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SYSTEM REVIEW
of the
PALO VERDE NUCLEAR GENERATING STATION
EQUIPMENT QUALIFICATION

Before the
EQUIPMENT QUALIFICATION REVIEW BOARD

RETURN TO SENDER'S OFFICE
FILES

VOLUME II OF III

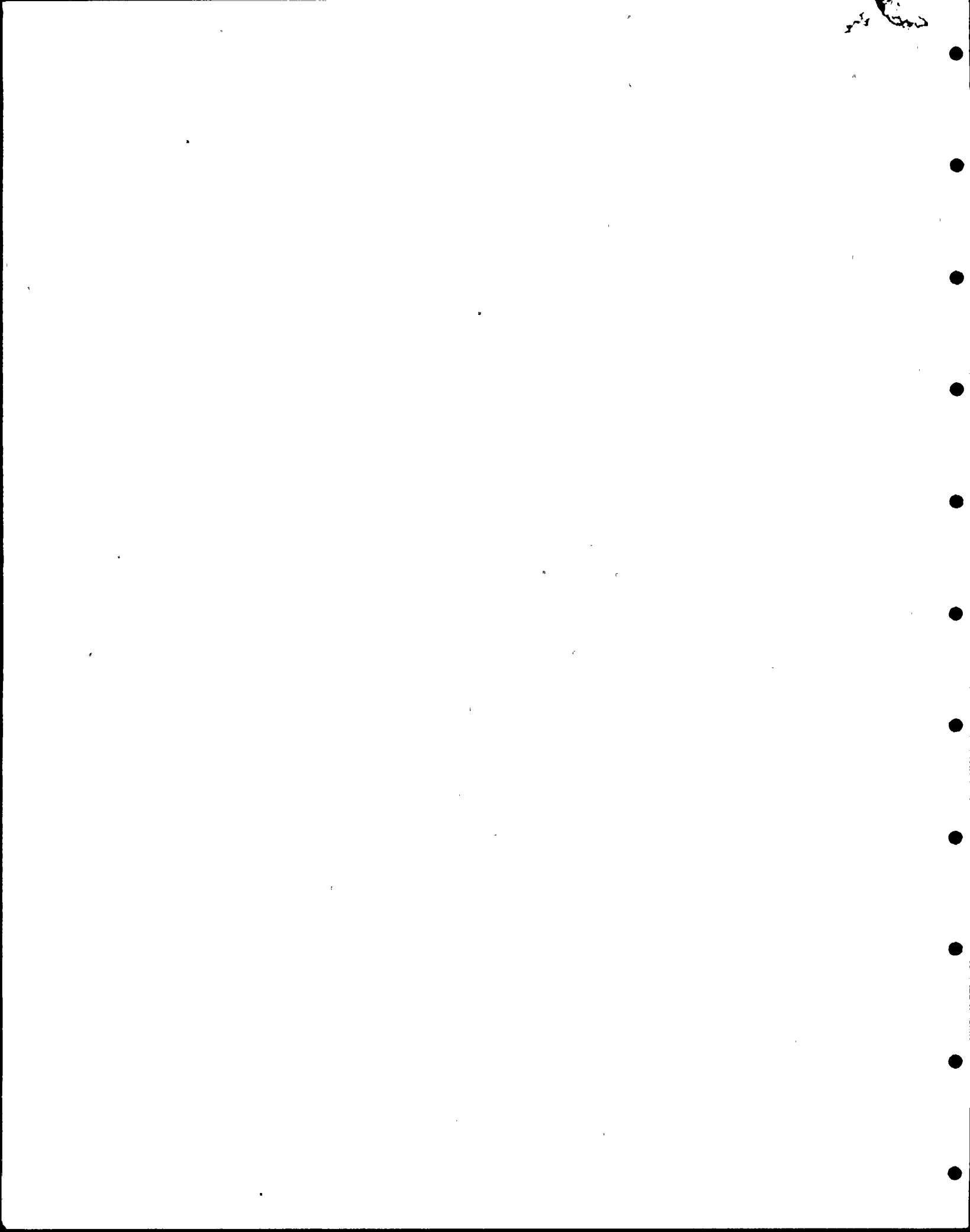
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Phoenix, Arizona
September 25 & 26, 1980

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1 VOLUME II
2 September 26, 1980

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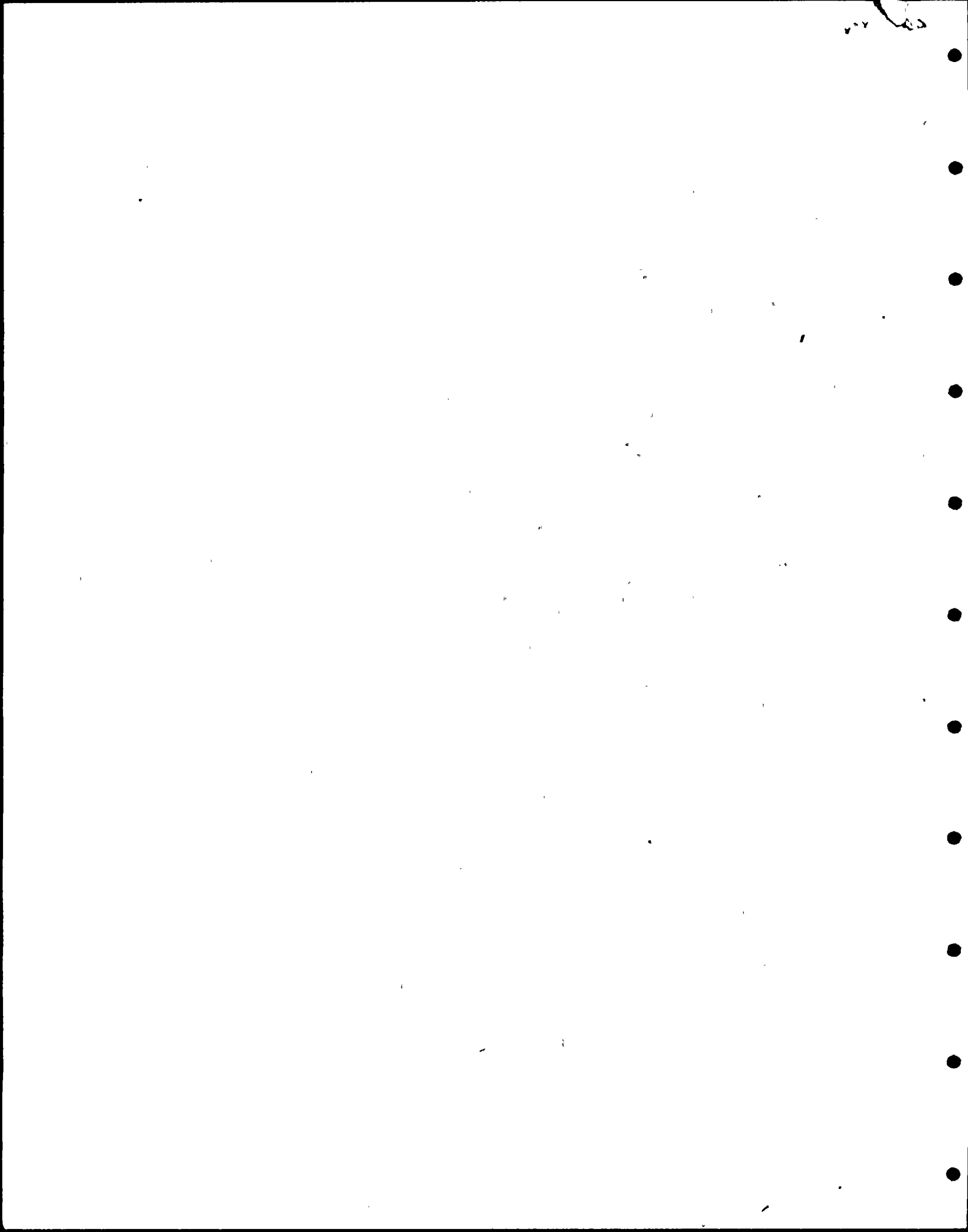
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Phoenix, Arizona
September 26, 1980
8:15 a.m.

