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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON NUCLEAR WASTE

DATE: February 21, 1990

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

17TH ADVISORY COMMITTEE MEETING

7920 Norfolk Avenue

Room P-110

Bethesda, Maryland

Wednesday, February 21, 1990

The above-entitled proceedings commenced at 8:40 o'clock a.m., pursuant to notice, Dade Moeller, committee chairman, presiding.

PRESENT FOR THE ACNW SUBCOMMITTEE:

M.J. Steindler

W.J. Hinze

D. Orth

ACNW CONSULTANTS:

J. Shapiro
D. Okrent
C. Abrams
W. C. Fraley, Executive Director

PARTICIPANTS:

J. Linehan	P. Justus
K. Stablein	K. McConnell
Mr. Youngblood	J. Trapp

PROCEEDINGS

[8:30 a.m.]

MR. MOELLER: I will call on Bill Hinze who will introduce King Stablein, who will be leading the Staff's discussion on the first subject. Bill, go ahead.

MR. HINZE: Thank you very much, Dade. Before we ask King to make his presentation, I would like to make a few remarks. I think that we are all aware of the importance of the study plans to the characterization of Yucca Mountain. They are an important adjunct to the SCP and, therefore, it is very important that the NRC review the study plans with great interest and place a significant amount of importance on them.

Many of the details that many of us expected to find in the SCP were not there and, therefore, I believe that the importance of the study plans are even greater than perhaps we anticipated that they might be. It seems to me, therefore, that the study plans take on a critical role.

About a year ago the staff did make a presentation to the Committee regarding their plans for the review of the study plans and that was very helpful and very informative. A number of things have transpired in that year. Therefore, it seems very appropriate that we revisit this issue not only from the standpoint of understanding what the NCR staff intends to do about this but also Dr. Moeller in terms of

our role, the ACNW's role in reviewing the study plans in general and specifically the materials that are covered in particularly the technical reviews of the NRC.

Some of the changes that have -- and some of the specific reasons why we are revisiting this issue, I would like to list out. I don't know that King or the staff are prepared to discuss all of these or perhaps they are not worthy of discussion. To set the record straight, I tried to for myself, specify why we should be looking at this issue again. First of all, the level of details in the study plans was agreed on four years ago in a protocol between the DOE and the NRC. I really believe in terms of the changes that have happened in terms of the characterization of Yucca Mountain, that it might be appropriate to revisit the subject of the detail that are in the study plans and that protocol.

Secondly, in the presentation a year ago the staff did state that they would be reviewing again the study plan review, and the question really that we have is now that some of the study plans have been looked at by the staff and reviewed, are we in a position to state any variations to the review plan that was developed. There has also been, as I think we are all aware, a significant amount of slippage in the delivery of the study plans to the NRC by the DOE. I think that this certainly must impact on the plans of the

NRC in terms of their availability of time and resources to review these study plans.

The question is, are we going to see more than 20 percent of the study plans reviewed and, if so, have the criteria changed at all in terms of what study plans will be reviewed. I think one of the statements we find in the agreements between DOE and NRC is criterion for selection. This refers to the detailed technical review as the potential importance of the study plan relative to NRC license concerns.

Certainly, I think we all know what those licensing concerns are and, therefore, it seems appropriate that we focus in on those which are going to be reviewed and make certain that the criteria are spelled out. We note also in the study plans that we have received to date that there is reference to other study plans, and these are study plans that have not been to the best of my knowledge submitted to the NRC. One of the criteria listed in the protocols between DOE and NRC is the fact that one will in the review look at other related study plans.

I think that it is important that we learn -- and particularly in the study plan that we are dealing with this morning of the Midway Valley faulting, certainly there are study plans that impact upon that study which are not in our hands. I wonder how one can do a proper job of a technical

review without all the study plans in place.

Finally, the Secretary of Energy's Reassessment Program very well and to my great pleasure, focuses a new project on the prioritization of surface-based testing that is scheduled for completion by the fall of 1990, by the fall of this year. As a result of that, we are going to see perhaps a change in the order of the study plans, perhaps some change in the number of study plans that are going to be received by 1990. I think it would be very helpful to the Committee if we knew the plans of the NRC staff in relationship to the surface-based testing prioritization study and how that is going to impact upon our interest in the study plan and upon our workload.

Those are just some of the concerns that I have focused upon in terms of the study plans. With that, I think I will turn it over to King.

MR. STABLEIN: How is this, can you hear me all right?

MR. MOELLER: That's fine.

MR. STABLEIN: Good morning. It is a pleasure for me to be back here talking to you again about some of the review work that we have been doing on DOE documents. As you may recall it was exactly a year ago that Robert Johnson and I were down here to talk to you among other things about how we were going to review the study plans. At that time,

I was more focused on the site characterization plan which we reviewed.

But today, it is pleasing to be able to come to you to refresh your memory on our approach to review of study plan and then provide the first example of how this works out in practice, and to perhaps illustrate for you some of the lessons that we have learned as well as what we found out by looking at the study plan. My part of the presentation will be to set the stage by discussing our approach and then Keith McConnell who had the lead on the Midway Study Plan, will present the results of that review.

Does everyone have a copy of my few slides? I won't be using viewgraphs so you will have to have this in front of you.

A little bit of background with regard to the study plan review. The study plans are detailed plans for implementing investigations presented in the SCP. As Dr. Hinze mentioned, the DOE and NRC agreed upon a certain level of detail that should be contained in the site characterization plan and detailed past that in the SCP was expected to be contained in the study plans. So, that's why we need this next level of detail and why we need to look at it. Obviously, all the answers to our technical concerns would not be contained within the SCP.

Currently, DOE plans on issuing 106 study plans.

With regard to the content of the study plans as Dr. Hinze also mentioned, in 1986 DOE and NRC agreed upon what should be in study plans especially in contrast to what would be in the SCP. The lines were drawn as clearly as possible so that DOE could go ahead and confidently prepare an SCP knowing that NRC would be looking for details beyond the SCP in the study plans.

MR. MOELLEP: Excuse me. On that now, you have agreed what should be in a study plan and I gather that is in terms of the depth of detail and so forth. Does that also include the list of specific topics that are supposed to be covered by the study plans?

MR. STABLEIN: No. The list of specific topics, technical topics was not part of the agreement. Those topics come out of the organization of the SCP which DOE organized in accord with other agreements with the NRC and other documents.

MR. HINZE: King, while you are interrupted there, if I may ask. Is this an appropriate time to ask the question, has the NRC staff reviewed that document of 1986 to see in view of the present situation and after the SCA, do we have an appropriate document for the level of detail? Obviously, things were quite different in 1986 than they are today.

MR. STABLEIN: I think that is an excellent

question which we have thought about. One of the ways that we are approaching it is, as we review these first study plans to see whether the types of concerns we come up with relate to level of detail or whether they are matters of technical substance. What I would like you to do is, as Keith talks to you about the study plan for today is to think in terms of whether the concerns we are raising are matters of level of detail or technical substance based on what is supposed to be in the study plans.

MR. HINZE: Perhaps vagueness in that 1986 document, which we --

MR. STABLEIN: Possible. Or possibly, vagueness that could be cleared up, right. We have thought about this. We haven't come to any final conclusion, since we are just at the beginning of study plan.

MR. HINZE: Could you keep us informed on that, please?

MR. STABLEIN: Absolutely. I might mention too in reference to another question that Dr. Hinze raised asking about how we can review the study plan when we don't have the others that relate to is, this is another logical question which we don't have just a perfectly pat answer to. One of the requirements in the level of detail agreement was that there would be a discussion in the study plan as to how it relates to the other study plans or what is anticipated

to come in the other study plans.

At least as we get these early ones and we know we are going to get some before others, clearly we won't have a total set in hand on any topic such as TECTONICS. If DOE has discussed the relationship of the early study plan to what is to come later, it would be possible for us to do a fuller review than if they ignore this topic. Keith can take this up also in reference to the study plan that is our example today.

Are there any other questions at this point?

[No response.]

NRC and DOE have agreements pertaining to the review of study plans. The first agreement is that DOE will provide NRC with the study plan six months in advance of the beginning of work. You may notice that I have put when possible. DOE in a meeting with the NRC in late 1988, expressed the wish to get the study plans to a six month in advance but promised that they would get them to us at least three months in advance of when work is to begin. The reason why NRC would like them six months in advance is so that we can get comments back to DOE and have those seriously considered and perhaps interactions to resolve those comments prior to the beginning of work.

MR. MOELLER: Yet, when I read your review plan it said that for an acceptance review you would take hopefully

one week, and for a start work review you would take three months and a detailed technical review it would require six months. Now, if the technical review six months is beyond the three months for the start work review and that presumably is beyond the acceptance review, then you are talking nine to 10 months. Yet, you are only receiving the item less than six months ahead.

At the best within the time schedule here, I guess you could do a start work review and I guess as the name implies, it's okay for them to start work; is that it?

MR. STABLEIN: Yes. I will go into those stages in more detail, but I do want to address it here since you have raised it.

MR. MOELLER: Okay.

MR. STABLEIN: First of all, the six months and three months are maxima. Those were my first estimates in the draft study plan, review plan which I hope to refine at some point based on our experience. Those were generous enough to allow us the leeway to take that time.

MR. MOELLER: So, you may do much better than that?

MR. STABLEIN: We would like to do much better if possible, certainly on at least the start work review. Certainly, if we receive the document three months before work is to begin, we would like to get those comments back

to DOE in time for them to thoroughly adjust them and incorporate them in their plans.

I might also say that it may appear that it is a nine or 10 month process lined out, but the six months was meant to be six months from receipt of the study plan. We would expect to get all comments back to DOE certainly within six months, at least once we get into the rhythm of reviewing these study plans and have ironed our any wrinkles in the procedure.

MR. MOELLER: Help me again. You may have told us this, but I don't always hear what you are saying. The acceptance review, every study plan will undergo an acceptance review without exception.

MR. STABLEIN: Every study plan without exception, will undergo both the acceptance review and the start work review, every single one.

MR. MOELLER: Twenty percent or whatever the percent, only applies to the detail technical review.

MR. STABLEIN: Absolutely.

MR. MOELLER: Thank you. That is an important point.

MR. STABLEIN: Right. I will come back to that 20 percent number also, but I think I will wait until I get to the detail technical review to talk about that. The last point in the way of background is that we did issue our

draft study plan review plan in December, 1987. We do hope to upgrade it, but we need some experience before it makes sense to revise the document. So, we are getting that experience now and telling you about that now.

I would like to move on now to talk about the purpose of the study plan review. We see two purposes for reviewing study plans. The first is the general purpose that applies to all of our reviews of DOE documents and our interactions with DOE. The identification, and it should say the early identification of concerns with DOE plans to gather information needed to resolve licensing issues, the earlier we can raise pertinent issues the earlier DOE can start resolution of those issues.

Secondly, to audit the process by which DOE develops its plans for characterizing the site. We have looked at DOE's procedure. DOE has an administrative procedure for the preparation, review and approval of SCP study plans. Our QA folks and technical people have looked at this procedure, and we didn't find major problems with it. Now, in looking at the study plans we will see how that works out when it is applied to development of the study plans. That is one of the reasons we will be looking at study plans.

Let's move on to the three stage approach to review of study plans. Before I get into the individual

stages, I would like to call your attention to the fact that in a continuation of how we reviewed the SCP and you are familiar with this approach, we utilize a team -- a multi-disciplinary team of staff experts covering a range of areas. Keith will mention the different disciplines that were involved in the review of the Midway Valley study plan. We always involve more than one discipline in looking at any of these study plans.

In the case of today's you will see various geological disciplines involved. Quality Assurance personnel always are involved in looking at the study plan as well, and the other disciplines as needed. In fact, today I have several members of the team that reviewed this study plan in the audience.'

MR. MOELLER: Does the same team do all three reviews if it goes that far?

MR. STABLEIN: Not necessarily. It is not automatically the case. It would be logically the case that the people who are involved in the early reviews would continue on, but it would not be absolutely essential. If it is decided to do a detailed technical review, it is likely that reviewers would be added for the detailed technical review. As I discuss the stages, I think it will be apparent why you might add more disciplines for the detailed technical review. Also, it could be a different

team of reviewers for each study plan. It is not a totally fixed team of people that do all study plans.

Let me take the first stage of the review, which is the acceptance review. It is important to understand the meaning of the term acceptance review. This has caused some confusion, and I would like to make sure today that we all understand the meaning of the term. It is not an endorsement of the technical detail of the study plan, just as our acceptance review of the SCP was not an endorsement of the technical detail in the SCP.

It is a review to determine whether the study plan contains the material that was agreed upon by the NRC and DOE and, therefore, is worthy of further review by NRC or does the study plan need to be returned to DOE with notation that further material is needed before we can make a contribution by reviewing this document.

MR. HINZE: Excuse me. Do I understand that the acceptance review states that NRC has agreed to the level of detail that is presented in the study plan and not the substance of the material?

MR. STABLEIN: That is correct. That is right. The second criterion is the availability of the references supporting the study plan. DOE has to supply us with the references unless they are readily available in the open literature. This is the same criterion as was used for the

SCP. Of course, if those references have already been supplied for the SCP, we don't require that those reappear with the study plan. This is primarily to ensure that DOE documents which have not yet been published are available to us during the time of review of the study plan.

Are there any questions on the acceptance review?

MR. STEINDLER: Yes, I have one. Do I understand you correctly to say that the only document against which this review is carried out is the May 7, 1986 agreement between NRC and DOE, the acceptance review?

MR. STABLEIN: That is right.

MR. STEINDLER: You are reasonably comfortable that that document is sufficiently precise and easily interpretable in terms that would be agreed to by yourself and DOE, and agree that this review is not going to cause endless back and forth at the acceptance level?

MR. STABLEIN: The results of the May 1986 meeting have been boiled down to a table, contrasting what should be in the study plan with what should be in the site characterization plan. To date, it has proven to be sufficiently precise to make this determination relatively straightforward.

MR. HINZE: Would it be possible for you to share that table with us so that we would have a better idea of what you are talking about?

MR. STABLEIN: Yes, it would. I didn't bring 40 copies today, but I do have the table with me. If the ACNW staff doesn't have that table in that form and they well might, I would be happy to provide that.

MR. HINZE: Thank you.

MR. HINZE: Let me ask you, is there any problem in getting this done in a week? I guess all you have to do is go through a matrix and check it off, but it seems to me that's a short turnaround for such an important topic.

MR. STABLEIN: I think I can plead that I may have been naive in all three times that I laid out for the different review phases. We really didn't have any idea what this would involve before we got the first study plan. My thinking was that the acceptance review being based on this table and the availability of references should be relatively straightforward. It has proven to be fairly straightforward, but not quite as straightforward as a week would imply. I would probably in revising the timetables, allow myself and the staff a little more time at this end and perhaps a little less on the later stages.

Is there anything else on the acceptance review?

[No response.]

Let me move on then to the start work review, which as you may recall, will also be done every single study plan that we receive. The start work review has as

its purpose to identify problems with the study plan that raise flags in the staff's mind such that we should alert DOE not to go ahead with starting work before these concerns are resolved. You may recognize this as sounding very much like SCP objections. In fact, it should sound that way because that's what we intend these to parallel.

The review criteria potentially adverse affects on waste isolation, in other words compromising the site or messing up the site such that other characterization efforts cannot take place. These are fundamental flaws which, if present in a study plan, we would need to call DOE's attention to those immediately so that they don't start work and thereby jeopardize the site itself or characterization of the site. That's the focus of the start work review, and I think therefore it's pretty apparent why that must be done on each and every study plan.

We also, at the time of doing the start work review, assess the need for a detailed technical review which is the third stage of review and which, as you are well aware, is not necessarily going to be done on each study plan that we receive.

Turning to that third stage of review, you will note that the slide says review selected study plans which brings us to one of the more interesting questions today, what about 20 percent of the study plans and how did we come

to that; how does it work out from the criteria and so forth. Before I come back to the 20 percent, let me just address the criteria laid out in the review plan for determining the need for detailed technical review.

If the study plan is related to a key technical topic, something that has been identified in previous interactions with DOE, our technical exchanges, our meetings, letters, reviews of DOE documents, any other forum where technical topics have emerged as being very important to characterization of the site then we would deem it necessary to do a detailed technical review. More specifically, if the study plan is related to key concerns in the SCP, concerns that we have identified in our review of the SCP, we have many open items remaining from that review. If this study plan should relate to those, it is a likely candidate for detailed technical review.

If the study plan involves unique, non-standard or controversial test or analysis methods, if this is a state-of-the-art sort of study plan, for example in the area of characterization of the unsaturated zone about which not too much is known how to approach the hydrology in the unsaturated zone, that is a very important topic and something that is a likely candidate for detailed technical review.

