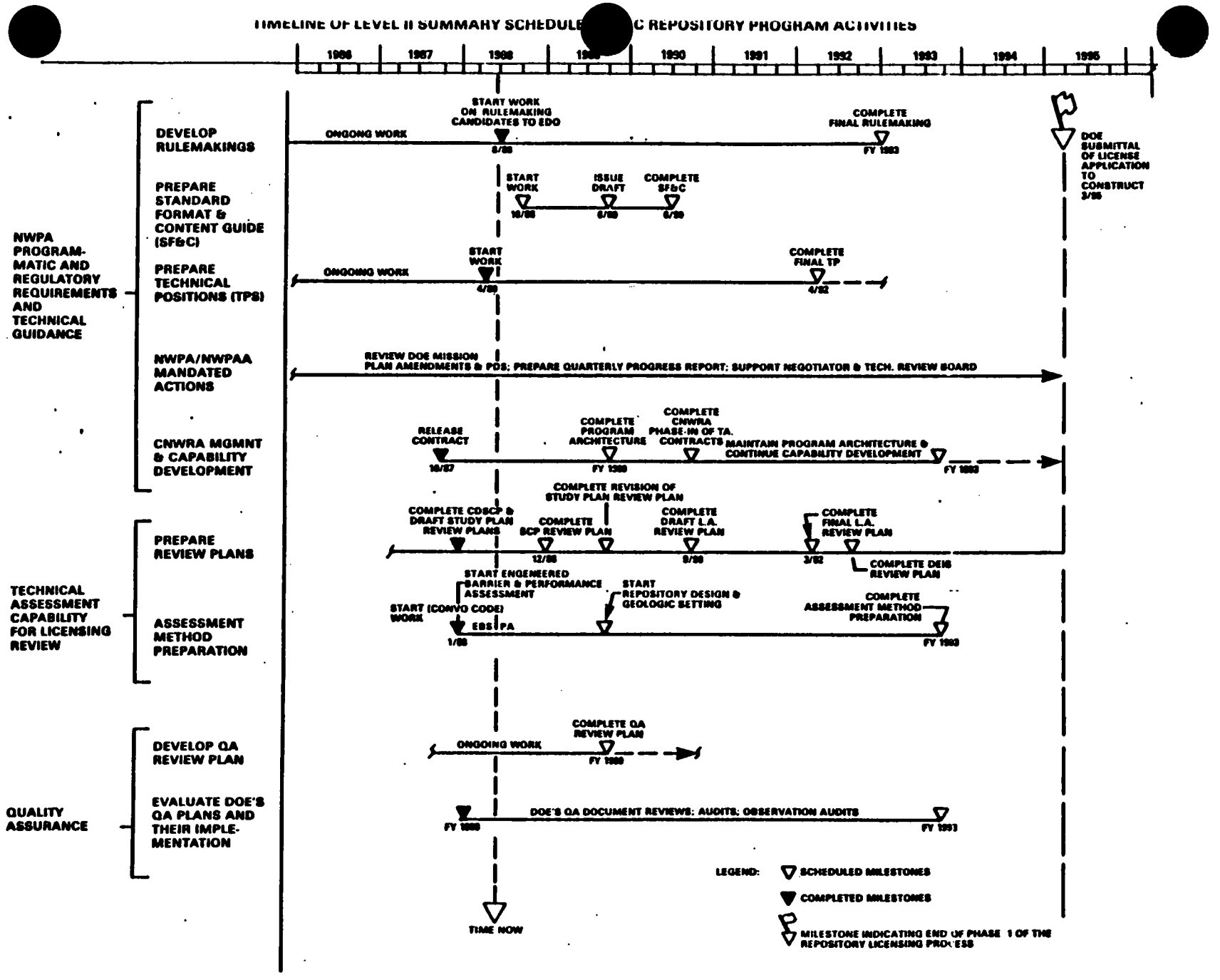
PERFORMANCE ASSESSMENT

- RESPONSIBILITIES
  - PRIMARY RESPONSIBILITY RESTS WITH DOE
  - NRC STAFF'S JOB IS INDEPENDENT REVIEW OF DOE'S PERFORMANCE ASSESSMENT
- ACTIVITIES
  - ITERATIVE PROCESS DURING SITE CHARACTERIZATION
  - ESSENTIAL PART OF LICENSE APPLICATION