1
2
3
4 MR. ALLEN: Let's go on the record and start the
5 meeting.

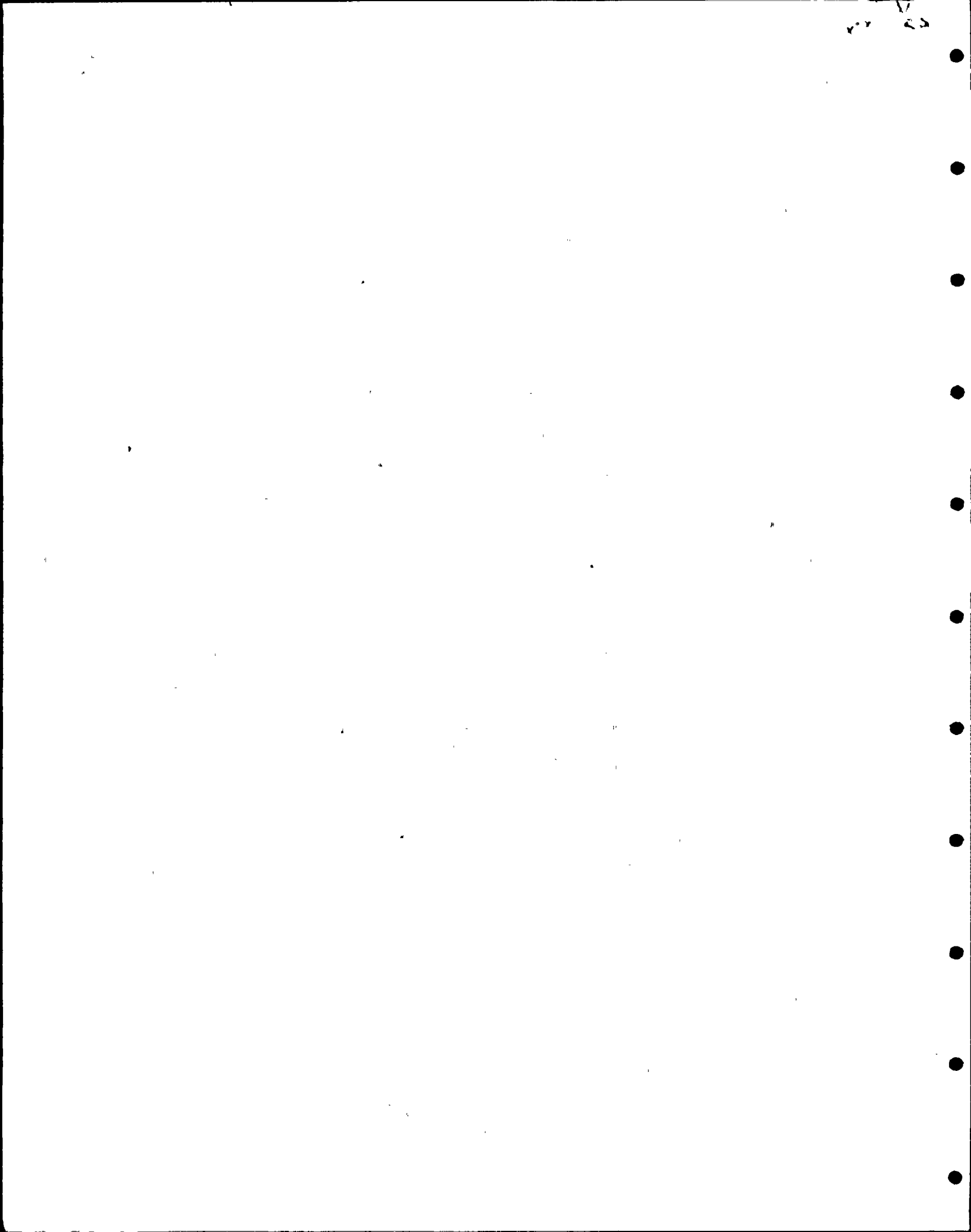
6 Bill, why don't you go over basically what we plan
7 on covering today and then proceed with your presentation.
8 I believe we are about ready to start the seismic portion
9 of the presentation.

10 MR. BINGHAM: We will cover today the seismic qualifca-
11 tion criteria, go into the equipment qualification process,
12 we will cover the documentation, and then we are going to
13 review some example qualifications. After that review, we
14 will then discuss with you qualification problem areas, and
15 we are prepared to get into whatever detail is necessary with
16 the board on that subject. Ken Schechter will make the
17 presentation on the seismic criteria.

18 MR. SCHECHTER: Thank you, Bill.

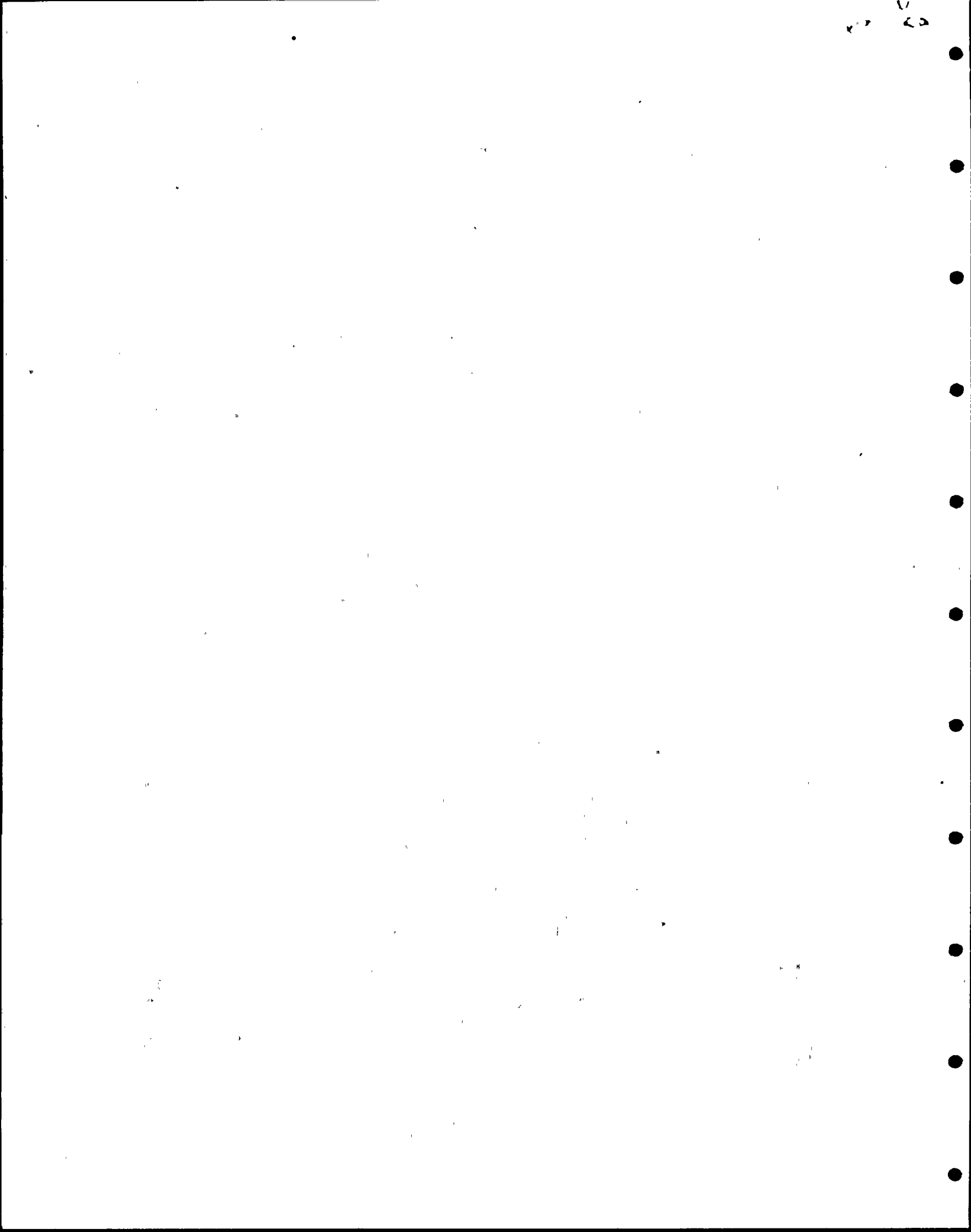
19 Good morning. I would like to begin with a brief
20 description of the seismic design criteria for the Palo Verde
21 Project and how it is incorporated into the equipment
22 specification.