Others unspecified refers to the fact that we are

doing an audit approach to DOE's program. We shouldn't have to review every study plan in great detail if the process is working by which they develop their study plans. At the same time in doing an audit approach, we might just want to pick and choose one or another almost just by chance or by when it comes in, to see how the process is working. This allows us the freedom to at any time, take a detailed look at a study plan. You may note it says selected procedures. Procedures are referenced in the study plans and NRC can request any of those from DOE and can conduct reviews of those.

Returning to the 20 percent --

MR. HINZE: Could I interrupt while you are talking about the criteria here?

MR. STABLEIN: Sure.

MR. HINZE: Am I to interpret what you have said, that those items that have been talked about as fatal flaws volcanology et cetera, that these will automatic -- that any study plans that relate to any potential fatal flaws will automatically be subject to technical review?

MR. STABLEIN: I can't commit to automatically.

MR. HINZE: Is that the intent of what you said.

MR. STABLEIN: That's the intent.

MR. HINZE: The intent of what you have said?

MR. STABLEIN: Right. DOE has informed us that

two study plans related to volcanism are close to coming our way, whether close is a month or two months or whatever. Certainly, the staff's thinking at least is that those would be basically automatic candidates to detailed technical review.

MR. HINZE: This would also include some of the hydrology issues, the mineral resources and natural resources, those that have been pointed to by various groups as potential fatal flaws, I would assume?

MR. STABLEIN: Those would be top candidates for detailed technical review.

MR. HINZE: Maybe you are getting to this point in your subsequent discussion, but do you see the sequence by which these will come in to you that will permit you to really do a proper job of technical review on all of those dealing with the fatal flaws, those that are really critical? Do you see the staff time available to handle those?

In other words, you are talking about getting two volcanology or three volcanology I have heard about coming in at one time. I am wondering, is this going to overload the staff and as a result, are we going to get not as detailed technical review as we might like to see? Am I making my point?

MR. STABLEIN: You are making your point. It's a

good point, and something that we have thought about. In fact, I am going to ask if management wants to comment on part of it. I would like to say that in my experience the NRC staff and management have not allowed resource shortfalls to cause us to do less detailed reviews in any area where we really need to do them. So, I just don't envision us doing less than adequate detailed technical reviews on, for example, the volcanology study plans.

Now, as to the resource situation I don't know if Mr. Youngblood or Mr. Linehan want to say anything about that.

MR. LINEHAN: John Linehan. I agree with what King has said. In looking at the study plans that are going to be coming in in the near future, it appears that a number of them are going to address key topics. I believe we have enough flexibility in the program that, if they are things we feel we need to review we will be reviewing them.

MR. HINZE: You will even let that six months slip if necessary?

MR. LINEHAN: The problem that we are faced with is if that DOE gives them to us all at once, then we are not going to be able to necessarily meet that six months and we have told them that.

MR. HINZE: I see.

MR. LINEHAN: The thing we are faced with though

is, we have had schedules for the study plans to be submitted over a period of time and they keep slipping and slipping. As of today, we don't have a really good idea when we are going to get them. The way our program is laid out and the way our budget is, is if there is a need to put more resources in the reactor varier then we will just slow down some of the proactive if the reactor things such as study plans really need to be looked at.

MR. HINZE: That is very heartening. Thank you.

MR. ORTH: The way the answers to Bill Hinze's questions have been phrased, can I deduce that you have not already selected a group of study plans that deal with the fatal flaws that you are going to wait and sort do on an audit basis?

MR. STABLEIN: That is correct. We haven't already designated the study plans for detailed technical review. Dr. Hinze has asked about specific fatal flaws, and I have tried to give him the staff reaction and very high likelihood of doing detailed technical review on those.

MR. MOELLER: I guess too, the whole subject of priorities is one portion of what we are trying to get at. It seems that most people agree that one of the first things you want to find out is if there are any fatal flaws in the Yucca Mountain site. Now, you apparently receive the study plans as DOE submits them. You don't go to DOE and say the

study plans that would appear to be most important are those that possibly could uncover fatal flaws and, therefore, we would like to see number four, eight, 12 and 26 as soon as you can. You don't do that?

MR. STABLEIN: No, we don't do that. We have given DOE several indications as to what we think are important technical topics via our reviews and technical exchanges. DOE can logically assume that the study plans for those would be important priorities. In addition, we have indicated in meetings with DOE the need for them to get us the study plans on ongoing activities as a high priority, and they appear to be attempting to address that.

MR. MOELLER: Do you get the impression that DOE is placing top priority on the study plans that have the potential for uncovering fatal flaws?

MR. STABLEIN: Well, I am hesitant to state DOE's position on this. They have publicly informed I guess the technical review board at least, that they are prioritizing their surface-based testing on the basis of potentially adverse conditions. So, they appear to be responsive to this concern. DOE is in the audience, should you care to hear from them on that particular topic.

MR. MOELLER: If there is someone that could comment on that, we would welcome that. If you could, give us your name first.

MR. KIMBALL: Jeff Kimball, acting Branch Chief in the Geosciences Branch at DOE Headquarters. In general, it is difficult to be anything more than general because obviously there has been internal problems with study plan schedules that we are working very hard on. On the schedules, I might add that we try to work with the staff almost on a monthly or bi-monthly basis updating them on what is coming up, at least over the next few months in terms of the relative sequence of study plans to help them plan their resources.

As we get a better schedule that looks like we can make the commitments that have been put forth, then we will work with them on a longer range basis to make sure the resource priorities are correct. There can be adjustments back and forth in terms of release or length of reviews and things like that, if we get into a period where the study plans are coming in a large number per month or something like that.

I think at this point on the schedule we see flexibility on both sides in being able to negotiate if we get into a period where there is a heavy load of study plans. In the near future I don't see that happening. In terms of priorities about a year ago, we made a switch essentially or readjustment of priorities in the study plan process which have caused some of the schedule problems.

That focus of priorities obviously had to do with the general priority of the shaft versus the surface-based program.

The original emphasis in the study plan process was to emphasize study plans that were going to be focused on testing either during shaft construction or the underground. As King mentioned, we had a meeting with the staff in December of 1987, and we were aware of their concern related to ongoing field activities. Since the shaft schedule has slipped and as a result of that meeting, we have now made our highest priority category ongoing field study plans. The next cycle of study plans that the staff will get will focus on ongoing field activities.

In general, the ongoing field activities can be correlated with the concerns that the staff has raised; volcanology is an ongoing program; faulting is an ongoing program; the unsaturated zone studies are ongoing. About the only one that doesn't fall in that category is the natural resource program, and we have cycled that one up earlier in the sequence as a new field activity. It lags a little bit though with the ongoing field studies. That's a general prioritization of it.

Now, obviously as Dr. Hinze mentioned, we are undergoing an effort to specifically or more explicitly prioritize studies that will be available next fall. If

that causes any shift in the schedule of study plans, then we will cycle that back in and make sure the staff is aware of what shifts were made, why they are made. That is a general answer. We have 25 study plans currently in the review process. It is not like -- the schedules slip -- we are making a large effort to review study plans. We have another one-half dozen or ten that are cycled in relatively soon to get the ongoing field ones which are the highest priority through the system faster.

So, we are putting a heavy priority on study plans internally. I have to balance that with all the other commitments, and that has been another reason that the schedules have slipped. But we are working very hard on study plan schedules.

MR. HINZE: So. 25 have been written at least in preliminary form?

MR. KIMBALL: I think if you want written in preliminary form, you are actually getting down to the participant level and there's probably at least double that.

MR. MOELLER: Thank you. That is helpful.

MR. STABLEIN: Very well. I will continue then with discussing the detailed technical review. The 20 percent, have we covered that adequately or would you like me to discuss that number which I think by now you can tell is not some magic number which emerges from an evaluation of

DOE's overall program or from the draft study plan review plan, but it was a number that was chosen on the basis of the resources available at the time and the status of DOE's program at the time. It does have the flexibility that Mr. Linehan indicated.

MR. HINZE: If I understand correctly, it was not only the resources but the sequence or the time at which you are going to receive the study plans. Obviously, that slipped and that 20 percent is no longer constrained neither by resources nor by the speed with which they are coming in to you.

MR. STABLEIN: Well, the budget for fiscal year 1990 is budgeted for I believe 10 detail technical reviews at the present. We do have flexibility to alter that. As DOE's schedule changes and need for detailed technical reviews becomes more apparent, we can make alterations in that.

MR. HINZE: If my recollection is correct, the 20 percent is really a 20 percent in 1989.

MR. STABLEIN: Originally, I believe it was.

MR. HINZE: Originally, right. Your budgeting in 1990 is for a total of 10, and you don't really know how many study plans you are getting in.

MR. STABLEIN: It was projected on the basis of 51 or 52 received.

MR. HINZE: I see, okay.

MR. STABLEIN: So, roughly 10 detailed technical reviews.

MR. HINZE: So again, 20 percent.

MR. STABLEIN: Right. Are there any other questions on that 20 percent or how we are going to determine detailed technical reviews?

MR. LINEHAN: I think it is important to note that as King has indicated, we are using an audit type of process here. In any type of audit the staff does of anything that DOE will be doing, if we see problems then we would be putting more resources on that particular area. I just want to emphasize that 20 percent isn't a fixed number. It is something more for just budget and planning purposes.

MR. STABLEIN: My last point that I wanted to make before Keith McConnell talks to you about our specific example today is the technical review criteria. The basic study plan review plan criterion is the adequacy of the study to provide the information needed for licensing. I think you will see how this is borne out in the review that Keith will talk about in a few minutes. Dr. Steindler?

MR. STEINDLER: Yes, I have -- let me read the last half of that sentence. It is the adequacy to provide the information for licensing. It was designed to provide, that is the study was designed to provide. At least that's

what I have here.

MR. STABLEIN: Right.

MR. STEINDLER: Okay. I think there is a significant difference between truncating that at the end of the word licensing and noting that it was designed to provide specifically. I don't see anything in the study plan review process that defines whether or not the staff accepts the notion that the design of the study being reviewed will in fact be to produce useful data.

Where does that issue get adjudicated?

MR. STABLEIN: First of all, I think it is a very sharp observation to pick up that truncation which is one of the things that I think needs to be addressed when I revise the study plan review plan. Although it is not stated in the review plan as it now stands, the staff has come to believe that we need to address both points; does the study plan provide the information it is designed to provide, and does it provide the information it needs to provide.

MR. STEINDLER: Somewhere that is going to be incorporated into --

MR. STABLEIN: Yes, it is.

MR. STEINDLER: Into the process.

MR. STABLEIN: I think you will see when Keith goes over the results, that it has already been incorporated in this first review. It is an excellent point, and there

is a significant difference.

MR. STEINDLER: As long as I have the microphone, if you don't mind, let me ask another question. Suppose in fact some study plan has undergone the detailed technical review that we have been talked about here. After associated back and forth with DOE the document finally meets whatever approval process you folks go through, does that mean that the staff is then prepared to accept the results of this study without any further discussion the subject, having presumably approved the plan by which these results are being obtained?

MR. STABLEIN: We would expect to be looking at the results in terms of the quality of the results via technical and QA audits as DOE gathers the data.

MR. STEINDLER: I understand that. You want to ensure presumably in an audit fashion that the QA aspects of getting these data as indicated in the study plan have in fact been followed and so on and so forth. Assume that there are no glitches in that operation and everything in fact has been done in accordance with the document that you folks have reviewed, let me ask the question again.

Does that mean that you are going to accept the data as useful for licensing without any further discussion?

MR. STABLEIN: I would like Mr. Linehan to help me out on this one to make sure I understand the question first

of all, and then the answer is precisely as possible.

MR. LINEHAN: No, I think there is going to be in any of these areas, there's going to be additional discussions between us and DOE. Part of it is because of the lack of knowledge that there is on the site. A lot of these study plans based on our existing knowledge, we may feel appear adequate to go off an start the study and it may turn out as data is collected under that study plan or other additional study plans that we feel the study needs to be expanded or revised somewhat.

There is also the question that once DOE collects the data, is the way they are going to interpret the data. These are also going to be subjects that we are going to have to deal with DOE on an ongoing basis.

MR. STEINDLER: I certainly understand the aspects of interpretation. I wasn't considering that. I was primarily interested in essentially the results as they flow from the study itself. What I guess I am driving at is, you are going to go through what appears to be a fairly extensive and expensive process, and I assume that the Department of Energy then looks at this and says well, it looks like NRC approves this operation in some fashion or another and if then the issue comes up two years later when all the results are in that we may have approved the study plan but we don't think the data is approvable, I think it's

legitimate to ask what does that first acceptance technical review really mean?

MR. LINEHAN: I think it is telling the Department that based on our existing knowledge of the site, it appears that the study as laid out will get the information that you need for licensing. We are going to make our best effort to make that type of determination.

I was just trying to point out that I think in some areas as we get more knowledge about the site, the studies that need to be done may change somewhat. That's why I don't want to say it's a final buy off, that if you do this particular study the way you have laid it out that data is going to be acceptable to answer the questions in that particular area.

MR. JUSTUS: May I add something?

MR. HINZE: Yes, sir.

MR. JUSTUS: I am Philip Justus. From our technical perspective, we are just reviewing a plan to gather data. That in no way presupposes that the actual data collected are automatically approved because the plan to collect it was approved.

MR. STEINDLER: I know that's what you are saying and I guess I have a problem with that. If in fact you are correct, then why bother going through this exercise? In other words, if you approve -- somebody says here's the

protocol to follow to do a particular analysis and you say that's a great protocol and it's going to work, it looks good. The guy goes in the laboratory or wherever and does all that and you come back to him and say I didn't say to you that I was going to approve the data. All I said was go ahead and go to the laboratory.

That, you know, that is overstating it obviously. I am trying to get at the notion of where you are once you have done that detailed technical review. What I sense is that you will have looked pretty hard at what DOE is planning to do, but you have made no commitments. It strikes me that that is perhaps a problem, I don't know. You never make commitments until the final licensing is done. You never say to these guys yes, this is acceptable data. Someplace, that process has to close. Otherwise the schedules, both your's and the Department's, are going to continue to slip forever.

MR. STABLEIN: I understand your point, and we will -- as I mentioned earlier, our attempt is to raise concerns as early as possible in the process so that DOE can address those. We will make every attempt to address all the conceivable concerns, significant concerns that we can based on the plan and the overall site characterization plan. But just of necessity as technology develops and the knowledge of the site develops, there could be some

surprises that emerge in the field or in the lab work.

MR. MOELLER: I hear it as an iterative process which you have indicated all along. When you approved the SCP or issued your comments on the SCP, that did not say that you approved the site. So, I hope I understand. I think I follow what you are saying. Dr. Steindler's question then of what does your review of study plan accomplish and commenting on it what does it accomplish as I hear you, you are saying it hopefully avoids pitfalls to the greatest extent possible that might occur in the future but you can't guarantee it.

MR. STABLEIN: That's right.

MR. HINZE: I have another concern regarding the slippage problem. If I understand what I have heard here this morning, the NRC staff is concerned or at least reviewing the review plan for the review of the site plans. One of the concerns there has to be the ambiguity in the phraseology, things like level of detail. The words mean different things to different people.

I am concerned that we hear from Jeff Kimball that 50 study plans have been written, and yet we may not have a sync between the DOE and the NRC staff's in terms of some of the phrasing of the agreed upon materials in the study plan including the level of detail. As Marty has said, are we just leading to a situation that is going to slip even

further?

It seems to me that in view of this, that NRC even with a limited amount of experience in the review -- but also taking into account as you say as technology has changed, as our view of Yucca Mountain has changed, as our priorities have changed -- that if you are going to change that review plan for the study plans, that this should be done with dispatch in order not to cause further slippage and reiteration of the development of the study plans by DOE.

MR. STABLEIN: Dr. Hinze, you mentioned two documents there; the level of detail agreement which is a fundamental part of the study plan review plan process and the review plan. With regard to the level of detail based on the experience that we have had so far, I personally don't believe that that is going to need revision at all, and I don't think that you will find that our comments on the study plan will relate to level of detail. I think they will relate to the substance of study plan and technical comments. In other words, not misunderstandings between DOE and NRC on what should be in a study plan in terms of the details.

I don't want to get ahead of Keith, but that is my understanding on the basis of that review. Let me address the other document that you mentioned and get your comments

on both of them. I don't think that the revision of the study plan review plan is going to hold up the process of reviewing future study plans, because we are treating it as a draft document and I am adapting the reviews to the reality of the situation such that for example, we are not held to the timetable laid out. I don't have to extend the review to last three months for the start work review and six months for detail technical reviews, for example.

As I said, those are maxima. If we start to get a lot of study plans and as we get more experience, I don't expect that we are going to need to take as much time with the reviews. There are things such as the language that Dr. Steindler highlighted on, does the study plan achieve what it was designed to achieve for licensing as well as does it achieve what it should for licensing that I would like to clean up. In our thinking, we have already incorporated that because it is an important point.

Certainly, we don't want to slow down this process any further by our review procedures. I don't at this point think that we are, but I am still open to hearing concerns along these lines.