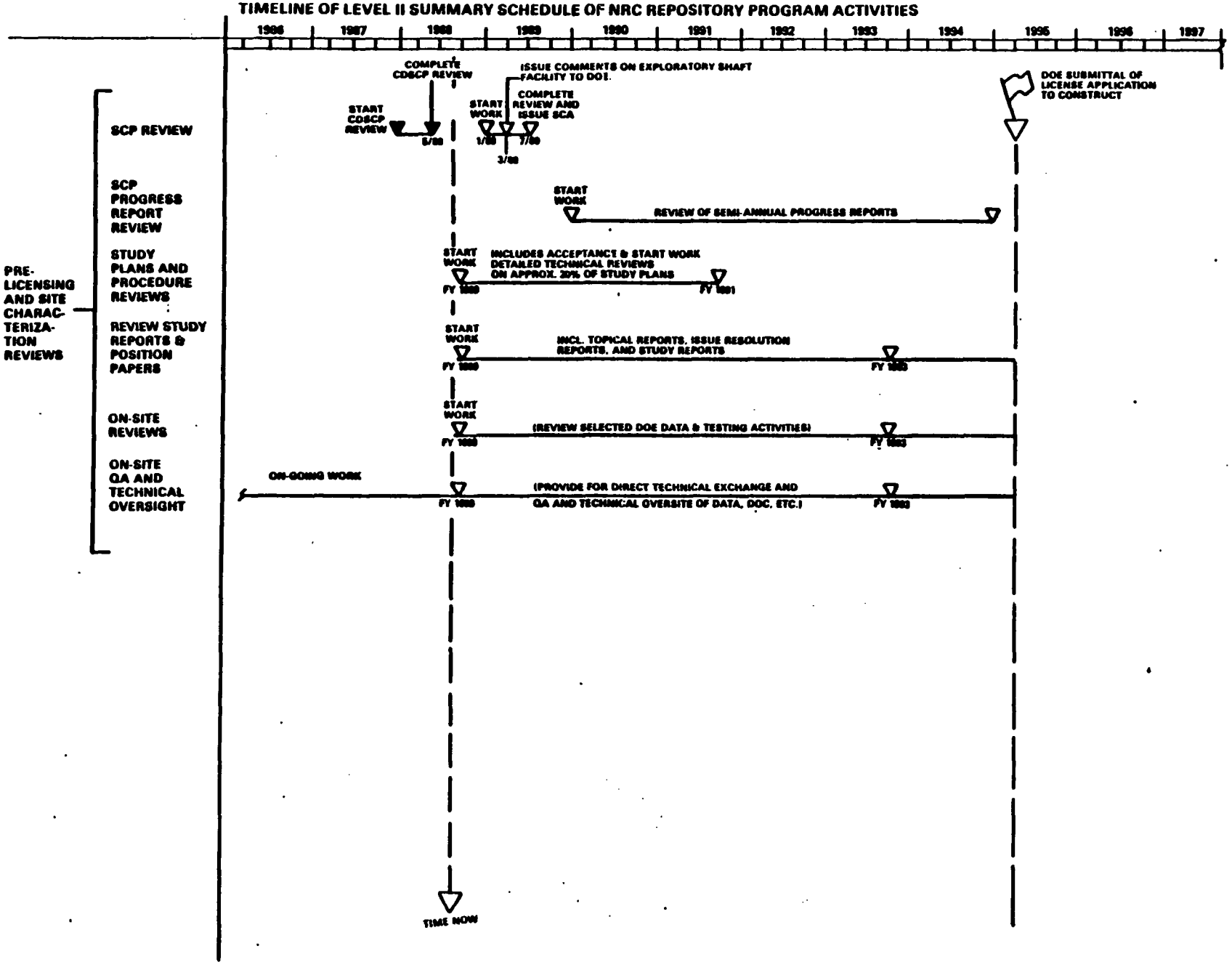
TIMELINE OF LEVEL I NRC & DOE NWPA MAJOR REPOSITORY MILESTONES



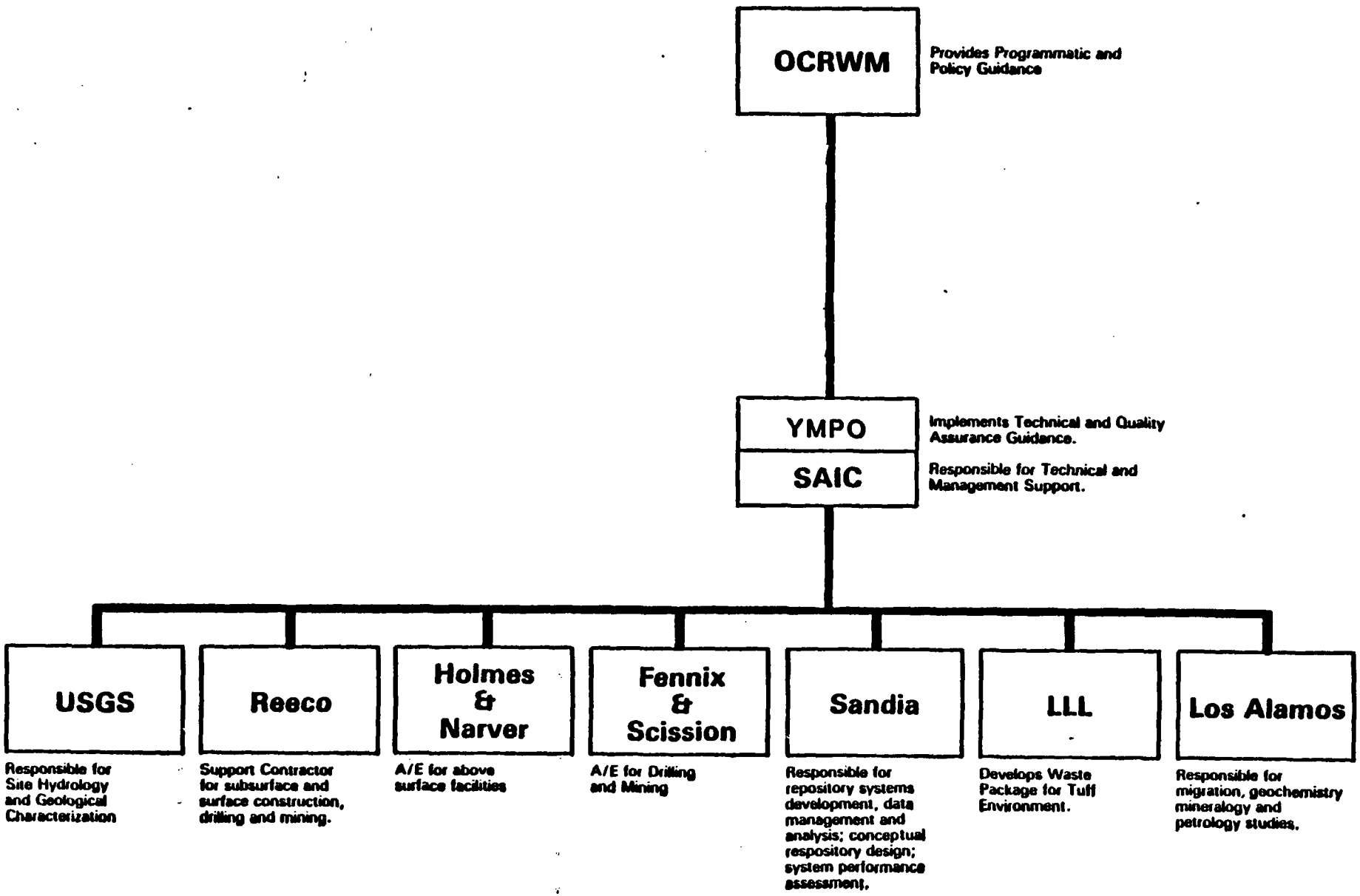
Backup Slide 1


TIMELINE OF LEVEL II SUMMARY SCHEDULE C REPOSITORY PROGRAM ACTIVITIES
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
NWPA PROGRAM-MATIC AND REGULATORY REQUIREMENTS AND TECHNICAL GUIDANCE
DEVELOP RULEMAKINGS
START WORK ON RULEMAKING CANDIDATES TO EDO
ONGOING WORK
6/88
COMPLETE FINAL RULEMAKING
FY 1993
PREPARE STANDARD FORMAT & CONTENT GUIDE (SF&C)
START WORK
10/88
ISSUE DRAFT
6/89
COMPLETE SF&C
6/90
PREPARE TECHNICAL POSITIONS (TPS)
START WORK
4/89
ONGOING WORK
COMPLETE FINAL TP
4/92
DOE SUBMITTAL OF LICENSE APPLICATION TO CONSTRUCT
3/95
NWPA/NWPAA MANDATED ACTIONS
REVIEW DOE MISSION PLAN AMENDMENTS & PDS; PREPARE QUARTERLY PROGRESS REPORT; SUPPORT NEGOTIATOR & TECH. REVIEW BOARD
CNWRA MGMNT & CAPABILITY DEVELOPMENT
RELEASE CONTRACT
10/87
COMPLETE PROGRAM ARCHITECTURE
FY 1989