23 Figure 14 shows an overview of the first part of
24 my presentation. It shows the steps involved in developing
25 the seismic criteria. I will be covering the different steps



1 involved in the first part of the presentation. Extensive
2 regional and site investigation provided the basis for select-
3 ing the magnitude of the safe shutdown earthquake. As can
4 be seen in Table 9, the ground level motion for the safe
5 shutdown earthquake corresponds to a .2G response spectrum.
6 The operating basis earthquake was defined as one-half of the
7 safe shutdown earthquake or .1G. However, for additional
8 conservatism, the dynamic analysis of Seismic Category I
9 structures and equipment was performed using as input .25G
10 for the safe shutdown earthquake and .13G for the operating
11 basis earthquake. This corresponds to the zero period accelera-
12 tion in the design response spectra.

13 Exhibit IIIC-1 Reg. Guide 1.60 contains the criteria
14 for the development of the ground design response spectra. The
15 Palo Verde Project is in compliance with this Reg. Guide, as
16 can be seen on the next figure. Figure 1.60-1 represents the
17 figure from the Reg. Guide normalized to 1G and it has the
18 spectra curves for the various damping values ranging from
19 .5% to 10%. I superimposed on this curve the Palo Verde free-
20 field design response spectra normalized to .25G. These
21 curves correspond to the 2% damping value. As can be seen,
22 it follows the shape in the Reg. Guide. It has the same turn-
23 ing points and the amplifications used are from the Reg. Guide.
24 The free-field design response spectra was used to develop the
25 synthetic earthquake trace that was required for the dynamic



1 of Category I structures and equipment.

2 Structural damping values for the time history analysis
3 were obtained from Regulatory Guide 1.61 shown in Table 10.
4 For example, in the time history analysis of the structures,
5 for the safe shutdown earthquake, 7% damping was used for the
6 reinforced concrete structures and for the OBE, 4% damping.
7 I might add that the equipment vendors also made use of this
8 regulatory guide using, for example, for equipment the 2%
9 damping value for the OBE and 3% for the SSE.

10 The time history analysis generated in-structure time
11 histories and the in-structure floor response spectra. Figure
12 15 represents a typical in-structure floor response spectra.
13 This figure is for the auxiliary building. It is an SSE re-
14 sponse spectra. It is for the roof elevation, Elevation 156,
15 and it is typical of the in-structure floor response spectra
16 for the project. The zero period acceleration is .56g.

17 In addition to the floor response spectra, the
18 project developed required response spectra for use with
19 equipment that is located in several areas of the plant.
20 Figure 16 shows an example of a required response spectrum.
21 This one happens to be for the control panel assemblies, and
22 it is interesting to note that the zero period acceleration
23 is 1.6g. Similar required response spectra were developed
24 for other generic type equipment such as valves.

25 Exhibit IIIC-2, Regulatory Guide 1.29. This
regulatory guide provided the criteria for deciding what

1 structures, systems, and components are required to be
2 classified as Seismic Category I and, as such, required to
3 withstand the effects of an SSE while remaining functional.
4 For the Palo Verde Project, a listing of all Seismic Category
5 I structures, systems, and components is provided in the FSAR
6 Table 3.2-1. The project is in compliance with this
7 reg. guide.

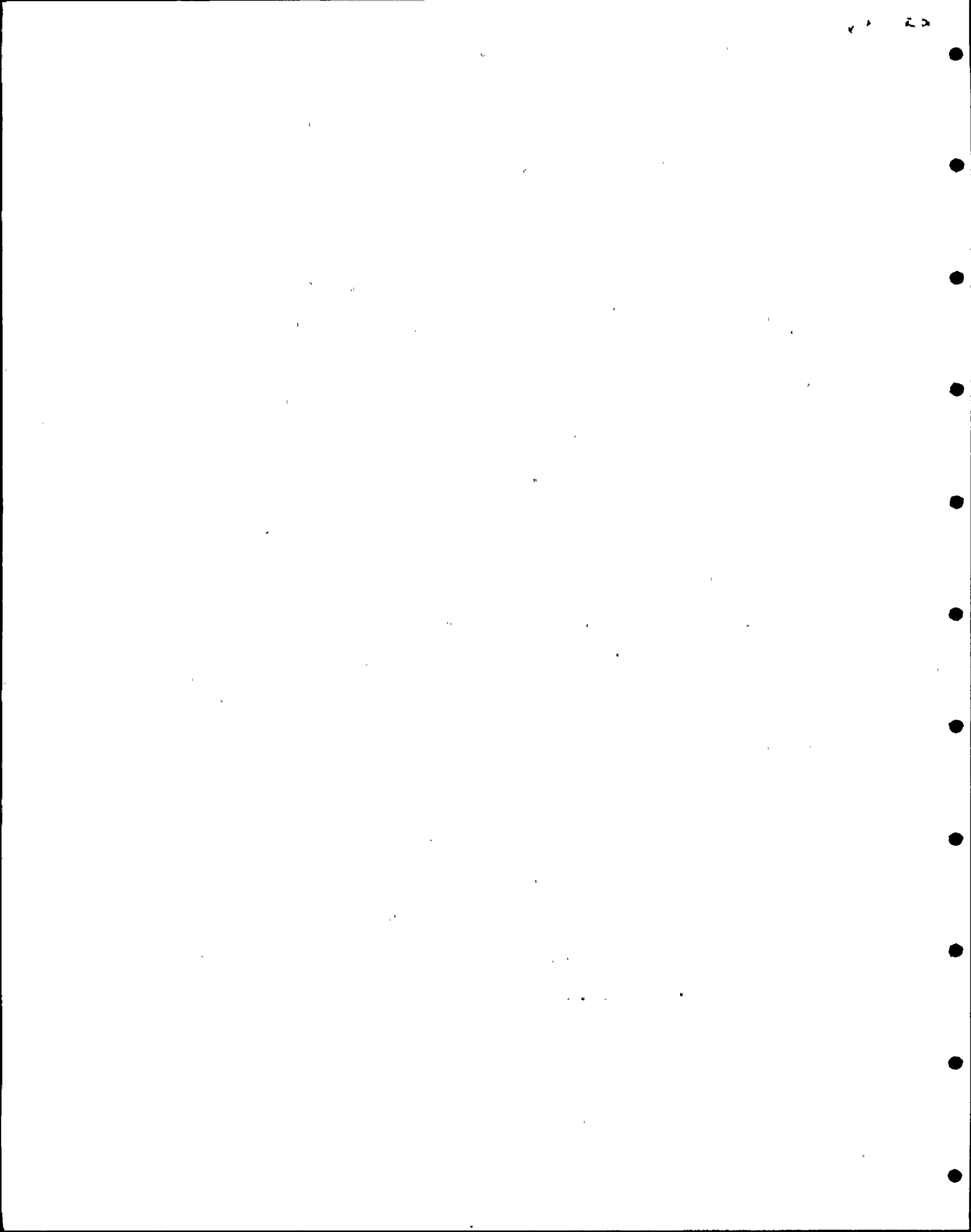
8 The next two slides, Exhibits IIIC-3 and IIIC-4,
9 are a list of the standardized seismic qualification appendices
10 for the project. One or more of these appendices is made a
11 part of every Seismic Category I equipment specification.
12 These are used by the vendor to give him acceptable methods
13 to be used and set up the requirements that he has to meet
14 in order to qualify his equipment.