MR. HINZE: I must admit that I have concerns in looking at the Midway Valley faulting in terms of the level of detail. This certainly does not -- perhaps we are getting ahead of this -- it doesn't specify the kinds of

materials that I even read in the level of detail document regarding numbers and locations, et cetera of various items. So, I think there may be room for discussion about that.

MR. STABLEIN: Okay, I will look forward to hearing that when Keith goes through that review.

MR. HINZE: Sure. Let me ask you, are you through discussing the item regarding specific criteria identified by review team before review begins; have we completed that item?

MR. STABLEIN: Actually, I hadn't touched on that last point yet.

MR. HINZE: Okay, I will wait for that then.

MR. STABLEIN: We were still on the point that Dr. Steindler made on the first bullet under technical review criteria. I did have one further thing to comment on that regard. In those cases where the study may not provide the information it should provide, we picked up many of those points during our review of the SCP itself. I think that is where you get a lot of those. But I still think it needs to be as well kept in mind for review of the study plan.

With regard to the specific criteria identified by review team before review begins, this refers to the need for the lead reviewer and the multi-disciplinary reviewers if they are involved in the review to have in mind specifics that they are looking for in this detailed

technical review of this particular study plan. Keith will be discussing the review criteria that he in fact utilized in this review.

Did you have a question on that, Dr. Hinze?

MR. HINZE: I guess perhaps it is best to wait and get an example on this. These are specific criteria then, that relate to that study plan and that are used in determining whether it satisfies technical review?

MR. STABLEIN: That's right.

MR. HINZE: I guess that's where it is.

MR. STABLEIN: Right. We have a large body of material that has been prepared by the staff as general preparation for these reviews. They are the detailed technical review guides which we in fact have had available for use during the SCP review as well.

MR. HINZE: I would presume that many of the comments in the SCA would also bear heavily upon that?

MR. STABLEIN: Indeed they do.

MR. MOELLER: Who integrates the NRC reviews? I gather that is your job or the team leaders and so forth.

MR. STABLEIN: The team reviewing the study plan consists of a technical lead who would be the most likely specialist for that area and other reviewers and myself as the project manager. The job of integrating the review falls to the lead and to me, and we work together to

integrate review. Of course after we have done so and the appropriate section leader also gets involved in looking it over to ensure that the quality of the review and of the integration, and then we have the management review process.

MR. MOELLER: You indicated of course, that you have a QA plan for the reviews for the NRC review itself?

MR. STABLEIN: The review plan that we use is a draft study plan review plan which contains internal quality assurance procedures.

MR. MOELLER: Right. Have those been reviewed and critiqued by a group outside the NRC?

MR. STABLEIN: I believe that, and Mr. Linehan can correct me if I am not totally correct on this, I believe that they have just been looked at by quality assurance personnel within the NRC.

MR. LINEHAN: That is correct.

MR. MOELLER: You know, QA is not my area, but DOE appoints independent in-house teams to go and review the QA say at Los Alamos or any other field lab. Then, you observe the people who conduct those in depth reviews. It would seem to me it might have been wise at some point for you to have had some sort of an independent review of your QA procedures. I don't know, but I am asking.

MR. STABLEIN: QA is also not my field. However, we do have a group that deals with internal quality

assurance, and they are independent of the review team that does the study plan.

MR. MOELLER: They have looked at this?

MR. STABLEIN: They have looked at it, right.

MR. MOELLER: At the QA plan. Well, you might give that some thought. As I say, I don't know that much about it. I notice too that in the start work and certainly in the detailed technical review, and I wonder if this is true for the start work review, that you provide an opportunity for input by the states and Indian tribes.

Do they have an opportunity for both a start work review -- am I mixing something up here -- and a detailed technical review?

MR. STABLEIN: No. You are not mixing anything up. It is good reading of the draft study plan review plan. It is one area that I haven't had the opportunity yet to fully involve the state and the counties. If it doesn't say that affected parties, it should include the counties too. We don't have tribes right now involved.

MR. MOELLER: In the one we are going to hear this morning, there was no input from the state or the country or the affected groups?

MR. STABLEIN: No, there hasn't been.

MR. MOELLER: Again, having heard you mention it this morning, this was written in 1986 I believe you said?

MR. STABLEIN: The level of detail agreement or the study plan review plan?

MR. MOELLER: The study plan review plan.

MR. STABLEIN: I think it was issued in December of 1987.

MR. MOELLER: Okay, it is several years ago.

MR. STABLEIN: Right.

MR. MOELLER: Would they be invited when you get farther along, will they be invited both to help with the start work reviews and detailed technical reviews?

MR. STABLEIN: This is an area that we need to think over how much involvement we need and at what time.

MR. MOELLER: All right.

MR. STABLEIN: The opportunity, I might say, is always there for the state and the affected parties to offer whatever comment or express concerns to us. That will remain true at any time during the review.

MR. MOELLER: I presume that if you revise the study plan review plan you will incorporate a segment that says ACNW will have input?

MR. STABLEIN: I think that depending on ACNW discussions with NRC management, I will certainly incorporate whatever the appropriate language would be to capture ACNW involvement.

MR. MOELLER: Okay. When a study plan involves

non-standard tests, you know, if the tests -- and this relates back to what Dr. Steindler was asking about -- if it involves standard tests that is one thing. If it involves non-standard tests, how do you evaluate and approve or whatever the correct word is, evaluate and comment upon non-standard tests?

MR. STABLEIN: We would apply the best expertise we have in the given technical area, ask that person or those persons to apply their expertise as best they can to the state-of-the-art test or method that has been proposed, possibly have to request an interaction of technical exchange or appendix seven visitor some interaction so that the experts can get together with the DOE experts to explore it before commenting on it.

In other words, inform ourselves as completely as possible, apply the best expertise to understanding what is proposed and why, and then give our best considered evaluation recognizing again that we are in an area where the technology may advance and progress past our present state of knowledge.

MR. JUSTUS: Dr. Moeller, that is correct. If you will, we have an example that we have been working with. In the area of non-standard tests or measurements, DOE has proposed a photogometric stereo photogometric mapping technique for mapping underground openings. This is a not a

non-standard technique. In order to evaluate it, we would need to put the burden on the developers of the method and DOE to demonstrate that such a new method or non-standard method is at least as good as a conventional method. Some comparison studies would have to be made.

Generally, there would be some way of calibrating the goodness of a non-standard method given the existence of more conventional ones to compare it to.

MR. MOELLER: Last question. Is someone going to tell us what you have learned from having done the review that we will hear this morning?

MR. STABLEIN: I hope that some of what we have learned has already emerged.

MR. MOELLER: Okay.

MR. STABLEIN: I, at this point, haven't totally assimilated everything that we have learned. We have another review ongoing of the regional quaternary hydrology study plan, and we are learning some different things from that study plan. It is totally different, done by a different DOE organization participant, and we are learning some things from that one too. I am still gathering all this knowledge.

MR. MOELLER: Will the review plan be revised? Is that what you have said, on the basis of these first few?

MR. STABLEIN: At some point we do intend to

revise it. I don't have a schedule to adhere to right now, but the intention was to revise it and make it a final review plan.

MR. MOELLER: Okay, thank you.

MR. KIMBALL: Dr. Moeller, may I say something regarding the level of detail if it is appropriate?

MR. MOELLER: Yes.

MR. KIMBALL: The level of detail agreement which is at this point over four years old I must say, has caused the preparation of the review of study plans to be longer than we had anticipated four years ago. It is an area that, while we have learned a lot in the preparation, it does cause us some concern. It is a Catch 22 really, is what could be set up, and that is what causes us the concern.

If you could explicitly put in all the information about locations, numbers and data that one could read into the level of detail, it implies basically you could write that part of the SAR. That is the Catch 22, is obviously a site investigation program has to be an iterative program. The whole point about going out in the field is to learn what information exists. Obviously, the program has to expand/contract as you get out in the field and gather that information.

So, we do have a concern with the explicitness of the level of detail, what you can tell today, the difference

between a plan and actual knowing what the answer should be. It really is a balance that has to be struck in that. I think as we have gotten into discussions about specifics with what few study plans we have, we can understand the concerns that are coming out, whether they have to do with level of detail or the technical method and adjust as we go along. I would say that we have a general concern with the difference between a plan or even a detail plan and knowing the answer, which we don't know today.

The other point about level of detail is, there is one level down below study plans that actually the principal investigator uses in the field and that is the detail technical procedures. There is actually for each investigative technique, one or more and in many cases many detailed technical procedures that lay out the step by step method that they are going to do.

I just wanted to make that point about level of detail, I thought it was important and may address some of Dr. Steindler's general comments that he asked about also.

MR. MOELLER: Thank you. Bill.

MR. HINZE: In response to Jeff, I sympathize with his concern. I think he also has to be somewhat sympathetic to those of us that are looking at the study plan and see a lot of maybe, possibly and words that are considered in the proposal writing game as very vague. Somehow or other that

has to be balanced out here, you are quite correct.

There are a couple of other questions that I do have while we are on this topic, and it was one that I brought up in my initial statements. That was, what are the plans of the NRC staff in terms of the prioritization of the surface studies initiative by the DOE? I think that is an appropriate question here, because it does involve so closely the prioritization of the study plans and development of study plans.

Could we be brought into the plans for NRC to track this, to monitor this, to review this heavy emphasis that is being put on performance analysis and performance assessment and so forth?

MR. LINEHAN: At the present time, we are tracking what DOE is doing in this area. In fact, we have requested an interaction with DOE to better understand what they are doing and determine whether or not we need to be involved. Whether we think it is important, whether they want our input in this study that they are doing on prioritization. I think there is a lot of material coming from the reviews we have done in the past that lay out our basic position of prioritization and give a good indication as to those areas that we think are of the high priority. At a minimum, we would follow what DOE is doing.

MR. HINZE: Is there a particular individual that

is identified as the point person there, and will that person keep us informed as to the progress that is being made and what the evaluation of the staff is on the whole project?

MR. LINEHAN: It would be somewhat in my organization, one of the senior project managers. At this point in time, I am following it myself. Once we set up an interaction with DOE, there will be someone specifically involved and it may be Dr. Stablein. We would be happy to keep you abreast of what is going on in that area.

MR. HINZE: We are concerned about the prioritization program, and we will want to get in at the right place if it is appropriate.

MR. LINEHAN: Okay.

MR. HINZE: The other question that I have is, what are the intentions of the NRC staff in terms of reporting to the ACNW regarding the completion of the acceptance review, the start work acceptance and the technical review, and what kind of information will we be receiving regarding the technical review? I note that we have technical review here this morning, yet we have just this morning received written material regarding the technical review by the staff.

It makes it rather difficult for us to do a proper job of understanding what the staff is doing without having

the opportunity to read over the material beforehand. I think it is also very wasteful of our work because I think the staff can do a lot of the spade work for us and we don't have to be concerned about some aspects of the reviewing of the study plans.

MR. STABLEIN: Let me start with the acceptance review and start work on this study plan and work my way to the detailed technical review comments which you received this morning. With regard to the acceptance review and start work review, we issued a letter to DOE with those results on November 24th. The letter was sent also to ACNW at the same time. That constituted -- we provided the study plan and the previous materials, but that is all we started on the start work and the acceptance review just with the contents of that letter.

With regard to the detail technical review, it was our intention to get comments to ACNW in advance of this meeting, and we were disappointed that we didn't get them down here. This is our first set of detailed technical review comments, and you can only hide behind that so much. We did run into things as we discussed, comments internally which we felt it was more important to make sure that we got the comments right than to rush them.

In future, when we come down to talk to you about study plans and detail technical review, we intend to get

the material to you far enough in advance so that you do have a chance to review it so that we can set the stage better for you to interact with us on our review. So, I do apologize for not getting them down here sooner. We wanted to, and we didn't.

MR. LINEHAN: Dr. Hinze, if I could also answer that. Our plans to date with respect to the study plans haven't involved any significant ACNW interaction the way we had planned things out. What we were doing today was to come down and basically explain to you the process we are following to make sure that you understood that, go through an example of one of the study plans, the types of review that we do.

We were considering it as an information type of briefing for the ACNW. We would appreciate any comments that you have on the process or on the review that we have done. At the present time, we don't have any specific plans for coming back to the ACNW on study plans. That is something I think we would have to discuss. We were focusing most of the ACNW interaction we are going to be having on rulemaking and areas of technical positions. That is our current planning. I am not saying that can't change, but that is currently what we were planning.

MR. HINZE: You understand we are trying to find out where we can be of most use to the NRC in terms of this

whole study plan, and that is part of our reason for getting together this morning.

MR. MOELLER: Back on the study plan we are to hear about this morning, you said that in November sometime there was a letter sent for acceptance review, or was that earlier?

MR. STABLEIN: On November 24th a letter from Mr. Linehan to Ralph Stein of DOE contained the results of the acceptance review and start work review for two study plans.

MR. MOELLER: To be honest, that went by me. I never noticed it. How many pages roughly was it?

MR. STABLEIN: It is a two-page letter.

MR. MOELLER: Two-pages, so it's not that long. It is not a detailed technical review.

MR. STABLEIN: Since we had no objections and found the study plans acceptable for further review, it didn't take too many pages to summarize that.

MR. MOELLER: Okay. So, it was pretty general in its words.

MR. STABLEIN: Right.

MR. MOELLER: Okay, thank you. That is helpful.

MR. STABLEIN: We can of course make copies available if needed.

MR. MOELLER: You have already said that you did, and I am sure we can dig it out. As I say, it certainly

went by me. It should have had a red label on it or something.

MR. STABLEIN: Since it was our first acceptance review letter, I am sure it would have looked innocuous like just another piece of mail. It was significant of being our first one.

MR. MOELLER: Sure. Okay. Go ahead, you were responding to Bill's questions.

MR. STABLEIN: Let's see. I may have reached the end.

MR. HINZE: He reached the end.

MR. MOELLER: If this wraps things up for you, you will still be here so that we can ask you more. I think it may be a good time to take a break, and then we will resume with the review of the specific study plan.

MR. STABLEIN: Thank you very much.

MR. MOELLER: Thank you. Take 15 minutes.

[Brief recess.]

MR. MOELLER: The meeting will resume. We will now move ahead with Keith McConnell and the detailed technical review of the study plan on the location and recency of faulting near prospective surface facilities.

MR. MCCONNELL: My purpose this morning is to give you an overview of the results of our detailed technical review. I won't be going into the specific comments that

you go this morning, specific detailed comments, because you just did get them this morning and you haven't had a chance to look at them. If there are any questions that do come up we can always go into them.

[Slides.]

MR. MCCONNELL: The study plan on the location and recency of faulting near prospective surface facilities is a TECTONICS related study plan that was prepared for DOE by Sandia National Laboratories. It is also the first study plan, as Dr. Stablein has mentioned, that has gone through the entire review cycle. What I would like to do first of all is to go through the various stages in the review cycle and give you some dates as far as when they were completed.

MR. MOELLER: Excuse me. You mentioned this was done by Sandia, and we do have the DOE representative here. I wondered how many different outside organizations are doing study plans. Is it five or is it 25?

MR. MCCONNELL: I would have to defer to Jeff Kimball.

MR. MOELLER: Jeff, could you tell us? I gather Los Alamos, Sandia.

MR. KIMBALL: The principal investigators or the authors responsible for the study plans are the major participants which are the USGS, Sandia, Los Alamos and Laurence Livermore.

MR. MOELLER: Those four are doing the bulk of them?

MR. KIMBALL: I'm sorry, and SAIC has a few. The bulk are the four with the remaining few by SAIC. I guess the five major participants.

MR. MOELLER: Say them again. USGS, Sandia, Los Alamos, Livermore and --

MR. KIMBALL: Los Alamos --

MR. MOELLER: SAIC.

MR. KIMBALL: Yes. The general breakdown is USGS for geohydrology, climatology, TECTONICS, Los Alamos for geochemistry, Laurence Livermore for waste package related testing. SAIC for some probably assessment or analysis studies is the main breakdown. Some of the other minor ones I could add in, but those are the fields.

MR. MOELLER: Thank you.

MR. KIMBALL: And Sandia, I'm sorry. I did leave them out, I'm sorry. Field work related to design and rock characteristics, both surface and underground.

MR. HINZE: Keith, if I may to complete this chronology. When was the study plan received?

MR. MCCONNELL: I think it was received June 30, 1989, if I am not mistaken. Dr. Stablein has outlined the various criteria that are used for the various stages in the review cycle. The acceptance review for this study plan was

completed on September 8, 1989. Again, the acceptance review is where we judge the study plan versus the level of detail agreement. That has already been mentioned several times here.

After that, we worked on the start work review and completed it on November 24, 1989. That is when the letter that Dr. Stablein mentioned went out to DOE. Finally, the draft detail technical review was completed January 11 of this year. As Dr. Stablein mentioned also, the review of the study plan, the detail technical review of the study plan was a team effort involving several high level waste management staff members, including Mike Blackford in the area of sisemology; Abou-Bakr Ibrahim in Geophysics; John Trapp and myself in the are of TECTONICS.