COMPLETE CNWRA PHASE-IN OF TA. CONTRACTS
MAINTAIN PROGRAM ARCHITECTURE & CONTINUE CAPABILITY DEVELOPMENT
FY 1993
TECHNICAL ASSESSMENT CAPABILITY FOR LICENSING REVIEW
PREPARE REVIEW PLANS
COMPLETE REVISION OF STUDY PLAN REVIEW PLAN
COMPLETE CDSCP & DRAFT STUDY PLAN REVIEW PLANS
COMPLETE SCP REVIEW PLAN
12/88
COMPLETE DRAFT L.A. REVIEW PLAN
9/90
COMPLETE FINAL L.A. REVIEW PLAN
3/92
COMPLETE DEIS REVIEW PLAN
ASSESSMENT METHOD PREPARATION
START ENGINEERED BARRIER & PERFORMANCE ASSESSMENT
START (CONVO CODE) WORK
EBS PA
1/89
START REPOSITORY DESIGN & GEOLOGIC SETTING
COMPLETE ASSESSMENT METHOD PREPARATION
FY 1993
QUALITY ASSURANCE
DEVELOP QA REVIEW PLAN
COMPLETE QA REVIEW PLAN
ONGOING WORK
FY 1989
EVALUATE DOE'S QA PLANS AND THEIR IMPLE-MENTATION
DOE'S QA DOCUMENT REVIEWS; AUDITS; OBSERVATION AUDITS
FY 1989
FY 1993
TIME NOW
LEGEND:
SCHEDULED MILESTONES
COMPLETED MILESTONES
MILESTONE INDICATING END OF PHASE 1 OF THE REPOSITORY LICENSING PROCESS