15 MR. BINGHAM: Are there questions on this section?

16 MR. ALLEN: I have a question, Ken. Let's go back
17 to your acceleration spectra there. Assume we have a pipe
18 with a valve on it with a large actuator on it halfway
19 between the floor above and the floor in the room. What
20 acceleration would you use for that?

21 MR. SCHECHTER: For valves, we have required response
22 spectra that envelope the different buildings and we would
23 use the required response spectra, which would be higher than
24 the next elevation.

25 MR. ALLEN: Any further questions? Ed.



1 MR. STERLING: Just for clarification, could you on
2 the appendices delineate between what you mean by active and
3 nonactive equipment.

4 MR. SCHECHTER: I'm sorry, I meant to go into that.
5 An active mechanical equipment is one that has parts that are
6 required to move in order for it to function such as a motor-
7 operated valve. A nonactive mechanical equipment, examples
8 of it would be a vessel or a tank, HVAC duct, piping.
9 It is able to perform its function without any moving
10 parts.

11 MR. ALLEN: I thought active meant it had to act during
12 an accident.

13 MR. SCHECHTER: That is true, too. It has to be able
14 to perform its function during a seismic event.

15 MR. ROGERS: Is a check valve considered an active
16 component or not?

17 MR. BINGHAM: The answer is no, they are not classified
18 as active.

19 MR. ALLEN: Ed, do you have a further question?

20 MR. STERLING: Yes. On Figure 16, you say that that
21 is a required response spectrum for control panel assemblies.
22 By this, do you mean that the curve shown on that diagram
23 envelopes all of the possible accelerations located anywhere
24 in the plant.

25 MR. SCHECHTER: Yes. This particular one is applicable



1 for both the horizontal and vertical directions in all
2 buildings, all elevations. It does envelope the in-structure
3 response spectra.

4 MR. STERLING: Then all the control panels used in
5 Palo Verde are qualified to be used in any building?

6 MR. SCHECHTER: For seismic, that is correct.

7 MR. ALLEN: Ed Van Brunt, you've got a question.

8 MR. VAN BRUNT: Could you go back to Figure 14? As I
9 understand it, this is kind of the flow chart of how the
10 field investigations are converted into data that is used in
11 developing hardware and this information I guess at the point
12 of in-structure seismic data is factored into the specs.
13 Now, seismic data and things like that are a very specialized
14 field and we buy from a lot of vendors who are specialized
15 in areas, but they are not specialized in this area. What
16 kind of things do you do to ensure yourselves either at the
17 bid evaluation stage or later on that, say, a pump manufacturer,
18 who probably knows a lot about pumps but I would question
19 whether he knows very much about seismic calculations or that
20 kind of thing. How do you assure that he has properly
21 interpreted your specification requirements and properly
22 turned those into the loads which then get put into the
23 equipment and then get on into some later testing to assure
24 that whatever the testing is that he specifies does in fact
25 reflect the requirements for the equipment?

1 MR. BINGHAM: If I understand the question, Ed, it was,
2 first of all, how do we assure ourselves that the manufacturer
3 can properly design to the seismic data that we would need?

4 MR. VAN BRUNT: I am really interested, Bill, in the
5 assurance of the interface that what the specs require are
6 reflected in the equipment, in the design of the equipment
7 first, and then certainly if the design is proper that the
8 testing has some assurance of being acceptable.

9 MR. BINGHAM: Let's separate it into two problems or
10 two parts, the first part being assuring that a bidder is
11 qualified and the second part, once we have selected a supplier,
12 that the interfaces are proper. Let me take the second part
13 first. The supplier in the specification is given the proper
14 seismic data and they will prepare a report that is sent to
15 us on how they are analyzing or what program they are going
16 to use for testing.

17 MR. VAN BRUNT: Excuse me, Bill, you give him data,
18 but that data, as I understand it, is in the form of response
19 spectra curves and this kind of thing.

20 MR. BINGHAM: That's right.

21 MR. VAN BRUNT: What I am looking at is that equipment
22 manufacturers historically are used to dealing with loads,
23 not acceleration curves and things like that, and how do you
24 assure yourself that he has properly interpreted those curves
25 and converted them into the loads? I am taking the tacit

1 assumption that he knows how to take in the loads and convert
2 them into equipment.

3 MR. BINGHAM: We require that they provide us their
4 seismic calculations for review.

5 MR. VAN BRUNT: What does Bechtel then do with those
6 calculations?

7 MR. BINGHAM: Bechtel reviews the calculations, checks
8 that the calculations reflect the data that we gave them
9 and that the loads seem reasonable.

10 MR. VAN BRUNT: Have you ever rejected any?

11 MR. BINGHAM: Yes.

12 MR. VAN BRUNT: Does that interface get audited?

13 MR. BINGHAM: I am sure it does.

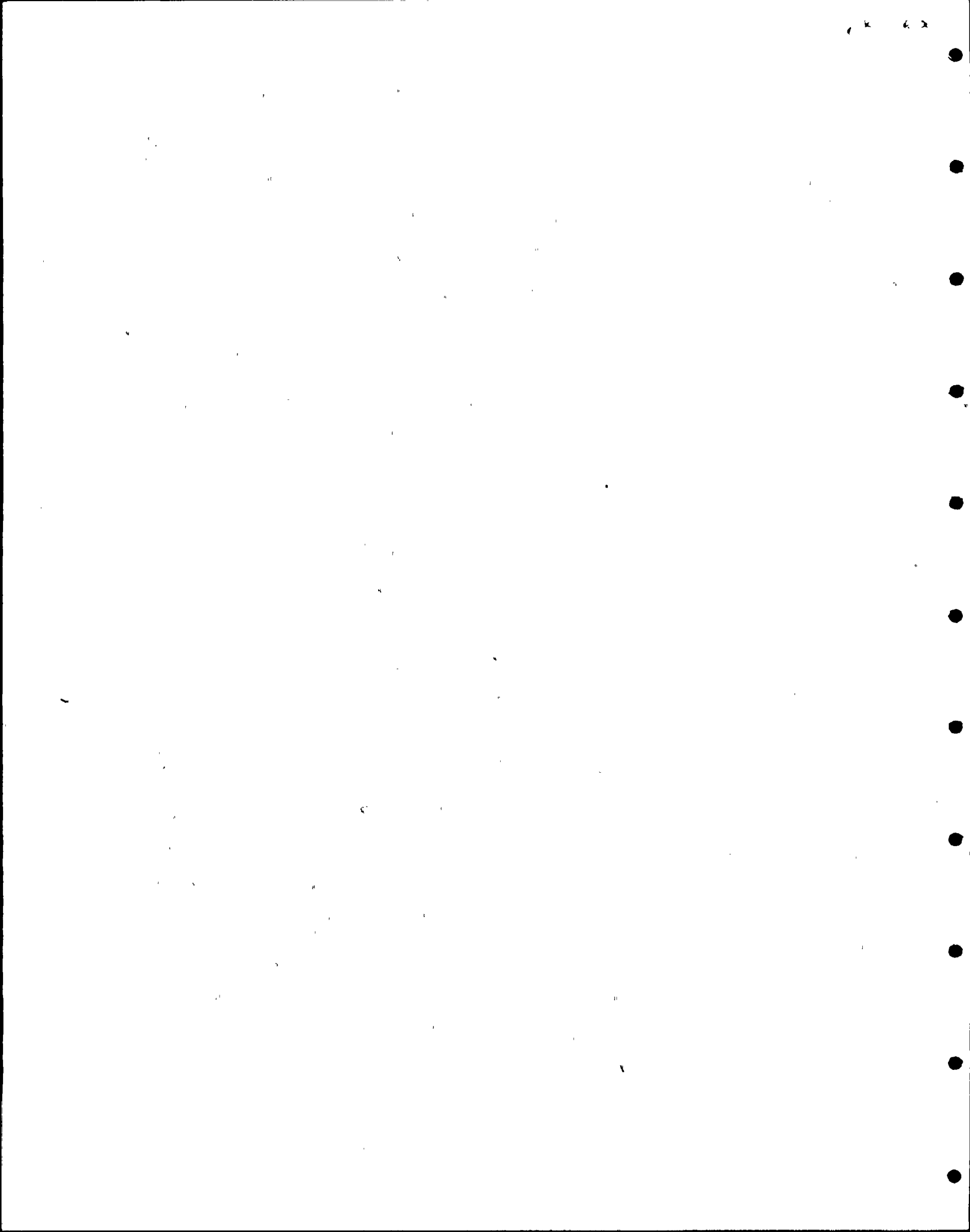
14 MR. VAN BRUNT: Through the QA program?