MR. HINZE: Keith, while you have that up there I would like to ask you a question or King. What is the intended role of the use of center personnel in the study plan reviews?

MR. MCCONNELL: I think, and King can correct me if I am wrong here, in areas where we do not either have the resources or the expertise we will then ask the center to come to our assistance in that area in reviewing various study plans.

MR. HINZE: Has there been a point person identified in the center that monitors these to see if they,

on the basis of the research that they are conducting their activities, that they have any contributions to these? Do they have to be asked by you to make contributions?

MR. MCCONNELL: I will answer the second part of the question first. No, they don't have to be asked. I think that Dr. John Russell at the center who is in charge of the geologic setting program there is monitoring the study plans, has copies of the study plans, has copies of our reviews, and is informed all along the way. So, if he sees some area of input he is free to contact us.

MR. HINZE: Thank you.

MR. STEINDLER: I just wanted to point out to Dr. Hinze who asked when we received the study plan and Keith mentioned it was late June of 1989, I didn't want to leave the impression that it took us two to three months to do the acceptance review which it could appear to be that way. We received this study plan in the quaternary regional hydrology study plan while we were in the throws of the review of the SCP. Hence, we didn't really get to start on the review of either study plan until sometime in August, after we had gone through the preparation of the site characterization analysis and appearances before ACNW, the Commission and all of those things that we needed to finish up the site characterization analysis.

So, just in terms of the schedule that we

discussed previously for the acceptance review, although it did in fact take us more than a week, it didn't take us two to three months.

MR. HINZE: Thank you for clarifying that point.

MR. MCCONNELL: What I would like to do now is just give you an introduction, a very general introduction to the study plan. What I have done here is to quote from the study plan, quote the objective and the purpose. The objective was to gather geologic data from Midway Valley and identify areas where late quaternary faults are absent. The purpose is basically as I have seen it, is to evaluate the location and recency of faulting near prospective surface facilities in Midway Valley.

MR. HINZE: Excuse me again. Perhaps I am interrupting your flow here, but to my way of reading that objective does not sync with the SCP objective, which looks not only at the late quaternary for the past 100,000 years but also at the entire quaternary. I am sure that you know the words to that as well as I do or better, and I am wondering what the reaction is.

Obviously, this is an accepted objective because this was an accepted study plan.

MR. MCCONNELL: I think as we go along, you will find out that the substance of our comments on this study plan is that even though you might fulfill this objective

you will not necessarily fulfill the purpose of the investigation.

MR. HINZE: If my reading is correct, the SCP states the study is the identification and characterization of faults that have apparent quaternary slip rates greater than one-thousand of a millimeter per year or measurable offset formations that are less than 100,000 year olds within 100 meters, et cetera, et cetera. The point here is that the word quaternary is used without the adjective of late.

There is this measurable offset in the late quaternary, but there is the general statement about quaternary.

MR. MCCONNELL: There is what we I guess have identified as inconsistencies and we will get into this a little bit later in the presentation, about what is meant by late quaternary and significant late quaternary. This study has outlined, the scope is outlined. They are only going to examine what they term as significant late quaternary faults which meet the criteria that you described, the slip rate and offset.

MR. HINZE: Not to my reading. It's quaternary, and that is late quaternary.

MR. MCCONNELL: Well, --

MR. HINZE: If you are going to come back to this

Keith, I just want -- that's fine. I just want to raise the question that I had in reading the document and in reading the SCP.

MR. MCCONNELL: I think we will get into that later.

MR. HINZE: Okay.

MR. MCCONNELL: If I don't hit it, let me know.

MR. HINZE: Okay, good.

MR. MCCONNELL: The study itself has two planned activities; one to identify appropriate locations for long trench in Midway Valley; two, to conduct the actual trenching effort. That is the brief overview of the study. What I would like to do now is to just give you some idea of the context of this study with the effort with respect to the surface facilities and location of the surface facilities.

This is just a page taken out of the SCP that basically shows the logic of the investigations. The one that we are talking about today is this activity here in the stipple pattern, 8.3.1.17.4.2.2. Just to make it a little bit easier to read, I have included a blowup of this. Again, here is 8.3.1.17.4.2.2. It is driven by these data requirements here, which are basically the criteria that Dr. Hinze mentioned. These feed into activity 8.3.1.17.2 and 1, which is to assess the potential for surface faulting at

locations of surface facilities.

One point that I would like to make on this diagram is to point out this area right here, this box. These are the data requirements, and this is what these activities are designed to provide information for. In this review the basic criteria used was to see if this activity could meet these design requirements or data requirements that are annotated here. In our SCP review that was documented in the site characterization analysis, we raised issues with respect to the data requirements that have been outlined here. We do have some concerns in that area, but we did not go back and readdress them. I will go back a little bit more on that subject later in the presentation.

I just want to point out this box and the relationship to the activity -- the major activity which is to assess the potential for surface faulting.

Again, in the area of introduction I would just like to go through and orient you just a little bit. This is a diagram of the conceptual design report that accompanied the SCP. It shows the location of the underground facility. It also shows a reference area for the surface facilities here, a waste ramp and tuff ramp. The area that the study plan deals with is Midway Valley, which is in this area right in through here. I am going to go through several diagrams and maps. What I want you to be

aware of is this little hill here, this is a small Hill. That is Exile Hill. That is a reference point for all these futures diagrams and maps that I am going to put up.

If you locate yourself with respect to Exile Hill, you will know that we are talking about the area East of Exile Hill.

MR. HINZE: Keith, while you have that up, if I can ask a question.

MR. MCCONNELL: Sure.

MR. HINZE: Concerning the waste ramp. We realize that the ACF is undergoing reassessment and alternatives are being considered. The waste ramp there, is that considered in the characterization of the surface facilities? Is that considered part of the repository? Where does the waste ramp, which seems to fall geographically between these two areas, where does that fall in the whole characterization issue?

MR. MCCONNELL: I am not completely certain. There have been statements made that it basically is an inclined shaft, and therefore, is outside the underground facilities. I think that is a question we are talking about internally. Maybe John Linehan will help.

MR. LINEHAN: It is basically considered part of the repository itself. It is in access to the repository and part of it.

MR. HINZE: That is crossing those faults, that we see at that Exile Hills thing?

MR. MCCONNELL: Yes.

MR. HINZE: That is going to be considered in the characterization of the underground facility, and you are not taking that into consideration in the surface facilities?

MR. MCCONNELL: I think it would be just the outside.

MR. HINZE: I just want to make sure that I understand.

MR. MCCONNELL: I think it would be considered part of the surface facilities and not part of the underground facilities, if it is assumed to be an inclined shaft. Shafts and bore holes are outside the area of underground facility.

MR. HINZE: Let me terminate this by stating that I am very pleased that the staff is looking at this problem and making certain that it doesn't fall between -- this is a pun --the cracks, because it is really falling right on a crack.

MR. MOELLER: To remind me now, the waste ramp looking at your scale, is about a mile long up there. How much is underground?

MR. MCCONNELL: It is entirely underground. There

is a portal.

MR. MOELLER: Right. It's right at the central surface facilities area.

MR. MCCONNELL: Yes.

MR. MOELLER: Now with the tuff ramp, it's a little bit shorter. How much of that is underground?

MR. MCCONNELL: Again, it is mostly underground and there's a portal up here.

MR. MOELLER: Right at the end, thank you.

MR. MCCONNELL: Again, we are going to move onto a closer view.

[Slides.]

MR. MCCONNELL: Here is Exile Hill and the reference conceptual site for the surface facilities. This is out of the study plan. Also, it shows some of the major faults in the area, including Paintbrush Canyon, East of Midway Valley and Bow Ridge Fault on the West side of Exile Hill. This also shows the area of study with respect to this study plan. Midway Valley is this area though here.

One thing for future reference is this line here. It is a line of cross-section that we will be looking at later.

MR. HINZE: Keith, where is Midway? Could you draw for us where the Midway Fault zone would project onto this? We see that in profile view okay.

MR. MCCONNELL: This is a copy of Lipman and McKay's map. I have added the annotations here including the Bow Ridge Fault, Exile Hill again. This was a reference location for the surface facilities. Midway Valley and the Paintbrush Canyon Fault, you can see that they projected the Midway Valley fault or what has been termed the Midway Valley fault up through the center of Midway Valley.

MR. HINZE: Could you put that on -- just sketch that for us on the preceding overhead? I want to make certain where that faults.

MR. MCCONNELL: Sure.

MR. MOELLER: To help me Bill, we are then interested in this fault primarily because of its affects on the surface facilities?

MR. HINZE: Yes, sir. That's the idea, whether it meets the criteria regarding the quaternary and late quaternary faulting.

MR. MOELLER: All right, thank you.

MR. MCCONNELL: This is an attempt to trace the Midway Valley fault through Midway Valley.

MR. HINZE: Can I ask you Keith, have you reviewed the Scott Neal's work in terms of the certainty or the validity that we might place upon the Midway Valley fault zone?

MR. MCCONNELL: I have looked at the data that has

been published on the Midway Valley fault, and I guess there's a lot of uncertainty of what the significance of the Midway Valley Fault is. Scott and Bonk left if of their geologic map, but included it on their cross-section. Lipman and McKay put it on their map as we see here, and projected it through Midway Valley.

What the evidence was that Lipman and McKay used to make this projection, I am not aware of.

MR. HINZE: Is there any direct evidence for this? Where is the nearest point where the Midway Valley is seen to the Exile Hills area?

MR. MCCONNELL: I am not completely certain, but I think it would be up in the Calico Hills which would be up to the North, on the North end.

MR. HINZE: Is there anything to the South there?

MR. MCCONNELL: I am not familiar with that. I don't know.

MR. HINZE: Thank you.

MR. MOELLER: Could you tell me whether or not all those dash lines that I see heading substantially North and South represent either known or estimated faults; is that what they are supposed to show?

MR. MCCONNELL: Yes. All the dotted lines trending in that basically North South direction and Northwest are faults. That's a road.

MR. MOELLER: With the exception of the road.

MR. MCCONNELL: Yes.

MR. MOELLER: Thank you.

MR. MCCONNELL: This is more again, in the way of introduction. This is a photo that is not in your package because it wouldn't reproduce. For Steindler and Dr. Moeller, if you remember when we were out at Trench 14 several years ago, you basically were standing in this trench. Exile Hill, it's difficult to get the perspective, is right in the foreground. Behind Exile Hill is the reference location for the surface facilities.

What I would like to do is try to set the stage a little bit of the TECTONIC questions that exist in Midway Valley. Again, I want to look at this cross-section through Midway Valley. That is prepared by Scott Bonk. This is Scott Bonk's cross-section. Again, the next diagram just blows it up a little bit to give you a better perspective.

You can see again Exile Hill there, bounded on the West by Bow Ridge Fault bounded by -- Midway Valley bounded on the East by Paintbrush Canyon fault. You can see that in this conceptual model of the faulting in Midway Valley, Scott and Bonk placed a number of imbricate faults underneath the valley itself in the tertiary section.

MR. HINZE: Why did they do that?

MR. MCCONNELL: They based it primarily on the

bore hole information that was derived in Midway Valley to accommodate the bore hole formation, the stratigraphy that they found in the bore hole.

MR. HINZE: Also, in terms of the nature of the faulting in the area where it is observed?

MR. MCCONNELL: Yes.

MR. HINZE: In those imbricate faults, do they go down to the master fault? Could we assume that they would intersect with the Midway Valley Fault zone then?

MR. MCCONNELL: I think in Scott and Bonk's interpretation they did not. As one conceptual model, that is something that DOE is going to address. At least in one of our technical exchanges, Ken Fox of the USGS indicated that they are going to address the interconnection of the faults in Midway Valley.

As part of our review questions or the questions we had with respect to the review of this document, we are asking to provide a little bit more clarification as to where this information will be provided and what study will provide the data that is going to test these hypotheses of interconnectability of faults under Midway Valley.

MR. HINZE: In your view, is it significant to you that if these imbricate fault systems really do go down and intersect and become part of the master system.

MR. MCCONNELL: In our view it is significant.

MR. HINZE: Yes.

MR. MCCONNELL: And, they do pose a hazard. The quantification of the hazard is the question.

MR. HINZE: In my reading of the study plan is that this is not addressed.

MR. MCCONNELL: That is correct. It is not addressed in this study plan. The only thing that is going to be addressed in this study plan is this stippled pattern area, and really only the upper part of the stipple pattern area which is the quaternary alluvium basically. They are only going to be looking at the upper most part of the quaternary alluvium. This study plan, which has a very limited scope, we will talk about that in the next viewgraph.

One of the things that we had to keep in mind when we were reviewing this study plan is the very limited scope that this study plan has. It made for a very difficult review. I will get into some of the details of that.

MR. HINZE: I am going to interrupt you. I will let you talk, okay. I was referring to direct information regarding the Midway Valley fault zone. Is there any microsisemicity, any sisemicity in the area at all that might be supportive of the Midway Valley fault zone? Is there any indication that there are faults occurring at depth with perhaps no movement at the surface upper

quaternary materials?

MR. MCCONNELL: To my knowledge, there is no microsisemicity that can be tied to a specific fault in Midway Valley.

MR. HINZE: Is the microsisemicity network adequate to look at this problem even over a short time duration?

MR. MCCONNELL: I think I would have to defer to Mike Blackford who looked at the sisemiclogical aspects of that.

MR. BLACKFORD: The simple answer to that is yes, the resolution of micro earthquakes is on the order of a kilometer or less. I am sure they would be able to detect micro earthquakes down to a magnitude of zero in that range at least.

MR. HINZE: Is there anything that has been detected over in this area with the present network that would --

Mr. BLACKFORD: In the records over the last 10 or so years, there may have been one or two micro earthquakes in that vicinity, but most of the activity is not near the Yucca Mountains. It is just a handful of micro earthquakes that have been actually located there, and that's not sufficient to pin any particular quake to a particular fault.

MR. HINZE: No, but it would be helpful to know where there is any of the micro sisemicity that has occurred out in the central portion of Central Valley.

MR. BLACKFORD: I can't think of any particular micro earthquake in the last 10 years that may be there. There may be one, but I think that is more up toward Yucca than the Midway Valley area.

MR. HINZE: Thank you.

MR. MCCONNELL: I think we have covered that group. One more slide in the area of introduction was something I mentioned about trying to keep the context of this investigation and this study in perspective. There were two things that we had to keep in the back of our minds while we went through the review process, a detailed review process.

The first of these was that the SCA comments, the site characterization analysis comments were published after DOE finalized the study plan. Basically the SCA comments that identified concerns with respect to the characterization parameters -- in other words, the things that developed the data requirements on that earlier slide -- these data requirements there. Those comments that we developed in the SCA could not have been addressed basically by the study plan, because it was finished prior to our SCA coming out.

MR. HINZE: What is the point of that?

MR. MCCONNELL: The point is basically, we did not go back in our study plan review and revisit the SCA comments. In other words, we didn't criticize the study plan for something we identified as a concern in the site characterization analysis.

MR. HINZE: Where is it going to be criticized?

MR. MCCONNELL: It is in the site characterization analysis as an open item, as one of the comments.

MR. HINZE: Is that going to be resolved before the study plan is initiated?

MR. MCCONNELL: Not to my knowledge. It is not necessary for DOE to resolve them. We have already told them that they can go ahead and start work. There is nothing in the study plan that we have judged will adversely affect the waste isolation capabilities of the site. They are tracked as open items by the projects, directorate, and DOE is attempting in their review of our SCA to address those comments and come to closure on them.

MR. STABLEIN: I just want to make it perfectly clear that what Keith is establishing is, we didn't rewrite the SCA comments in terms of this study plan. When we communicate the review results to DOE the SCA comments which we have already created and which apply to this study plan, will be called to DOE's attention once again.

MR. HINZE: Thank you.

MR. MCCONNELL: The second thing that we have to keep in mind in the review is that this study does not constitute the entire effort in the Midway Valley area. Basically you can see all of these activities here actually feed into the assessments of faulting for sites of potential surface facilities. What that means is that what might appear on the surface to be an inadequacy in the study plan might not be because that data perhaps may have been collected -- perhaps will be collected in another study.

With that, I will try to summarize the results of our detail technical review. It basically is that in order to determine if this study will provide the information for licensing, and we could add there for which it is designed. The purpose, goals and objectives need to be clarified for two reasons. First, there appear to be inconsistencies in the statements concerning the purpose, objectives and goals of this investigation. Also, there is uncertainty in our mind, unclear to us the relationship between which data will be collected in this study versus data that will be collected in another study.

This gets to Dr. Hinze's question about which study will collect information on the interconnections of faults under Midway Valley. If I could just amplify a little bit on what appear to be inconsistent statements in

the study plan, first of all the plan indicates that it will document the existence of any fault near waste handling buildings. Also, the plan indicates that a considerable effort will be placed in identifying an area where no quaternary faults have occurred.