TIMELINE OF LEVEL II SUMMARY SCHEDULE OF NRC REPOSITORY PROGRAM ACTIVITIES

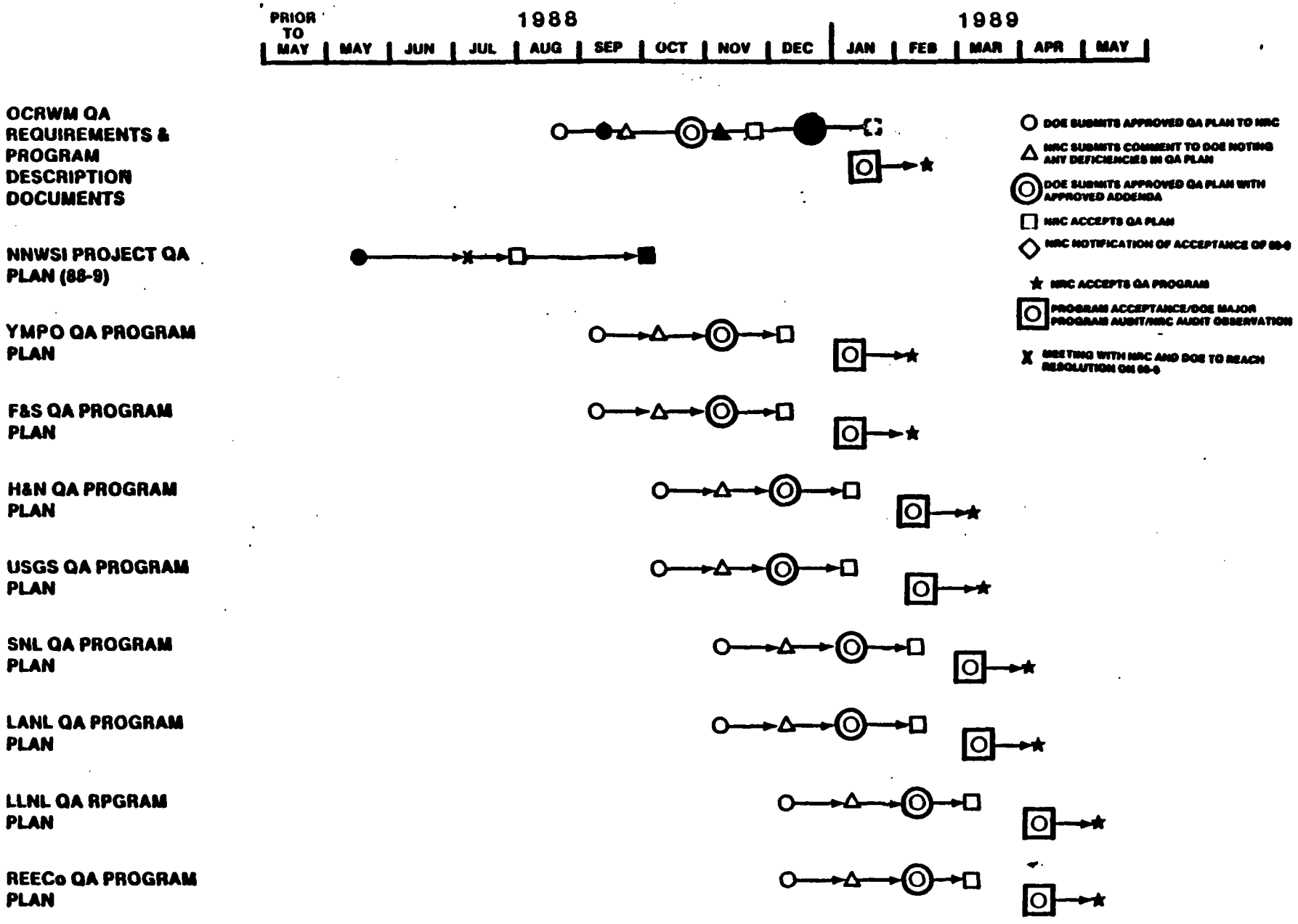


DOE REPOSITORY PROGRAM ORGANIZATION



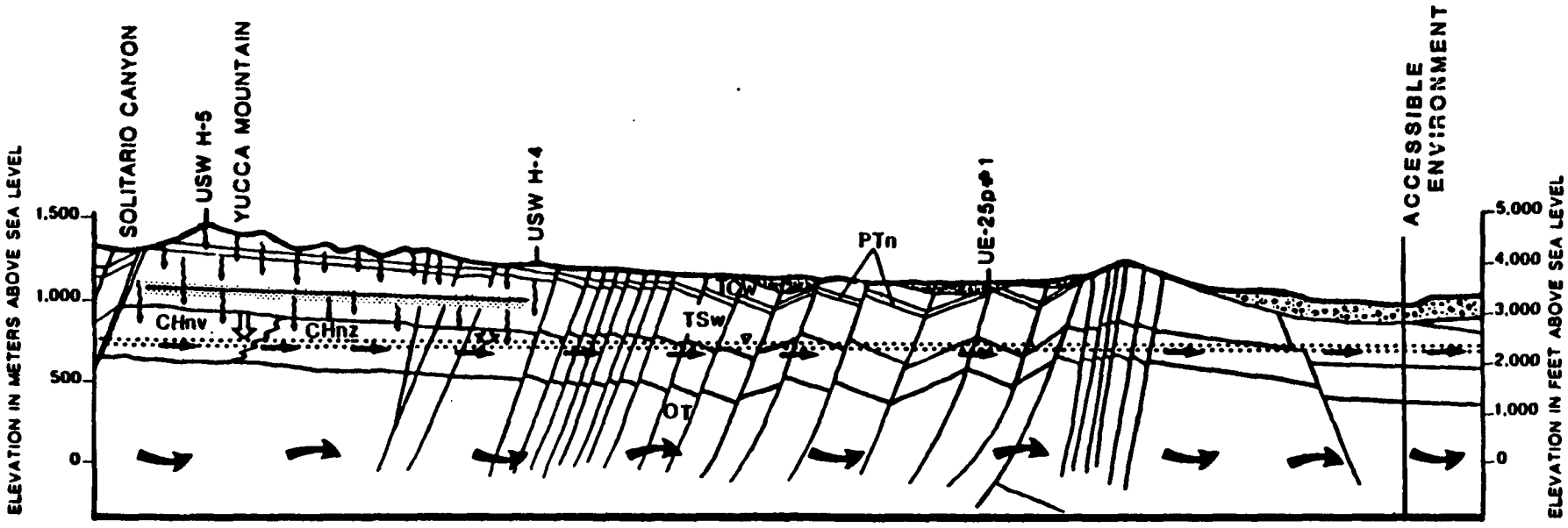
Backup Slide 3

SCHEDULE FOR NRC ACCEPTANCE OF DOE QA PROGRAM



Backup Slide 4

RADIONUCLIDES	RELEASE LIMIT PER 1,000 MTHM OR OTHER UNIT OF WASTE (CURIES)
AMERICIUM-241 OR -243	100
CARBON-14	100
CESIUM-136 OR -137	1,000
IODINE-129	100
NEPTUNIUM-237	100