15 MR. BINGHAM: Through the QA program, yes.

16 MR. ALLEN: Vince, do you have a question?

17 MR. VAN BRUNT: Excuse me, he hasn't finished the second
18 part of my question.

19 MR. BINGHAM: I haven't finished the first part, which
20 was how do we assure ourselves that the selected suppliers are
21 qualified to do this sort of work. Generally, in this phase
22 of the work, that is done prior to even submitting a specifica-
23 tion for request for proposal. We qualify the vendors prior
24 to our submitting a request for proposal. This is based on
25 Bechtel's experience not only on Palo Verde, but all the jobs



1 that we have, and generally once a year we will conduct audits
2 on various aspects and assure ourselves that the vendors are
3 qualified. As far as seismic, I think through the industry
4 we all have a pretty good idea who the manufacturers are
5 that can supply this safety equipment.

6 MR. VAN BRUNT: Do you have any manufacturers that are
7 using consultants to do this for you?

8 MR. BINGHAM: Yes.

9 MR. VAN BRUNT: Would you say that is predominant?

10 MR. BINGHAM: Many of them do. For seismic, yes, I
11 think so.

12 MR. VAN BRUNT: One other question and I will relinquish
13 the floor to Vince. You indicated that Bechtel checks the
14 calculations and this kind of thing. What level of personnel
15 in Bechtel is doing that? Is it a draftsman or is it an
16 engineer; is it a guy that is experienced in this area?

17 MR. BINGHAM: It is certainly a person that is
18 experienced in the area. The individual that is responsible
19 for those reviews, at least the ultimate responsibility, is
20 Bruce Linderman, who is sitting behind you, and he has a team
21 of people that support all the projects. We try to train our
22 responsible engineers to do as much of the work as they are
23 capable and then we supplement the reviews.

24 MR. VAN BRUNT: Do they ever do independent calculations?

25 MR. BINGHAM: Yes, we have done independent calculations.

1 MR. VAN BRUNT: My last question. I presume that this
2 whole review process and the interchange between you and the
3 vendor is a documented situation which, as you have indicated,
4 can be audited by the QA people or whoever.

5 MR. BINGHAM: That's correct.

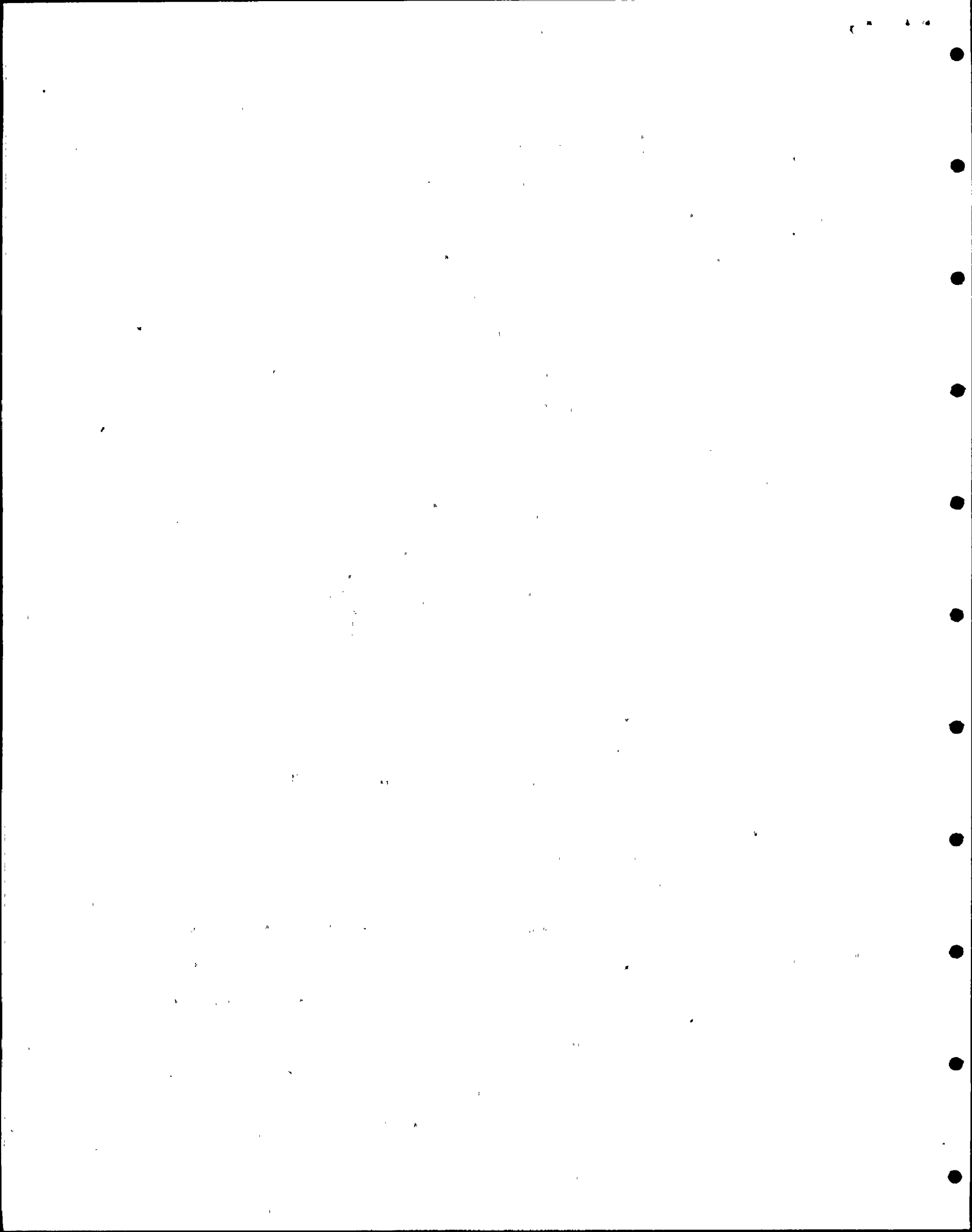
6 MR. NOONAN: I would like to back up to your question
7 on your qualification of valves. Say you have motor operator
8 valve supported by the pipe sitting on the middle of the pipe
9 that maybe has a few snubbers on it, and so forth. Can you
10 kind of walk me through your procedure on how you come up
11 with your loads and then how you tell your vendor to quality
12 that valve.