Again, quaternary is the key word here. When you get into the study plan and look at the objective, the objective is limited to late quaternary faults. We are going to identify areas where late quaternary are absent, and there's a distinct difference owing to the age of faulting that is related to those two terms. Late quaternary is basically taken to be faulting that is offset units that are 100,000 years old or less. Also, the emphasis in the study plan is to determine the existing of only those faults that are considered significant late quaternary faults.

In our view, these two items would require much more extensive study of what is outlined in the study plan that we have in-house now. We think from looking at the performance indication and the data requirements that DOE has done, that they really are only talking about looking at late quaternary fault and significant late quaternary faults. We would like it to be clarified what they are talking about as far as data collection in this study.

MR. MOELLER: I guess though another question, and

maybe you have already answered it is, whether the original plan -- I hesitate to say objectives. Your first two bullets, whether those were really necessary if the objectives are all that are really necessary, then it is okay. But if the original goals -- I will use that word for them, the first two bullets --really are essential, then the objectives are not meeting the goals.

MR. MCCONNELL: I guess we would agree. We are just asking for clarification as to which is which, what information is going to be provided and what is the true objective of the study. The purpose again, you could achieve the objective and not necessarily fulfill the purpose. If the purpose is to evaluate the location and recency of late quaternary faulting at your prospective facilities, then that's fine. We also consider early quaternary faults as potential hazard to the surface facilities.

We would just like clarification as to where that data will be collected, which study will collect that data. We have had technical exchanges with the DOE, where we have gotten some information but it still is not completely clear which studies can provide which information. It relates to something that Dr. Hinze brought up, if I can put the cross-section back up. Which investigation is going to provide the information on these faults that are in the tertiary

section or may be in the tertiary section and could possibly extend up into the lower quaternary section too, but not breech that 100,000 year data that they are looking at specifically.

The second part of our overview of the review is that there were questions in our mind about -- this is something I just basically went over -- the interface with other activities. The characterization parameters that relate to this study basically indicate that they are only going to look at these late quaternary faults. However, there is a statement in the study plan that suggests that this plan is going to be the most detailed study in Midway Valley.

If you read between the lines of that statement, you start to question if this is the most detailed what is going to provide this additional information. One thing that we have gotten out of both the study plan and our interactions with the DOE is that perhaps activity 8.3.1.17.4.6.2 will provide this information. We have to go back to this diagram.

[Slides.]

MR. MCCONNELL: You can see that 8.3.1.17.4.6.2 clears this one right here. When we go back into the SCP, we don't have this study plan in-house, but when we go back to the SCP the information provided in the SCP indicates

that similar things are going to be done in this activity as are going to be done in this activity. If this is the most detailed one, we are having difficulty understanding whether this is a duplication, whether this study is a subset or what. We are just asking for clarification on which information is going to provide -- which study is going to provide which information.

MR. HINZE: Let me ask a question here about the procedure. Perhaps King, you would like to answer this. After DOE receives your response to the study plan, what is the procedure and when can they start work? Can they start work upon receiving the acceptance of the start work?

MR. STABLEIN: The letter that summarizes the start work review makes it clear that we have no objections to DOE starting work. It further indicates that we will be doing a detailed technical review, we will have possibly comments and questions coming from that review. Of course, the definition of comment as we used it in the SCP differs from objections. Objections, really, they should not proceed with work until they have resolved them.

Comments, they can proceed with work at their own risk. These things need to be resolved at some point, or they may be in danger of not getting the data they need for licensing if they don't get these resolved. So, we recommend that they resolve the comments early on, but they

may proceed with work on the basis of the start work review. That is the purpose of the start work review, is to either tell them we have problems that are of such a nature that they shouldn't start work or that they can start work but that we may have comments coming.

Obviously, what this puts the onus on them to get our detailed technical review comments as soon as possible, so that they can factor those in early.

MR. HINZE: For example, DOE does not have to reply to your review?

MR. STABLEIN: DOE doesn't have to reply to our review, no.

MR. LINEHAN: If I could add to that, DOE is free at any time to go ahead and start any of these studies they want. They only specific agreement we have with them is that they will not start new site characterization activities until they have an accepted QA program in place. That is the one commitment that would hold them up from starting. Any of these things, they are free -- any of the studies other than QA, they are free at any point in time to proceed with the study.

What we are trying to do as part of our overall licensing program is to raise issues early, before they start doing something. It is up to them how they want to resolve them.

MR. MCCONNELL: Basically what we would like to do now is try to present what the bottom line is of our review and our review in this area. First of all, we have identified concerns with the characterization parameters and related data requirements that form the basis of this study. These were the result of our review of the SCP, and they are contained as comments and questions in the SCA.

Second, as a result of this review of the study plan, we are concerned that the approach laid out when view in concert with the other studies may not obtain the information for licensing that it is intended to provide. This again, gets at the problem of which faults are going to be looked at, how detailed is your investigation, will all faults in the vicinity of the surface facilities as is outlined in one of the statements in the study , any fault, are they all going to be looked at or only late quaternary faults. We think that the hazard extends back into the quaternary and early quaternary fault should be considered when you look at surface facility.

I think DOE would agree with that, it is the question of where is this information going to be derived.

MR. STEINDLER: I guess I am a little confused, so help me out. I want again to pick on that last phrase as I did before. It may not obtain the information for licensing that it is intended to provide. You make apparently no

comment as to whether or not that which is intended is in fact useful.

Is your silence -- one is it really silent. Two, if it is silent if you are silent on that question, is the implication -- the inference to be drawn that you agree that if they were to get the information that is intended by something, that it would be useful or necessary?

MR. MCCONNELL: I think basically our feeling is that the useful -- the data needed for licensing is developed in here, in this box right here.

MR. STEINDLER: Okay.

MR. MCCONNELL: Those are the data requirements. We have made comments that we are not completely satisfied or we have concerns with the way those data requirements have been generated. Those are in the SCA. In our review of this study, what we have taken a look at is, will these activities provide this information. We have some concerns about that. Overall when we review this study in context with all these other studies that are providing information into here, we still have doubts that the information necessary for licensing -- basically the results of this activity -- will be provided.

All of these studies and activities will provide useful information. It is just when you get to the total package, will you have a complete set of data necessary to

make a judgment about the suitability of some reference surface facilities location.

MR. STEINDLER: Your frame of reference then is sufficiency of information; is that right? In other words, you look at that red envelope you have just drawn around that viewgraph and you see that is not going to cover what we think is necessary to completely handle our data requirements so that, when we get down to that shaded box under assessment of fault time potential or whatever it says there, that we will have enough data to be able to do that; is that the point?

You don't think this particular study, even if accomplished according to the plan coupled with all the other things you know about it, will be sufficient to fill the data box required?

MR. MCCONNELL: It is unclear to us now. It may, but again, we are in a difficult situation. Just looking at one small piece.

MR. STEINDLER: Exactly. I am trying to understand the response to a criticism that says we don't think it's going to do the job. On the other hand we know that there are six other boxes up there that would be filled with six other study plans which we haven't seen. You don't really know by the time you are done putting all seven together that you will have a complete package of

information sufficient to handle the data requirements; is that correct?

MR. MCCONNELL: That is correct. What we are doing with this review and with the comments we are providing is giving DOE a heads up on our concern; that they can then subsequently address it either by asking to close out an open item or comment or address it in another study plan that they are now constructing.

MR. STABLEIN: Dr. Steindler, we have looked at the SCP to get as much information as we can at this point on those other activities. It is still the considered opinion, based on what we can see, that they may not be providing the data and it appears to be important enough to call DOE's attention to that.

MR. STEINDLER: Have you somewhere specified specifically the kind of information that you don't see being obtained to which you would draw DOE's attention, apparently missing from their overall planning process or have you just said there simply isn't enough data?

MR. MCCONNELL: No. I think we have identified in the SCA areas where we think there are gaps in their data collection efforts.

MR. MOELLER: I have a quick question. Is this chart a DOE Chart?

MR. MCCONNELL: Yes, it is.

MR. MOELLER: They are saying -- they are specifying the data needs and methods of obtaining that data. You are not imposing this on them?

MR. MCCONNELL: No, we are not.

MR. HINZE: It seems to me there are a couple of issues here. One is this integration with the other study plans to achieve the objective. There is also the concern regarding the objective as is laid out in the study plan that is looking at the faulting over the last 100,000 years. I am wondering if just restricting yourself to that limited objective, if you find problems with the study plan?

Specifically, do you find the problems with the level of detail that is provided? Maybe that's not the proper term to use. I can't help but use the details of the study plan. Are you convinced that this study plan will achieve the objectives of looking at the last 100,000 years. I have reviewed a lot of proposals in my day, and the amount of detail that is provided in this proposal are in the study plan --- is certainly great when it gets to the trenching and what is going to be done in terms of the trenching.

When it looks at some of the other portions of it, the geophysics, it is extremely lacking. You might say that there is a difference between the study plan and the proposal but I don't think so because in both approaches you are trying to achieve an objective. What the study plan

states in the level of detail that was in the accord between NRC and DOE, we have these terms like numbers, positions, et cetera, you can find those as well as -- I am sure you have them pinned down as well as I do.

My question is, do you have a problem with the level of detail, or am I alone in that regard?

MR. MCCONNELL: We sympathize with your concern. I think the way we have addressed that in our review is that if the scope of this investigation is extremely narrow, extremely narrow, just to the point of making trenches in an area to determine that there is no fault in that very upper crust, upper part of the section, potentially you can do that with the study plan and the level of detail is adequate.

What we have asked for is if you intend to do more than that, then we would envision a much more comprehensive study. Then, we would get into the problems of level of detail as provided as far as number of trenches and locations. We do recognize also that we have to -- it is kind of an evolutionary process that DOE will in activity one search for trench locations and then trench. The number and locations may depend on what they find in activity one. So, we do see that flexibility in the plan.

MR. HINZE: Do you see problems with the statements like remote sensing may be used in the mapping of

-- in the preparation of the surface map? I think that any of us in the geoscience area would agree that there is a great deal of information that can be overlooked in the normal rock and hammer type of mapping versus that which you can achieve with remote sensing.

In the same vein, statements are made such as geophysics may be used and only in the first activity. There is no indication that if faults are found that the trace of these and their significance in any way is going to be followed up with geophysics. It just says that we may use geophysics. I find that difficult to believe, that that is an acceptable level of detail when it is possibly, could be, should be and those kinds of words.

MR. MCCONNELL: I agree with you. Again, what we have attempted to do is to look rather than criticize that completely was to ask for clarification. Again, it relates to the scope of the investigation; how much are they trying to achieve with this investigation. Maybe I am repeating myself, but from our view it appears that the scope was very narrow. This comes from not only reading the study plan but our exchanges -- interactions at the exchanges on TECTONICS.

They narrowed the scope of this investigation purposely. When we raise questions like you have raised here, basically DOE has responded that information such as you are requesting would be provided in other studies or

other activities that are related to other studies. What we have tried to do with the review with that response to us is to ask them to provide us clarification where this additional data, where these additional tests will take place and which study.

MR. HINZE: I think it is very unfortunate that this is the first study plan that we have had a chance to look at and I guess that NRC has had a chance to look at. I think that speaking for myself, the review of the first study plan sets a precedent whether we would like that or not. It seems to me that we must -- I would like to see an aggressiveness in this study and the review, such that subsequent study plans can move through the system smoothly and with dispatch.

MR. MCCONNELL: I would like to say again, it was again a very difficult study plan to review, both because of its narrow scope and also because it was finished prior to our SCA comments and did not address our SCA comments.

MR. STEINDLER: Allow me to at least make an observation. I sense that the narrowness of the scope troubles you from the standpoint of an activity, not only because it was difficult for the review to be done. There is apparently something about a narrow scope study plan that troubles you. I have some difficulty understanding that, if in fact I am correct.

The reason for that is that it seems to me if you are willing to assume that DOE understands what it needs to do, has now not only gone through a site characterization plan but has your analysis and your comments of that, it ought to be in my judgment up to DOE on how to subdivide its tasks in order to get the assemblage of data necessary to satisfy whatever is required. That subdivision will turn out to be small, hence very broad studies in some cases and could very easily be extremely narrow in other cases.

My gut feeling is that if they are exploring areas where there is a great deal of uncertainty both in the field at large as a discipline as well as the specific area that they are looking at, I think prudence dictates that you begin to devise study plans and do studies on a fairly narrow target so you don't get yourself into grandiose plans, expend all kinds of energy and find out you have missed the boat completely.

In that sense then, a narrow scope study plan strikes me as a perfectly sensible initial exercise for the DOE to go through. If in fact you have difficulty seeing how that narrow study plan is coupled with all the other identified activities so as to assure that you are ultimately going to get this large package of data that you are looking for, that may be a legitimate thing to lay on the Department but not in the context of reviewing that

particular narrow study plan.

What I am sensing is that you have coupled the review and potential unhappiness with the narrow aspect of the study plan with another question which says okay guys, tell me how the big picture looks. I was not aware that that is an aspect which is part of a technical review of a document laid in front of you called a study plan.

MR. MCCONNELL: If I gave you the impression that were unhappy with the scope, I was wrong. We are not unhappy with the scope. As you say, that is DOE's prerogative to outline the scope of their investigation. It made it difficult to review. What I have tried to do is lay out in our perspectives that we were cognizant of that limited scope only, that we were just aware of it.

In our review comments, the detail comments, you will see that we did not criticize the scope of the investigation. What we did try to do in this review was to give DOE some heads up, early information of areas we thought might be of concern. We are asking for clarification on those items. They may be questions that are very easy to answer, open items that are very easy to close on DOE's part. Again, it is just an attempt to make sure that DOE is aware of our concerns very early on.

MR. STABLEIN: In other words, narrowness of scope alone is not a basis for criticism of the study plan. I

hope that becomes apparent in looking at the detailed comments.

MR. HINZE: I would hope, Dr. Moeller, that if there are any responses that are received to the NRC's staff comments from DOE that we would have a chance to look at those.

MR. MOELLER: Bill, you had provided us with some comments on this. What are your recommendations or I guess we should ask the staff once again, what they want. John Linehan had said earlier that this was primarily an informational session, and that the staff did not anticipate receiving or having us prepare comments.

Bill, do you think we should offer some sort of comments? It seems to me that there are several issues here that perhaps we should comment on.

MR. HINZE: Unfortunately, we have not -- at least I have not had a chance to see the overlap or underlap with the staff's comments. I think that if they are interested in our comments that may be in addition, that would supplement their comments. If they are interested in them we should provide them. I would hope that they would be interested in them, but I think they have already sensed at least some of my reactions to them and the reaction that I have received from others that have limited the plan.

MR. MOELLER: Let me be sure that I understand.

We have just received this morning of course, their detailed comments, and it would be obviously premature to try to respond because we haven't had time to really look at them. What we will probably do then is to look at these and decide where we go from here.

MR. HINZE: Is there any summary documents? I just received the comments here, and I am wondering if there is any summary document that might be helpful to us too that would be associated with these comments.

MR. MOELLER: Will there be a cover letter that goes with these?

MR. STABLEIN: There will a cover letter transmitting these comments and, as I mentioned, the relevant SCA comments to DOE. That cover letter doesn't exist currently. I still have to draft that up.

MR. LINEHAN: The cover letter will basically contain the conclusions that Keith McConnell has presented here today. Also, indicate we see no problem with them starting, going ahead with the study. It will be a very simple cover letter.

MR. MOELLER: I guess one other area that I am not sure that I understand and I would need to think more about it, you have said because the study plan was prepared before you had completed the SCA and therefore does not address the comments, concerns in the SCA, you will in offering your

comments on the study plan, you will simply cite the SCA relevant comments.

MR. STABLEIN: In the cover letter we will call DOE's attention to the fact that these SCA comments are relevant, pertain to the study plan, and we will attach or cite those comments. In looking at the study plan, we looked at it in terms of whether those SCA comments were addressed. What we are trying to say is that our expectations that they would be specifically addressed by DOE obviously that they were that they could not have addressed them specifically aimed at addressing our comments since they hadn't been generated yet.

We did look at the study plan to see if as they developed the study plan it had coincidentally addressed our concerns.

MR. MOELLER: I guess the question I have is, how significant are the SCA comments and indeed if they were really significant, are they serious enough to request DPE to rewrite the study plans? I don't know, and you are giving me the impression that it can be handled without them rewriting the study plan.

MR. STABLEIN: The SCA comments, as you many recall, I claimed every one be significant enough to call to DOE's attention and to track. We consider them to be very important and, in fact, as Keith has pointed out they call

into question some of DOE's data requirements that they have defined.

DOE needs to address these comments in some forum with the NRC, comment response documents, revised study plans, interactions, meetings. There are range of ways that DOE can go after resolving these comments.

MR. HINZE: If I may ask a question with reference to that. What do you see the revision, the semi-annual revision of the SCP including? Will it include really putting down in a formal way, the revisions as they apply to the comments that you have made?