PLUTONIUM-238, -239, -240, or -242	100
RADIUM-226	100
STRONTIUM-90	1,000
TECHNETIUM-99	10,000
THORIUM-230 OR -232	10
TIN-126	1,000
URANIUM-233, -234, -235, -236, OR -238	100
ANY OTHER ALPHA-EMITTING RADIONUCLIDE WITH A HALF-LIFE GREATER THAN 20 YEARS	100
ANY OTHER RADIONUCLIDE WITH A HALF-LIFE GREATER THAN 20 YEARS THAT DOES NOT EMIT ALPHA PARTICLES	1,000



ALLUVIUM & TIMBER MOUNTAIN TUFF

DESIGN REPOSITORY (THICKNESS EXAGGERATED)

WATER TABLE

FLUX THROUGH THE UNSATURATED ZONE

UNSATURATED-ZONE FLOW PATHS USED FOR TRAVEL TIME CALCULATIONS

SATURATED-ZONE FLOW PATH FOR WATER THAT HAS PASSED THROUGH THE REPOSITORY LEVEL

DEEP SATURATED-ZONE FLOW PATHS FOR WATER THAT HAS NOT PASSED THROUGH THE REPOSITORY LEVEL

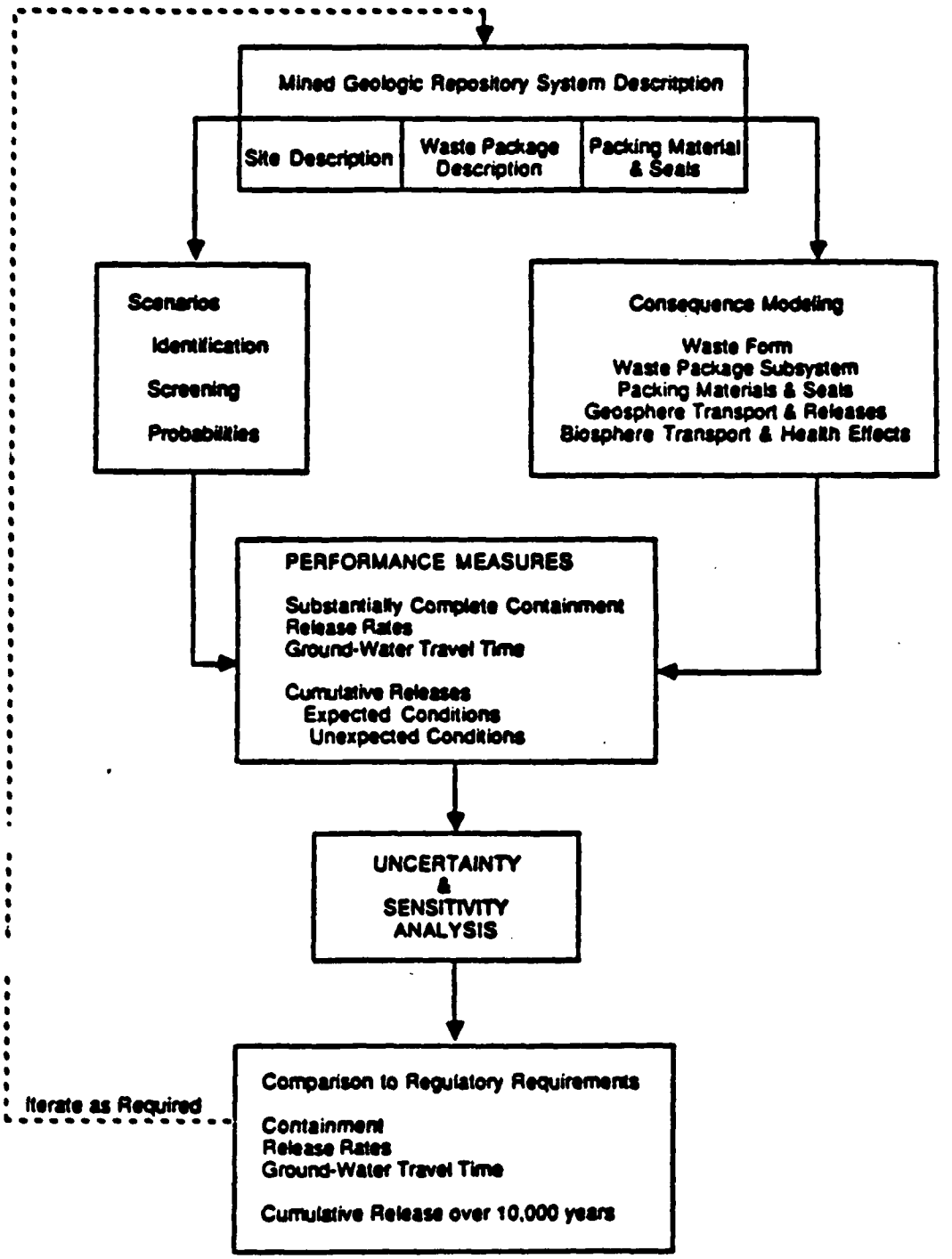
TCw	TIVA CANYON WELDED UNIT
PTn	PAINTBRUSH NONWELDED UNIT
TSw	TOPOPAH SPRING WELDED UNIT
CHnv	CALICO HILLS NONWELDED VITRIC UNIT
CHnz	CALICO HILL NONWELDED ZEOLITIC UNIT
OT	OLDER TUFF UNIT