13 MR. BINGHAM: Yes, I think we can. I presume you want
14 to focus on the tehcnical part of how this is, not the process
15 part.

16 MR. NOONAN: No, I would like to hear the technical
17 part.

18 MR. BINGHAM: Bruce Linderman will give you a back-
19 ground on that.

20 MR. LINDERMAN: In preparing the specifications, we
21 work closely with the stress group that is supporting the piping
22 system, because the piping system is going to feed in the vi-
23 bratory loads to the valve itself, and in there we have the
24 required input motion (RIM's) or response spectra that depict
25 the level that we expect. This is given to the valve supplier. Then he

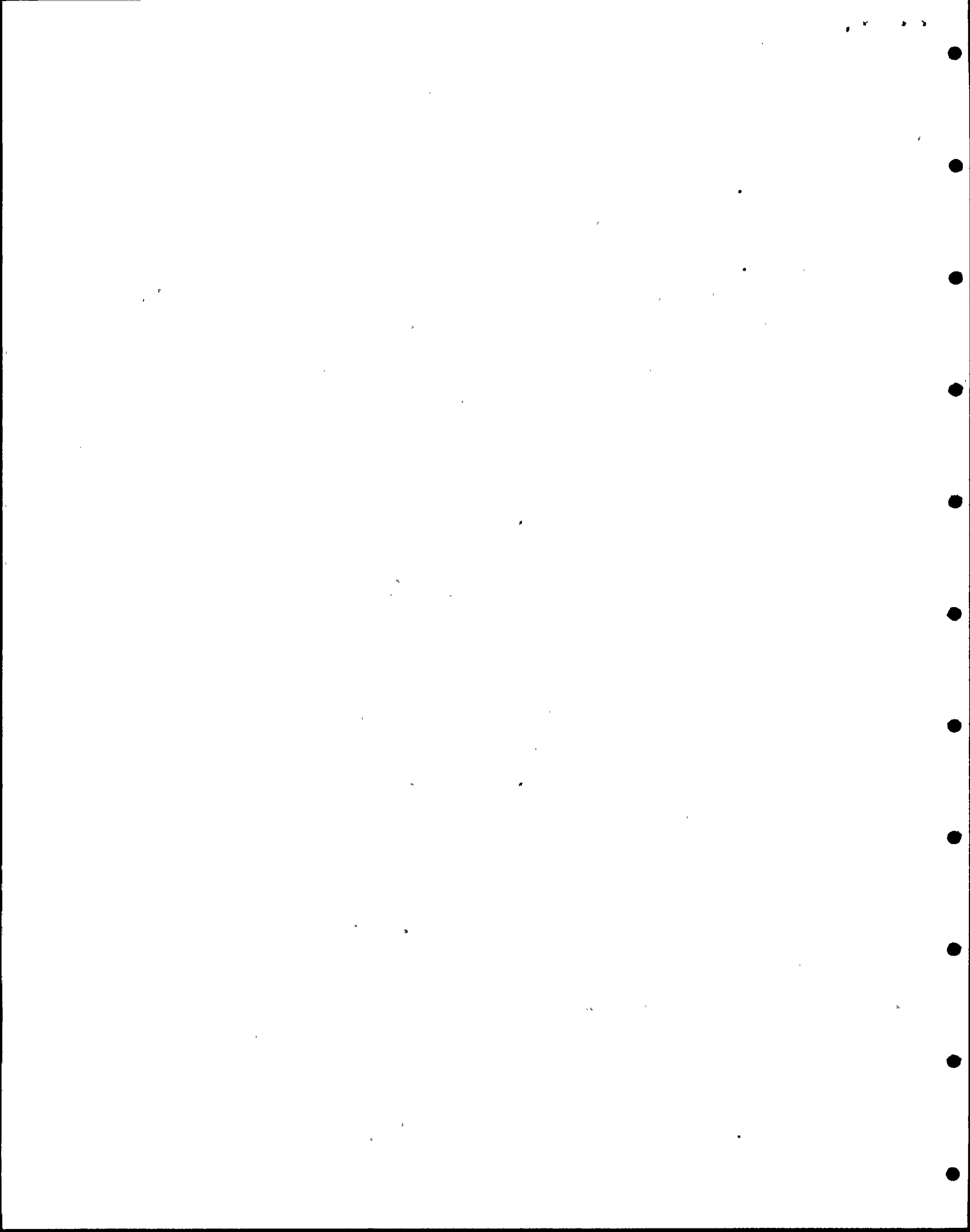


1 qualifies his valve to these levels. He may actually do a test
2 or he may do a test on the actuator and then analyze the valve
3 top works, and this is all taken into account. If he does any
4 analysis on the valve, then to prove operability of the total
5 valve assembly, the actuator and the valve itself, he will also
6 do a static pull test so that he can prove that, number one,
7 the actuator will operate, number two, that the actuator
8 mounted on the valve when displaced to the maximum that it
9 would be during a seismic event or greater will still operate the valve.

10 MR. NOONAN: I think I heard you say that you supply
11 these valve manufacturers with response spectra. That indi-
12 cates to me that the only way that valve can be seismic
13 qualified is by test, because you can't analyze using response
14 spectra without having more data. You need to know the
15 boundary conditions of the pipe. You need to know the modal
16 characteristics of the valve.

17 MR. LINDERMAN: These characteristics are given to
18 the supplier. He does not analyze the total piping system.
19 He analyzes the valve only. If you will notice, the ZPA
20 was very high. This is taking into account any vibratory
21 motions that he will get into the system.

22 MR. NOONAN: I don't want to belabor the point, but
23 if the valve is sitting out and if you can see the pipe
24 sitting out in the ZPA area, then I can see what you are
25 doing, but if it is not, then I don't understand.



1 MR. LINDERMAN: Well, then he's got the amplified
2 portion of the curve to account for it.

3 MR. NOONAN: But then he needs your numbers for the
4 modal characteristics of your piping for him to run his
5 analysis.

6 MR. LINDERMAN: Right. Most of the valves on this
7 project are not mounted inside the middle of the line; they
8 are mounted closer to the supports.