MR. STABLEIN: Would it be possible to ask DOE to comment on that particular topic, since it is their document?

MR. MOELLER: Yes. I think we need to hear. Maybe they have said in the semi-annual update of their SCP that they have addressed all of these comments that pertain to this study plan. At the same time now, I guess DOE has told us that there won't be the first semi-annual report. There will only be an annual report which will combine the first two semi-annual reports.

Could you refresh us, when is that coming out, or is it already out? I thought that was eminent.

MR. KIMBALL: In terms of the schedule, you know about as good as I do about that. I think eminence is about

the word I could use too. That definition takes on new meaning sometimes internally. In terms of the semi-annual progress reports though as a mechanism and some of the comments, the semi-annual progress report and the word progress is used there on purpose; that is, if there is progress made in terms of the data or analysis that is done, that is the mechanism to at least provide the reference or in a brief fashion discuss that.

In terms of specific comment responses though, the semi-annual progress reports are not intended to be the forum to provide specific responses to comments. There are other mechanisms in place that we would choose to do that, including the ones that King mentioned, the list of options that we have. I think that is roughly the same list that I would have given.

MR. MOELLER: How should we anticipate that DOE will respond now to these comments on the study plan, particularly in light of the fact that there are serious or important comments in the SCA that relate to the activities covered by this study plan?

MR. KIMBALL: We haven't made up our minds yet on this particular study plan, what mechanism we would like to choose to interact regarding the staff's comments. I think we would have to take a look at them, see the timing of when we think -- discuss with the staff the timing of when they

think those comments need to be addressed. Also, regarding the timing of when we are going to physically start ground disturbing field work, right now that is uncertain due to other issues, non-technical issues.

I think there are many factors involved in trying to determine -- I must say we have had a number of discussions in the past technical exchanges on this study plan. None of the staff's comments I heard today are a surprise to us. There is still probably clarification that needs to go back and forth on many of the things that they have said. I guess as a bottom line, I don't think the concerns from our perspective in the past that we have heard verbally or today and in writing or the future would cause us to change necessarily our schedule for going forward with the plan.

I think if there is time to address these early we would choose probably to do that.

MR. BLANCHARD: Dr. Moeller, this is Max Blanchard. I would like to -- from DOE at the Yucca Mountain Project office. I would like to provide additional clarifying response to your question that Jeff Kimball just gave with respect to the comments.

We are, as you undoubtedly know, preparing a package of comment responses to the SCA that the NRC prepared. That is in preparation and has been for quite

some time. That, of course, addresses the comments made on the SCP. Each study plan that is issued is issued as a control document. Any revisions that would come to that control document as a consequence of the department reviewing comments made by the NRC on study plans would cause a Rev 1 or Rev 2 or something of that sort to be made to that study plan.

In the process of showing that revision with the control document process, we would show how we have addressed those comments made by the NRC that pertain to that particular study plan. I think you will see them in two ways, one as we address the SCA comments in general against the SCP and second, in the group of all the study plans individually as we go through the NRC comments for each study plan.

To the extent that we will be making revisions to those study plans, you will see them show up there in a Rev 1 or Rev 2, or some subsequent revision. Does that help?

MR. MOELLER: Yes, that is very helpful.

MR. KIMBALL: Also, while we are up here at least just to take one more minute, talk about the narrow focus of this study plan. It was explicitly designed to be narrow focused. In fact, when people bring up the issue of do we go out and look for negative things early, I think we would use this as an example of yes, we are specifically on this

one trying to go out and look for a negative thing early.

The way to do the most negative thing is if you directly find evidence of albeit controversial term, late quaternary faulting where you want to put a facility important to safety and if you do find that quickly, it may cause you to change your idea about where you want to put that facility important to safety.

We designed this study plan with that narrow focus in mind to quickly get in the field and directly investigate the near surface material to see if such a feature exists or not, because as quick as we can we want to reach a level of confidence internally at least regarding where the surface facility should be. If it needs to change, we want to quickly figure that our in terms of impacting future design, both the layout of the access to the mountain and the entire underground layout has some linkage as to how you are getting down there.

So, that's the kind of big picture we put on it and why it was so narrowly focused to get quickly in the field.

MR. STEINDLER: Let me ask a question. What fraction of the completed study plans that you currently are either going through final review or whatever, have not had the benefit of having produced after the SCA has come out like this one?

MR. BLANCHARD: I believe almost all of them that are going through the process now benefit from the results of the SCA comments.

MR. STEINDLER: Okay, thank you.

MR. BLANCHARD: It is only those original eight that are in the hands of the NRC now that got out of that face link. If you care to, I would be glad to help address some of the questions you asked Dr. Hinze, about where is the geophysics that is associated with this particular study.

In order to do that, I would need the viewgraph that Keith McConnell used, where he was drawing the red lines on. I think I could help defer some confusion that might be there because of the manner in which we prepare a number of logic diagrams. A lot depends on the mindset of the person that prepares it originally, and it is confusing. I sympathize with the job that Keith and his team had with reviewing this, because it is always difficult to try to figure out what might be missing when large pieces of the puzzle aren't yet there on the table. I think that is what was the big challenge here for Keith.

[Slides.]

MR. BLANCHARD: In looking at the diagram there on the left where you see the cross-hatched block up at the top which is labeled assessments of faulting potential, the

group that prepared that part of the SCP on sisemicity faulting in a design basis earthquake tried to deduce the most substantive input to three, which were those three blocks called the data requirements. So, in their view to answer that assessment question, they felt there were three substantive assessments.

Now, feeding those three substantive inputs is the list of studies that Keith drew a red circle around, and that's about eight. But also, there is another seven in the column on the right hand side that are additional studies that would be required to be prepared and conducted in the field or the laboratory in order to support the answering of the question over on the left-hand side where the cross-hatched box is.

If you can read the printing, and I admit that the reproduction is not great when the print is this small, there is at least two of them on the right hand side for which geophysics is included in the title. There are several other synthesis ones in the central column where geophysics would also be used. I might ask Jeff to point those out for you.

You are quite right when you raised the question of I don't see the geophysics, how was it associated with this study. It isn't. The geophysics was coming into the bigger picture through some other activities that are listed

there. That, I think, causes the additional difficulty in Keith's dilemma trying to decide how he is going to look at the big picture when he doesn't have enough of the puzzle to put the puzzle together.

MR. HINZE: Let me ask a question of you Max, if I may. In the second box from the top on the right hand side, it has and vicinity. This refers to surface space, geophysical surveys at Yucca and vicinity. Is vicinity the surface site here; what does vicinity mean?

MR. BLANCHARD: Vicinity was supposed to be large enough to consider anything that would be close to be of concern for the design basis earthquake. The 100 kilometers limit was meant to be in the region, and that's why we used a differentiating word. It wasn't meant to be very restrictive with respect to the distance.

MR. HINZE: I see. I guess one of my concerns about the surface geophysics here is, one can put in a lot of trenches and you can miss faults. We know that. If one finds anomalous areas in various geophysical parameter measurements, one can isolate those anomalous areas as potential faults and test those out. So, those have to be done at a stage where one still has the resources to do the trenching and make certain that the trenching gives the right perspective to the entire area.

It is that kind of geophysics for example, and I

don't want to single on that. It is that kind of thing which I don't see in the study plan. Also, if one finds a fault, a very important aspect of the faulting as we all know is the extent of the faulting, the size of the fault zone in terms of length, et cetera. Those are kinds of things that one needs to do geophysics on an integrated basis.

In the plans here we see no geophysics for example that is included in the second activity level which would suggest that there is not going to be the opportunity to carry out that kind of work. I see no reason to believe that is going to happen without it being specifically stated and included in the time lights.

MR. BLANCHARD: Your concern is very valid. We share the same concern as you do, and we are currently evaluating a geophysics white paper which integrates the geophysics with the geophysical methods that could be applied with other investigative methods to try to convince ourselves that we have adequate geophysics to do all of the exploration needed so we can correlate physical structures that may be offset but now show any evidence of faulting.

Jeff, would you care to add anything?

MR. KIMBALL: I am not trying to prolong the conversation. The duration of this activity and all the trenching activities are flexible enough that as geophysical

information is gathered that may indicate something in the subsurface that might have been missed from a quick surficial approach, that can easily be cycled in the program I believe. We have long enough times to cycle those back in.

It is the intent of this one for example, that if some shallow reflection or some other technique indicates an anomaly in a different location than a rapid trench was put in, the intent will be to at a minimum recheck the surficial mapping that was done -- or air photo interpretation and if necessary, trench that anomaly also.

I tried to -- with the brown maker it's hard to see -- put an asterisk on the three major data gathering activities that provide some sort of geophysical information that would be used to address subsurface or concealed faulting at that location.

MR. MCCONNELL: If I could just add one viewgraph that is not in your package to illustrate your concern as well as one of the reasons we are identifying the current concerns we have in the study plan review plan we have now.

[Slides.]

MR. MCCONNELL: As Jeff has outlined, the geophysical techniques are there, and we have been told that they are and in other activities. Some of the things that don't give us a warm feeling sometimes is this diagram out

of the SCP which shows the sisemic reflection survey which would be one technique to identify faults in the subsurface. What I have done is, I have added the study area for the Midway Valley study plan. You can see that the sisemic reflection surveys go around the study area.

What we are suggesting in our review and in our comments that we do provide is that perhaps -- maybe we are not aware of it but perhaps there may be gaps in the data collection effort in these other activities. This is the type of thing out of the SCP that we are deriving that feeling from.

MR. HINZE: That is a very useful diagram, and I just add one comment. There naturally is a prejudice I think -- it's natural that there is a prejudice for it -- North/South faults in this Midway Valley study. The structures, the geomorphology, the structures that we see on Yucca Mountain to the West and other areas certainly indicate that there are the possibility of strike slip faults in other directions.

When those plans are laid, when those profiles are laid out, it is quite important. It is imperative in fact, that one not just be focused upon in laying out plans like that to look for North/South but to look for these East/West ones. They are going to be difficult to see in the reflection work because of the strike slip nature of this.

I think that the conservative approach is that we have to see that they be looked at as well as the North/South ones, the Northwest as well as the North/South. That just shows the importance of that.

MR. MCCONNELL: We agree.

MR. MOELLER: Are there other comments?

[No response.]

MR. MOELLER: Hearing none, let me thank the staff then for coming down and spending the morning with us. This has certainly been helpful to us in being updated on what you are doing and the background and depth of your thinking. I think with that then, this brings the morning session to a close.

I will mention that we will be taking an hour or so lunch break. Then, the Committee will be reconvening in Executive Session at about 12:45 p.m., and we will then spend an hour or so -- a little less than one hour talking about and planning our meeting with the Commissioners, which is to be this afternoon at 2:00 o'clock. That will be over in the White Flint Building.

Then, we will return here and have a closed session this afternoon on new members and internal deliberations of the Committee. Then, from 5:15 until perhaps 6:00 depending, we will discuss any reports we are going to prepare on the basis of what I have heard this

morning. It may be that will be a rather brief report, if there is one at all.

With that then, I will declare the meeting in recess.

[Whereupon, at 11:42 a.m., the Committee recessed.]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: 17th ACNW Meeting

DOCKET NUMBER:

PLACE OF PROCEEDING: Bethesda, Maryland

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

Mary C. Rosenberg

Mary Rosenberg
Official Reporter
Ann Riley & Associates, Ltd.

PRESENTATION TO THE ACNW

FEBRUARY 21, 1990

NRC STAFF REVIEW OF DOE STUDY PLANS RELATED TO CHARACTERIZATION OF THE PROPOSED HIGH-LEVEL WASTE REPOSITORY SITE AT YUCCA MOUNTAIN, NEVADA

KING STABLEIN

SENIOR PROJECT MANAGER

DIVISION OF HIGH-LEVEL WASTE MANAGEMENT

BACKGROUND

- STUDY PLANS ARE DETAILED PLANS FOR IMPLEMENTING INVESTIGATIONS PRESENTED IN THE SCP
- 106 STUDY PLANS ARE BEING PLANNED
- NRC AND DOE HAVE AGREED UPON STUDY PLAN CONTENT
- NRC AND DOE HAVE AGREEMENTS PERTAINING TO REVIEW OF STUDY PLANS
  - --DOE WILL PROVIDE STUDY PLANS TO NRC SIX MONTHS BEFORE WORK IS TO BEGIN (WHEN POSSIBLE)
  - --NRC WILL PROVIDE MAJOR CONCERNS TO DOE WITHIN THREE MONTHS
  - --NRC WILL PROVIDE OTHER CONCERNS TO DOE WITHIN SIX MONTHS
- NRC ISSUED DRAFT STUDY PLAN REVIEW PLAN IN DECEMBER 1987

PURPOSE OF STUDY PLAN REVIEWS

- IDENTIFICATION OF CONCERNS WITH DOE'S PLANS TO GATHER INFORMATION NEEDED TO RESOLVE LICENSING ISSUES

- AUDIT OF PROCESS BY WHICH DOE DEVELOPS ITS PLANS FOR CHARACTERIZING THE SITE

THREE-STAGE APPROACH TO REVIEW OF STUDY PLANS

- ACCEPTANCE REVIEW

  --REVIEW ALL STUDY PLANS ISSUED BY DOE

  --REVIEW CRITERIA: CONSISTENCY WITH NRC/DOE STUDY PLAN CONTENT AGREEMENT; AVAILABILITY OF STUDY PLAN REFERENCES

- START WORK REVIEW

  --REVIEW ALL STUDY PLANS ISSUED BY DOE

  --REVIEW CRITERIA: POTENTIAL ADVERSE EFFECTS ON WASTE ISOLATION; POTENTIAL ADVERSE EFFECTS ON ABILITY TO CHARACTERIZE THE SITE

  --ASSESS NEED FOR ADDITIONAL REVIEW

THREE-STAGE APPROACH TO REVIEW OF STUDY PLANS (CONTINUED)

- DETAILED TECHNICAL REVIEW

  --REVIEW SELECTED STUDY PLANS

    - RELATED TO KEY TECHNICAL TOPICS
    - RELATED TO SCP CONCERNS
    - UNIQUE, NON-STANDARD, OR CONTROVERSIAL TEST OR ANALYSIS METHODS
    - OTHERS UNSPECIFIED
    - SELECTED PROCEDURES

  --TECHNICAL REVIEW CRITERIA

    - ADEQUACY OF STUDY TO PROVIDE INFORMATION NEEDED FOR LICENSING
    - SPECIFIC CRITERIA IDENTIFIED BY REVIEW TEAM BEFORE REVIEW BEGINS

DETAILED TECHNICAL REVIEW OF THE STUDY PLAN ON THE LOCATION AND RECENCY OF FAULTING NEAR PROSPECTIVE SURFACE FACILITIES

PRESENTATION TO THE ACNW
FEBRUARY 21, 1990

Keith I. McConnell
GEOLOGY-GEOPHYSICS SECTION
DIVISION OF HIGH-LEVEL WASTE MANAGEMENT

REVIEW CHRONOLOGY

- ACCEPTANCE REVIEW COMPLETED SEPTEMBER 08, 1989
- START-WORK REVIEW COMPLETED NOVEMBER 24, 1989
- DRAFT DETAILED TECHNICAL REVIEW COMPLETED JANUARY 11, 1990

DHLWM STAFF REVIEWERS

- MICHAEL BLACKFORD - SEISMOLOGY
- ABOU-BAKR IBRAHIM - GEOPHYSICS
- JOHN TRAPP - TECTONICS
- KEITH MCCONNELL - TECTONICS

OBJECTIVE AND PURPOSE OF STUDY

- OBJECTIVE: "...to gather geologic data from Midway Valley and to identify areas where late Quaternary faults are absent."
- PURPOSE: "...to evaluate the location and recency of faulting near prospective surface facilities in Midway Valley."