0 0.5 1 MILES

0 0.5 1 KILOMETERS

CONCEPTUAL HYDROGEOLOGIC SECTION

Backup Slide 6


Mined Geologic Repository System Description
Site Description
Waste Package Description
Packing Material & Seals
Scenarios
Identification
Screening
Probabilities
Consequence Modeling
Waste Form
Waste Package Subsystem
Packing Materials & Seals
Geosphere Transport & Releases
Biosphere Transport & Health Effects
PERFORMANCE MEASURES
Substantially Complete Containment
Release Rates
Ground-Water Travel Time
Cumulative Releases
Expected Conditions
Unexpected Conditions
UNCERTAINTY & SENSITIVITY ANALYSIS
Comparison to Regulatory Requirements
Containment
Release Rates
Ground-Water Travel Time
Cumulative Release over 10,000 years
Iterate as Required

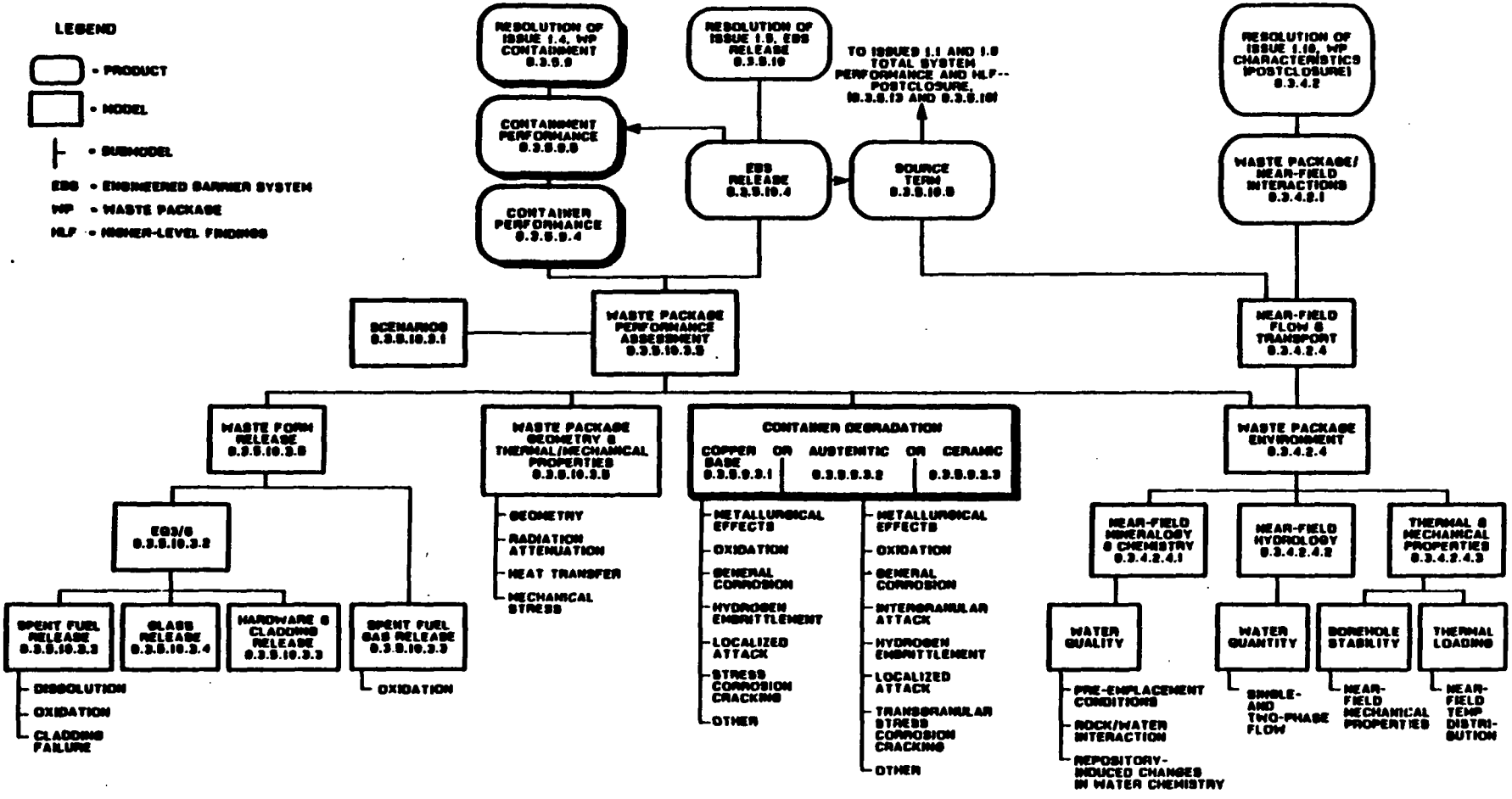


Figure 8.3.5.9-1. Model hierarchy for Issue 1.4 (containment by waste package).

Backup Slide 8

Table 8.3.5.19-1. Computer codes for use in performance assessment

Performance assessment task	Performance measures	Type of analysis	Potential codes[a]	Related issue in which the code may be used[b]
Waste package	Canister temperature	Conductive and convective heat and mass transfer	ADINAT NORIA, COYOTE, ARRAY F, TACO2D	1.4
	Waste containment time, waste release rate	Material degradation, dissolution, decay, leaching	WAPPA ORIGEN2, MORSE-L, NIKE2D,	1.4, 1.5
		Geochemistry	EQ3/EQ6, PANDORA, PHR81	