9 MR. NOONAN: So you are saying that most of your valves
10 would be out in the ZPA area?

11 MR. LINDERMAN: Right.

12 MR. NOONAN: You treat them as individual bodies?

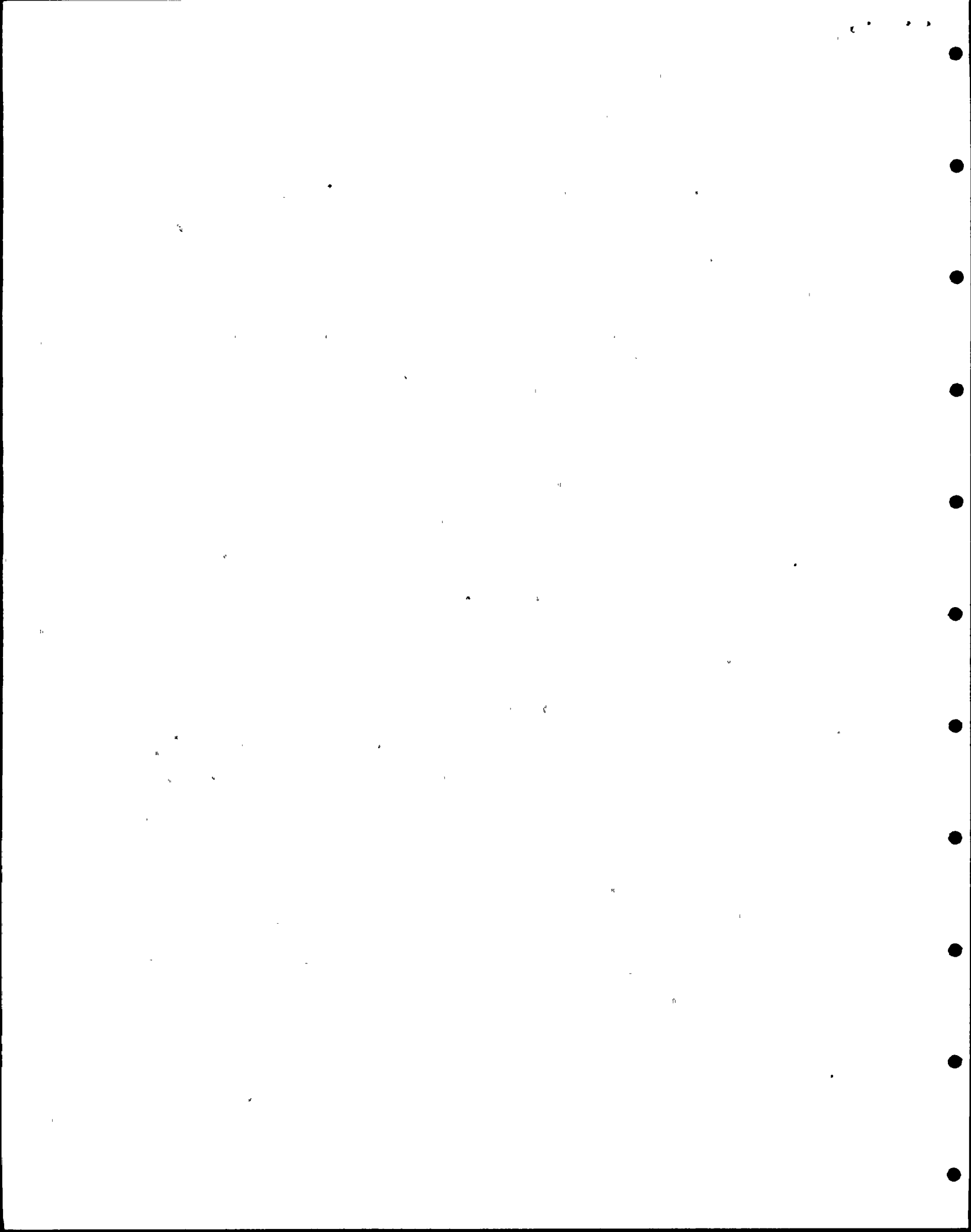
13 MR. LINDERMAN: Right. This was a decision made early
14 in the project to keep the valves out of the middle of the piping
15 system; other projects that Bechtel has it is a different
16 story and we do work more on an RIM.

17 MR. NOONAN: So when you do your piping analysis, you
18 strictly do it that the valve becomes nothing more than a
19 lump mass on that piping run.

20 MR. LINDERMAN: It is at least a two lump mass system
21 for the valve.

22 MR. NOONAN: And you determine what frequencies are
23 at that point plus any loads you might be putting into the
24 nozzles?

25 MR. LINDERMAN: Yes.



1 MR. BINGHAM: Any other questions?

2 MR. VAN BRUNT: I would like to go back to Table 9 for
3 a minute. I just want to clarify something. I see two
4 columns of seismic levels indicated here. You've got a safe
5 shutdown earthquake and you've got .2g, which was selected
6 based on the site investigation and then another used in the design of the
7 structures and equipment. One of those is the construction
8 permit license design level, if you like, for the plant.

9 MR. BINGHAM: This column with the .2g.

10 MR. VAN BRUNT: Secondly, you indicate that for margin
11 purposes that you have been using .25g. Have there been any
12 cases where you have eaten into that margin with either the
13 equipment or the facility designs?

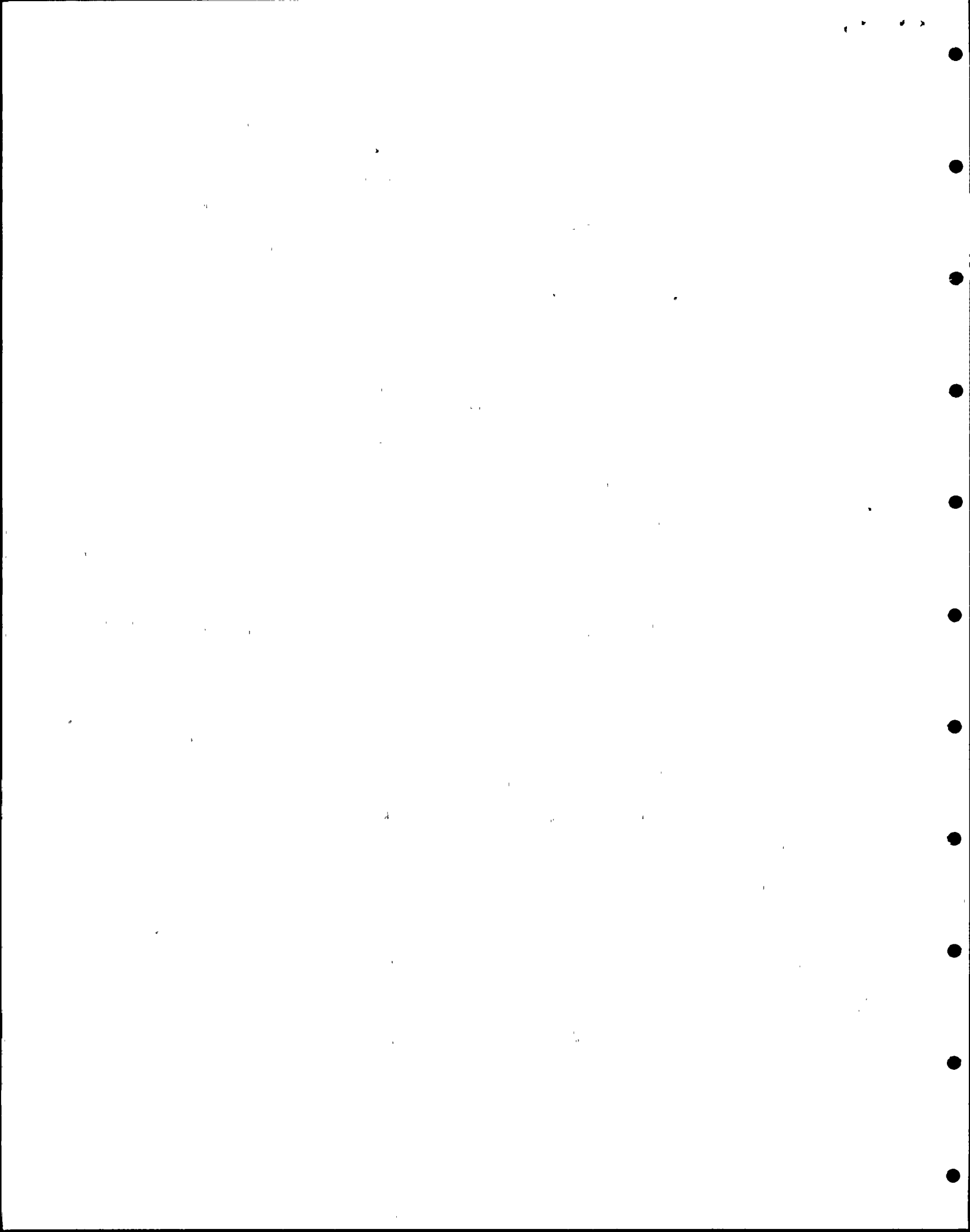
14 MR. BINGHAM: At least to the best of our knowledge,
15 we don't have that case. However, the reason the .25 was put
16 here, Ed, is that that is what is in our design criteria and
17 we wanted to make sure that that was clear to the board.