PLANNED ACTIVITIES

- ACTIVITY 1: Identify Appropriate Locations for Long Trenches in Midway Valley
- ACTIVITY 2: Conduct Trenching in Midway Valley

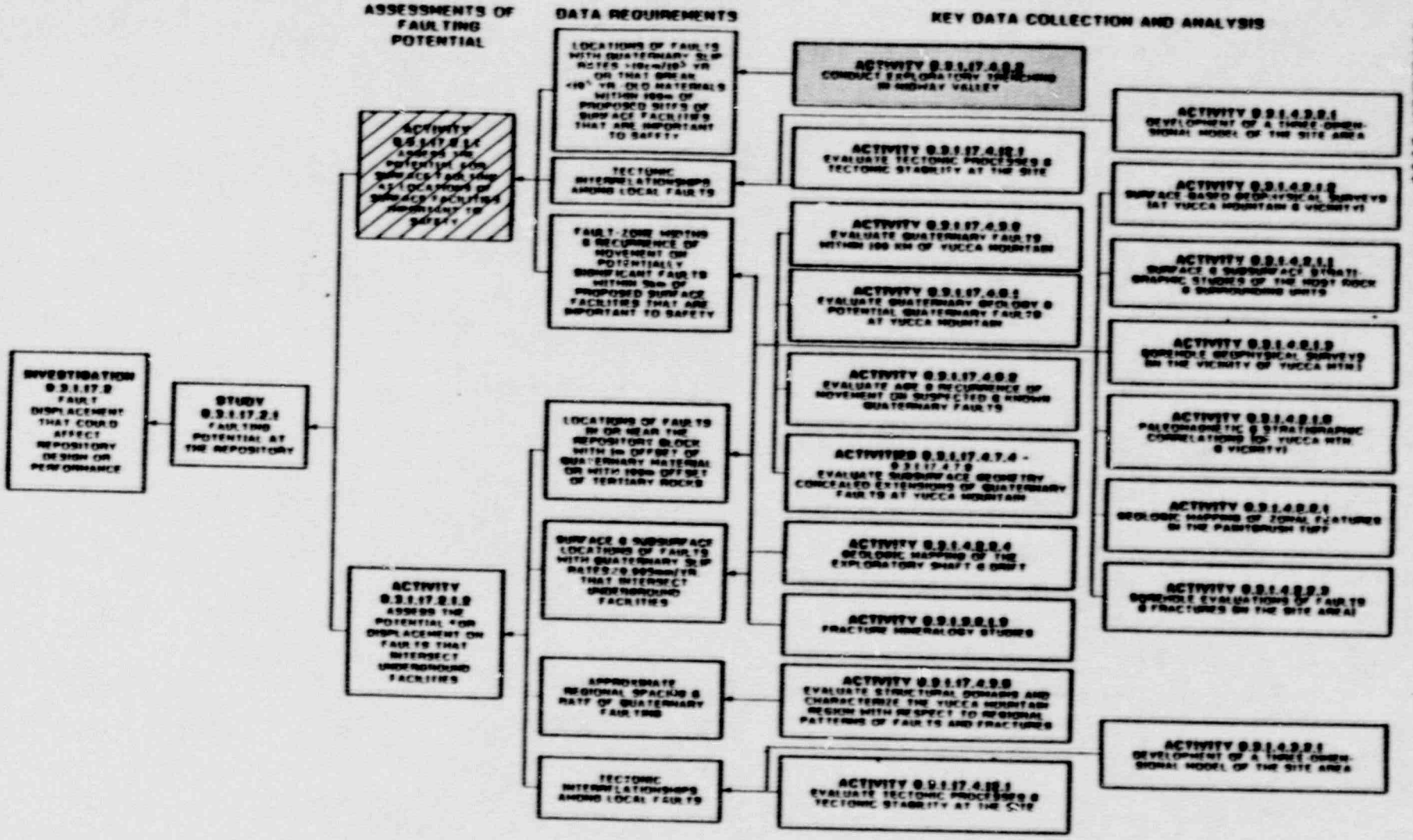
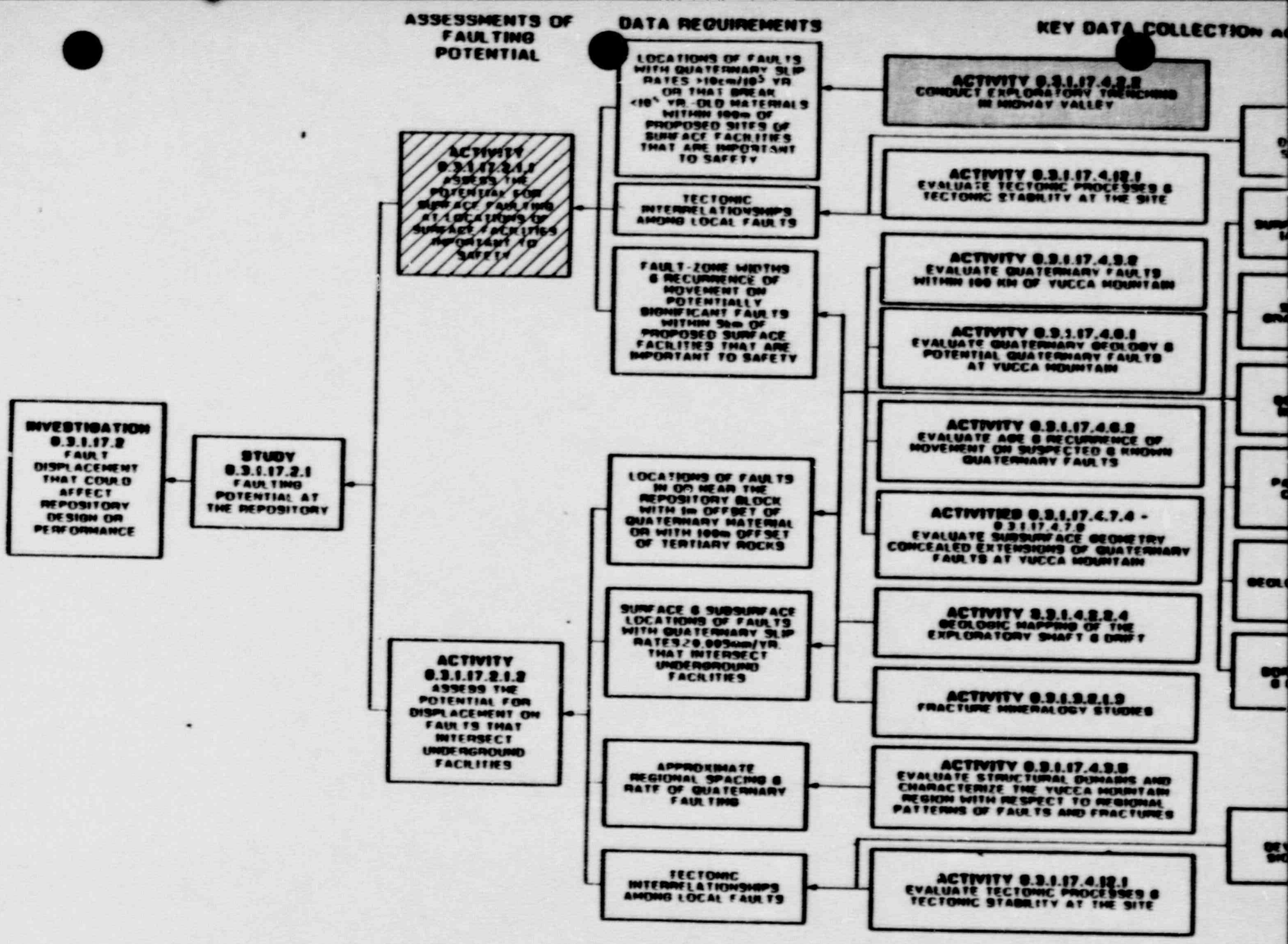


Figure 8.3.1.17-4. Logic diagram for the Investigation 8.3.1.17.2 (preclosure fault displacement)


ASSESSMENTS OF FAULTING POTENTIAL
DATA REQUIREMENTS
KEY DATA COLLECTION A
INVESTIGATION 8.3.1.17.2 FAULT DISPLACEMENT THAT COULD AFFECT REPOSITORY DESIGN OR PERFORMANCE
STUDY 8.3.1.17.2.1 FAULTING POTENTIAL AT THE REPOSITORY
ACTIVITY 8.3.1.17.2.1.1 ASSESS THE POTENTIAL FOR SURFACE FAULTING AT LOCATIONS OF SURFACE FACILITIES IMPORTANT TO SAFETY
ACTIVITY 8.3.1.17.2.1.2 ASSESS THE POTENTIAL FOR DISPLACEMENT ON FAULTS THAT INTERSECT UNDERGROUND FACILITIES
LOCATIONS OF FAULTS WITH QUATERNARY SLIP RATES >10cm/10^5 YR OR THAT BREAK <10^5 YR-OLD MATERIALS WITHIN 100m OF PROPOSED SITES OF SURFACE FACILITIES THAT ARE IMPORTANT TO SAFETY
TECTONIC INTERRELATIONSHIPS AMONG LOCAL FAULTS
FAULT-ZONE WIDTHS & RECURRENCE OF MOVEMENT ON POTENTIALLY SIGNIFICANT FAULTS WITHIN 5km OF PROPOSED SURFACE FACILITIES THAT ARE IMPORTANT TO SAFETY
LOCATIONS OF FAULTS IN OR NEAR THE REPOSITORY BLOCK WITH 1m OFFSET OF QUATERNARY MATERIAL OR WITH 100m OFFSET OF TERTIARY ROCKS
SURFACE & SUBSURFACE LOCATIONS OF FAULTS WITH QUATERNARY SLIP RATES ≥0.003mm/YR THAT INTERSECT UNDERGROUND FACILITIES
APPROXIMATE REGIONAL SPACING & RATE OF QUATERNARY FAULTING
TECTONIC INTERRELATIONSHIPS AMONG LOCAL FAULTS
ACTIVITY 8.3.1.17.4.2.2 CONDUCT EXPLORATORY TRENCHING IN MIDWAY VALLEY
ACTIVITY 8.3.1.17.4.10.1 EVALUATE TECTONIC PROCESSES & TECTONIC STABILITY AT THE SITE
ACTIVITY 8.3.1.17.4.3.2 EVALUATE QUATERNARY FAULTS WITHIN 100 KM OF YUCCA MOUNTAIN
ACTIVITY 8.3.1.17.4.6.1 EVALUATE QUATERNARY GEOLOGY & POTENTIAL QUATERNARY FAULTS AT YUCCA MOUNTAIN
ACTIVITY 8.3.1.17.4.6.2 EVALUATE AGE & RECURRENCE OF MOVEMENT ON SUSPECTED & KNOWN QUATERNARY FAULTS
ACTIVITIES 8.3.1.17.4.7.4 - 8.3.1.17.4.7.9 EVALUATE SUBSURFACE GEOMETRY CONCEALED EXTENSIONS OF QUATERNARY FAULTS AT YUCCA MOUNTAIN
ACTIVITY 8.3.1.4.2.2.4 GEOLOGIC MAPPING OF THE EXPLORATORY SHAFT & DRIFT
ACTIVITY 8.3.1.3.2.1.3 FRACTURE MINERALOGY STUDIES
ACTIVITY 8.3.1.17.4.3.3 EVALUATE STRUCTURAL DOMAINS AND CHARACTERIZE THE YUCCA MOUNTAIN REGION WITH RESPECT TO REGIONAL PATTERNS OF FAULTS AND FRACTURES
ACTIVITY 8.3.1.17.4.10.1 EVALUATE TECTONIC PROCESSES & TECTONIC STABILITY AT THE SITE

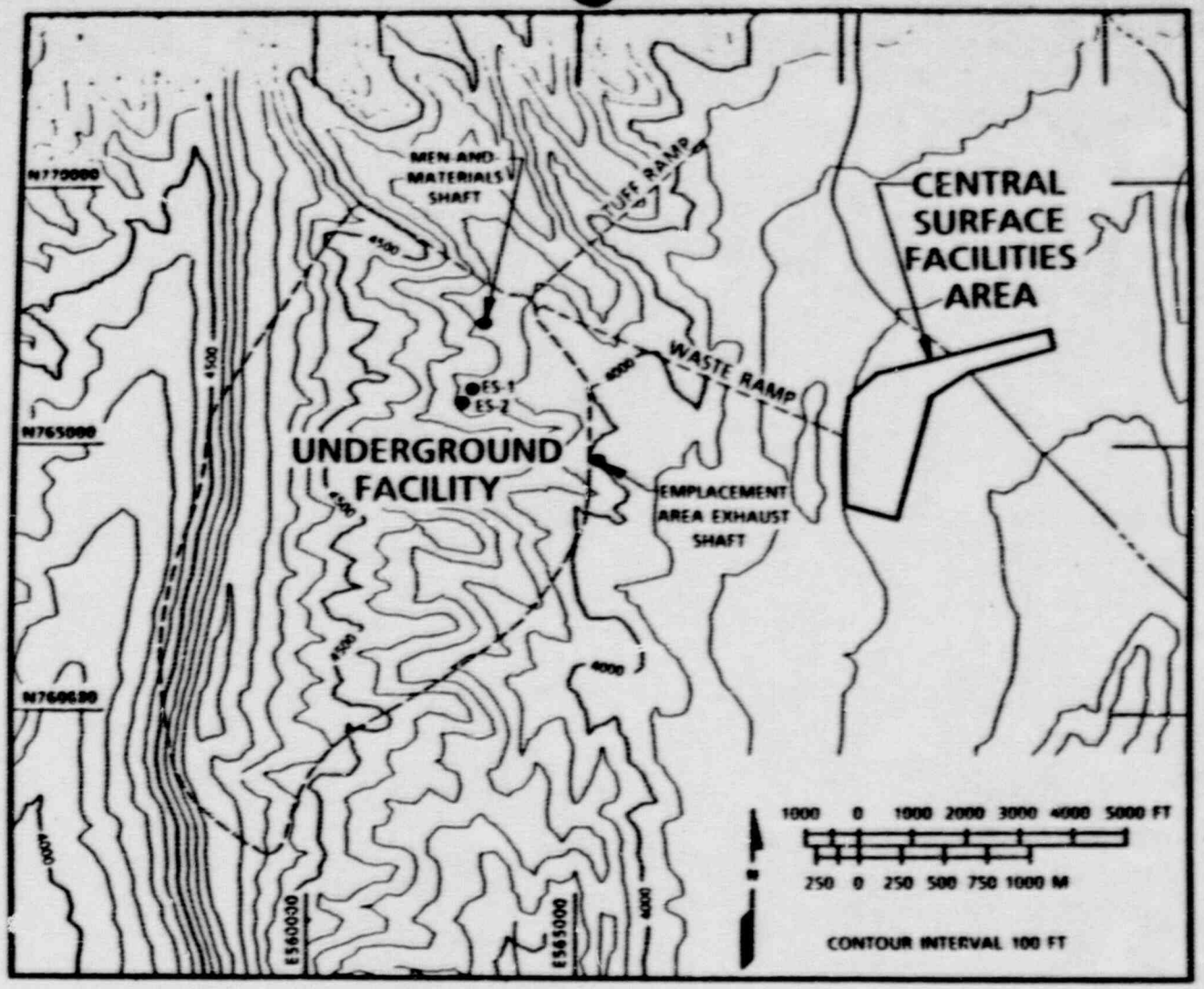


Figure 4-6. Location of the Underground Facility (SNL, CAD-IGIS Data Base, CAL0120 and CAL0202.)