Repository	Rock stress-strain, displacement, permeability changes	Rock stress and fracture alterations induced by excavation; thermal loads, moisture changes; backfilling	ADINAT SPECTROM 31, SPECTROM 41, JAC2D	1.4, 1.5, 1.6
	Unsaturated water travel times, radionuclide release rates	Water flow in unsaturated media; coupled water and heat flow; coupled water flow and radionuclide migration	NORIA/FEMTRAN, WAFE/TRACR3D, TOUGH	1.5, 1.6
Site	Ground-water travel time	Probabilistic analysis of ground-water travel time distributions along flow paths at Yucca Mountain	GWTT	1.6
	Unsaturated and saturated water and radionuclide transport	Water flow paths; radionuclide migration	SAGUARO/FEMTRAN, TRUST/TRUMP, NWFT, TRACR3D, ISOQUOD,	1.1, 1.2, 1.3, 1.6
	Dose to man	Biosphere transport and human uptake	HDOC, VSFAST, PABLM, DACRIN	1.2
Total integrated system	Radionuclide release Ground-water contamination Individual dose	Simple systems model of water flow in unsaturated media; leaching; flow and migration in unsaturated media; flow and migration in saturated media	TOSPAC, NWFT, SPARTAN	1.1, 1.2, 1.3
	Dose to man	Biosphere transport and human uptake	PABLM, DACRIN,	1.2
	Atmospheric transport	Inhalation dose at accessible environment boundary	AIRDOS-EPA	1.3

[a] The list of potential codes does not exclude use of other codes.
[b] Issues 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6 are discussed in Sections 8.3.5.13, 8.3.5.14, 8.3.5.15, 8.3.5.9, 8.3.5.10, and 8.3.5.12, respectively.