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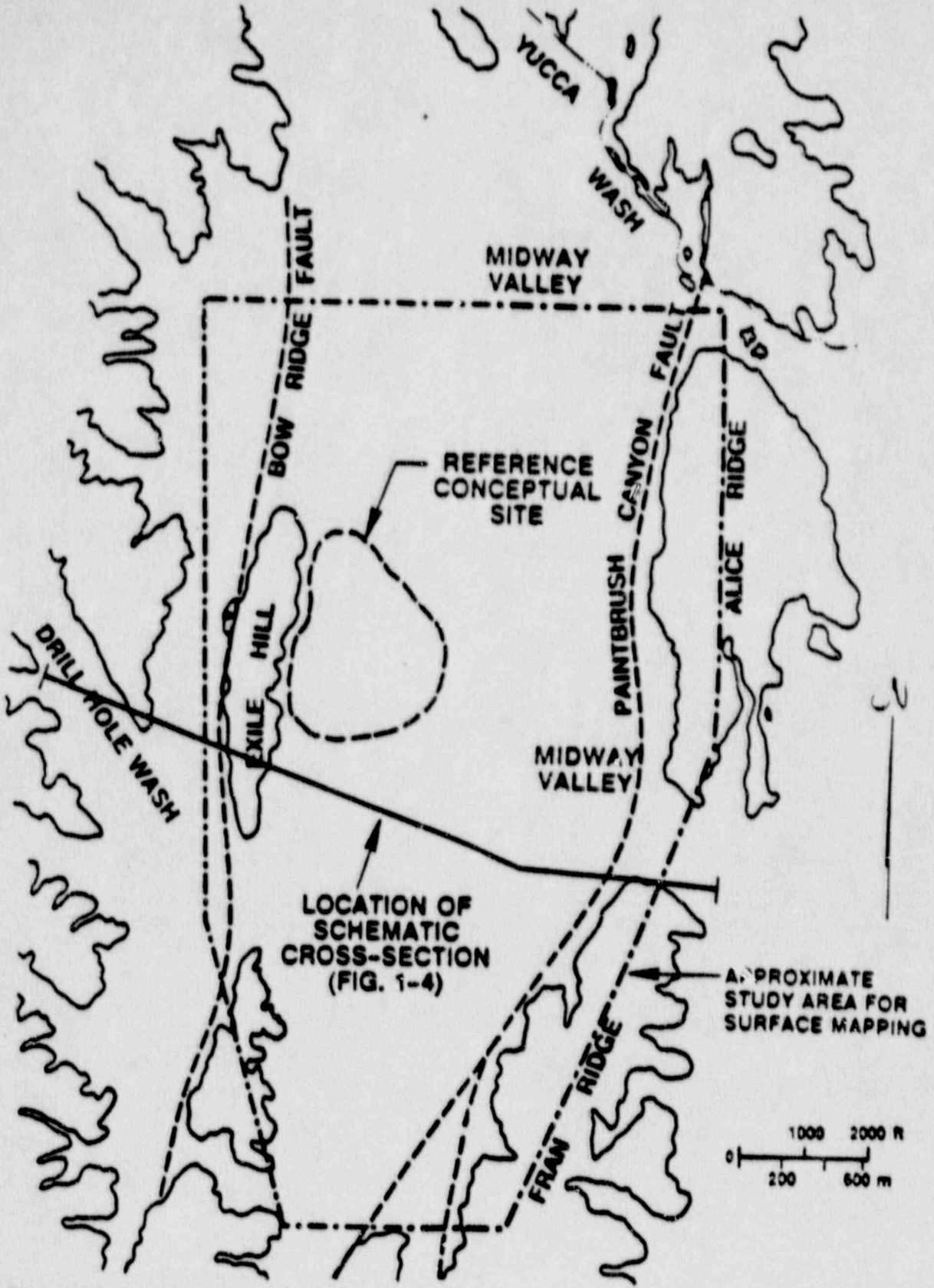
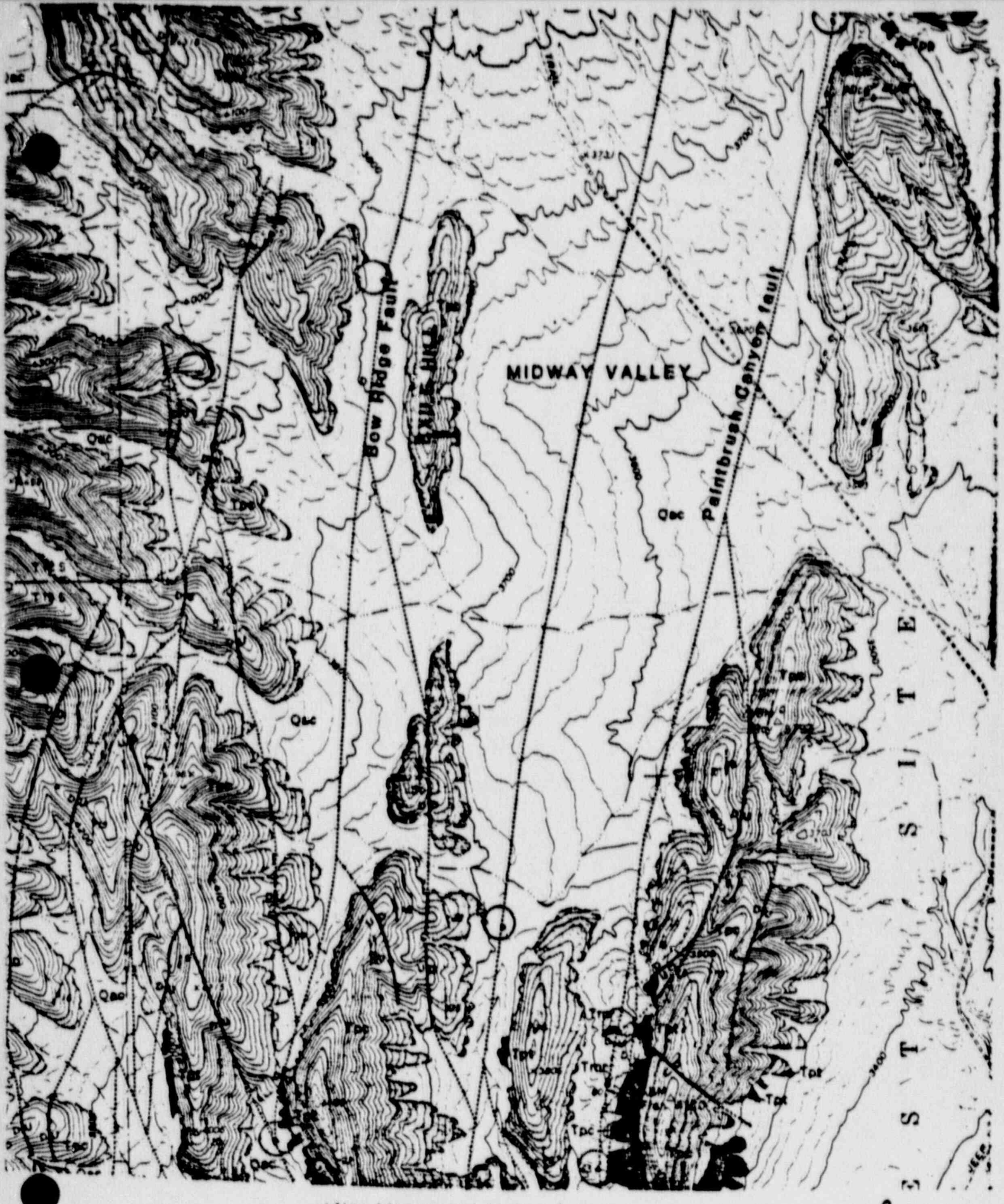


Figure 1-2. Proposed boundary of the Midway Valley Study area. Study area includes the reference conceptual site of Neal (1985).



after Lipman and McKay (1965)

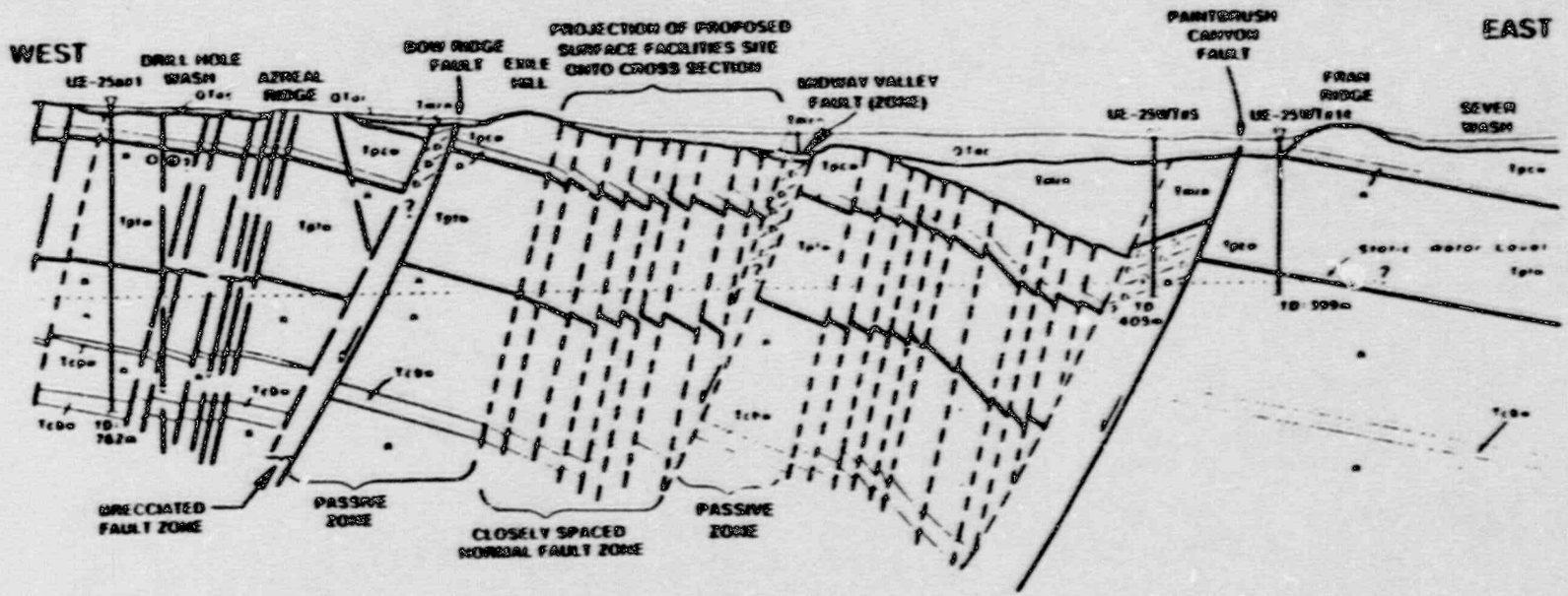
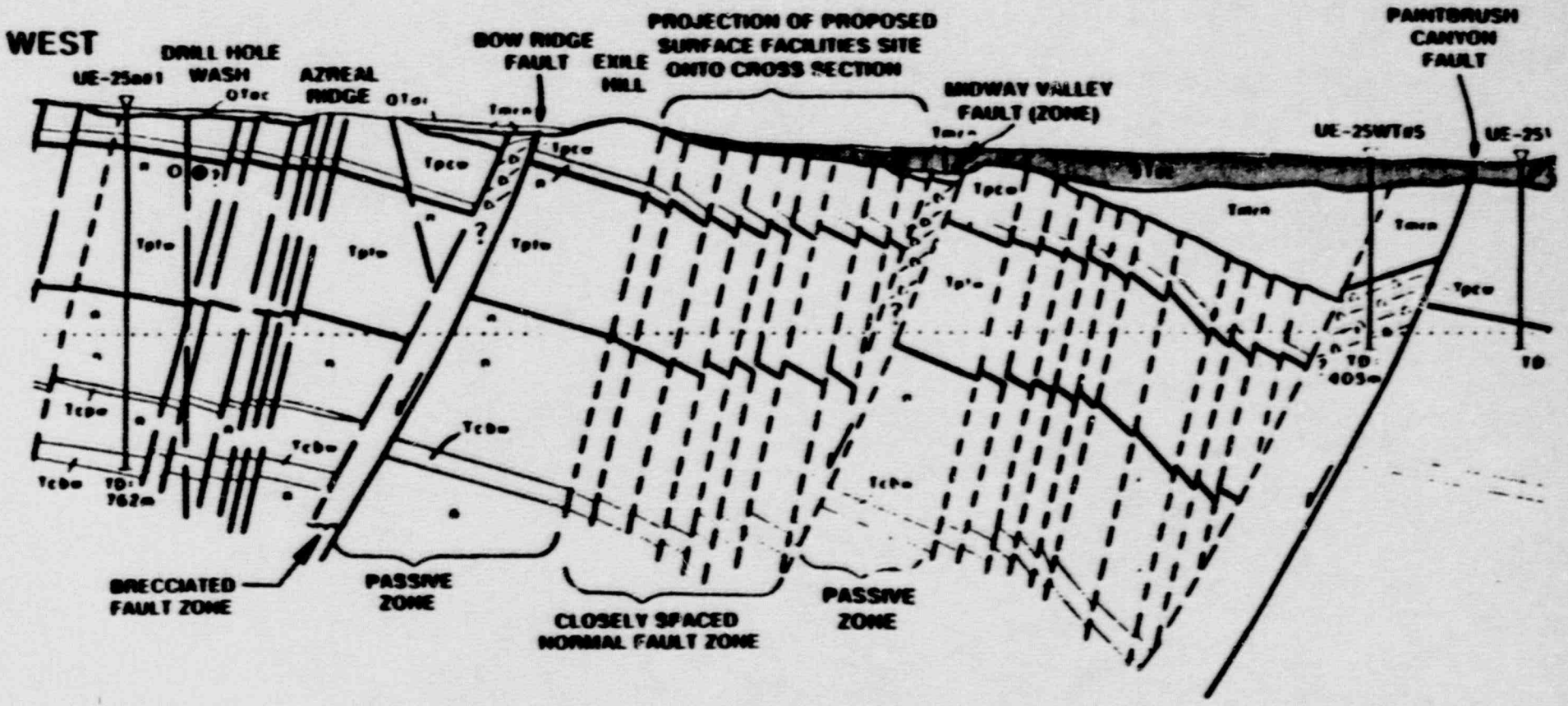


Figure 1-4. Cross section through Midway Valley emphasizing inferred structural features [Modified from Neal (1986) and Scott and Bonk (1984)]. Location of cross section is shown on Figure 1-2.


WEST
DRILL HOLE WASH
AZTEAL RIDGE
BOW RIDGE FAULT
EXILE HILL
PROJECTION OF PROPOSED SURFACE FACILITIES SITE ONTO CROSS SECTION
MIDWAY VALLEY FAULT (ZONE)
PAINTBRUSH CANYON FAULT
UE-25a#1
UE-25WT#5
UE-25
TD: 762m
TD: 405m
TD
BRECCIATED FAULT ZONE
PASSIVE ZONE
CLOSELY SPACED NORMAL FAULT ZONE
PASSIVE ZONE

REVIEW PERSPECTIVE

- SCA COMMENTS PUBLISHED AFTER DOE FINALIZED STUDY PLAN
  1) SCA COMMENTS HAVE IDENTIFIED CONCERNS WITH THE CHARACTERIZATION PARAMETERS THAT DRIVE THE DATA REQUIREMENTS FOR THIS INVESTIGATION
  2) REVIEW CONSIDERS WHETHER ACTIVITIES WILL PROVIDE THE INFORMATION TO MEET DATA REQUIREMENTS IDENTIFIED BY DOE, BUT DOES NOT REVISIT SCA CONCERNS RELATED TO THE CHARACTERIZATION PARAMETERS
- STUDY PLAN DOES NOT CONSTITUTE THE ENTIRE MIDWAY VALLEY CHARACTERIZATION EFFORT
  1) ACTIVITIES DESCRIBED IN STUDY PLAN MUST BE VIEWED IN CONTEXT WITH OTHER CHARACTERIZATION ACTIVITIES IN MIDWAY VALLEY

SUMMARY STATEMENT OF REVIEW RESULTS

IN ORDER TO DETERMINE WHETHER THIS STUDY WILL PROVIDE THE INFORMATION NECESSARY FOR LICENSING, THE THE PURPOSE, GOALS, AND OBJECTIVES NEED TO BE CLARIFIED BECAUSE OF:

1. APPARENT INCONSISTENCIES IN STATEMENTS CONCERNING THE PURPOSE, OBJECTIVES, AND GOALS OF THE INVESTIGATION BOTH INTERNALLY AND WITH THE SCP
2. UNCERTAINTY AS TO THE RELATIONSHIP BETWEEN THIS STUDY AND OTHER ACTIVITIES PLANNED TO DERIVE DATA IN MIDWAY VALLEY

INCONSISTENT STATEMENTS

- PLAN INDICATES THAT IT WILL DOCUMENT THE EXISTENCE OF ANY FAULTS NEAR WASTE-HANDLING BUILDINGS
- PLAN INDICATES THAT A CONSIDERABLE EFFORT WILL BE PLACED IN IDENTIFYING AN AREA WHERE NO QUATERNARY FAULTS HAVE OCCURRED.
- HOWEVER,
- OBJECTIVE OF THE STUDY IS TO IDENTIFY AREAS WHERE LATE QUATERNARY FAULTS ARE ABSENT
- EMPHASIS WILL BE ON DETERMINING THE EXISTENCE OF ONLY THOSE FAULTS THAT ARE CONSIDERED "SIGNIFICANT LATE QUATERNARY FAULTS"

QUESTIONS ON INTERFACE WITH OTHER ACTIVITIES

- THE CHARACTERIZATION PARAMETERS RELATED TO THIS STUDY INDICATE OTHER POTENTIALLY SIGNIFICANT FAULTS WILL NOT BE ADDRESSED BY THIS INVESTIGATION
- HOWEVER, THE PLAN INDICATES THAT IT WILL BE MORE DETAILED THAN SIMILAR STUDIES AND MAY BE USEFUL FOR CREATING MODELS OF QUATERNARY FAULTING
- ACTIVITY 8.3.1.17.4.6.2 IN MIDWAY VALLEY PROPOSES TO "DETERMINE...THE LOCATION, SPATIAL ORIENTATION, LENGTH,... OF ...SUSPECTED OR POSSIBLE QUATERNARY FAULTS WITHIN THE SITE AREA" BUT IT IS UNCLEAR WHETHER THIS ACTIVITY WILL INVESTIGATE POTENTIALLY SIGNIFICANT FAULTS NOT CHARACTERIZED IN THE STUDY PLAN ON THE LOCATION AND RECENCY OF FAULTING NEAR PROSPECTIVE SURFACE FACILITIES

CONCLUSIONS

- THE STAFF HAS IDENTIFIED CONCERNS WITH THE CHARACTERIZATION PARAMETERS AND RELATED DATA REQUIREMENTS THAT FORM THE BASIS FOR THIS STUDY (SCP REVIEW)
- STAFF IS CONCERNED THAT THE APPROACH LAID OUT IN THIS STUDY WHEN VIEWED IN CONCERT WITH OTHER STUDIES MAY NOT OBTAIN THE INFORMATION FOR LICENSING THAT IT IS INTENDED TO PROVIDE