18 MR. VAN BRUNT: I just wanted to clarify what the
19 license level was versus what you are actually using for
20 design.

21 MR. ALLEN: John Roedel has a question.

22 MR. ROEDEL: I have two questions. One, the .20g is
23 our license value. That also has some conservatism in it,
24 does it not?

25 MR. BINGHAM: Yes, it does.



1 MR. ROEDEL: Do you know based on the site investiga-
2 tion what that number is? Isn't it .18?

3 MR. BINGHAM: Well, I would like to research that.
4 I can give you the actual value for the board. Is it impor-
5 tant for the board for this? There is margin. I don't
6 remember the exact numbers.

7 MR. ROEDEL: That is satisfactory to me. The other
8 question I want to ask, I understand that you have been doing
9 an extensive evaluation of all our seismic calculations,
10 that we can verify that all of the input from the vendors
11 and our design are in fact correct. Are you doing that and
12 what have been the basic results of that?

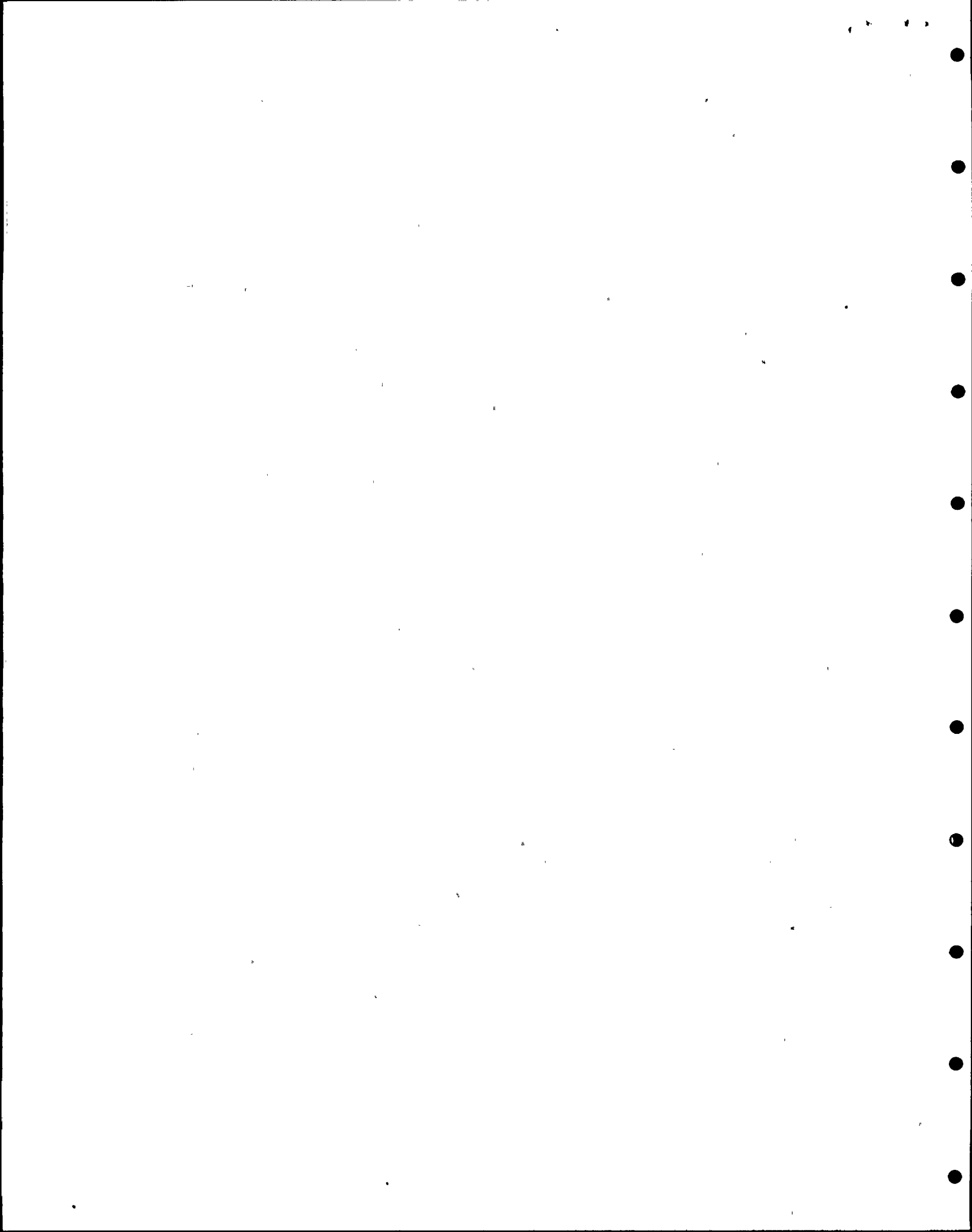
13 MR. BINGHAM: Are we talking as far as safety-related
14 equipment?

15 MR. ROEDEL: Just safety-related equipment.

16 MR. BINGHAM: Most of our work, John, has been
17 focusing on structures and there have been a couple of
18 cases where we have looked at some supports, and at the
19 present time, we believe that we will be satisfactorily
20 resolving all of those within our established criteria.

21 MR. ALLEN: Roger, you have a question.

22 MR. CLARK: I have seen seismic requirements in both
23 horizontal and vertical components. Is this a resultant
24 force or is it -- In previous jobs I have worked on --
25



1 MR. SCHECHTER: These values are the zero period
2 acceleration for both the horizontal and vertical directions.
3 As I mentioned before, on using Reg. Guide 1.60, there is a
4 separate figure, a separate curve, for the vertical direction.
5 The turning points are a little bit different. This one
6 (indicating) is for the horizontal direction. There is a
7 similar figure in the reg. guide for the vertical direction
8 and, again, the vertical design response spectra is in
9 conformance with the reg. guide. It has different turning
10 points in it.

11 MR. BINGHAM: Are there other questions from the board?

12 MR. ALLEN: Carter had a question.

13 MR. ROGERS: On Exhibit IIIC-1 and 2, I think the
14 board will recall that yesterday we had quite a discussion
15 on what "in compliance" meant under PVNGS position and I
16 think we decided that as far as environmental qualification,
17 we are going to go back and take a look at whether "in
18 compliance" is proper in each place or whether it should be
19 "will comply" or just what is correct.

20 MR. BINGHAM: That's correct.

21 MR. ROGERS: Here I am wondering can we say "in
22 compliance" or does this have to be reworded, also?

23 MR. BINGHAM: This is in compliance.

24 MR. ROGERS: This is in compliance in this case and
25 on IIIC-2?

1 MR. BINGHAM: Yes.

2 MR. ALLEN: Ed Sterling, do you have a question?

3 MR. STERLING: On the response spectra that you are
4 supplying the vendor, in the case of say, an instrument that
5 is on a support, does that response spectra include the
6 support? Is that what the instrument itself will see or is
7 that the floor, not particularly with control panels, but
8 say a rack-mounted instrument or such.

9 MR. BINGHAM: The issue that we have at hand is
10 exactly what we give them. We believe that we give them an
11 overall level so they know what the instrument will see, which
12 is quite conservative compared to the actual site values. We
13 will reconfirm that. You might want that as an open item.

14 MR. ALLEN: Terry, would you mark that down?

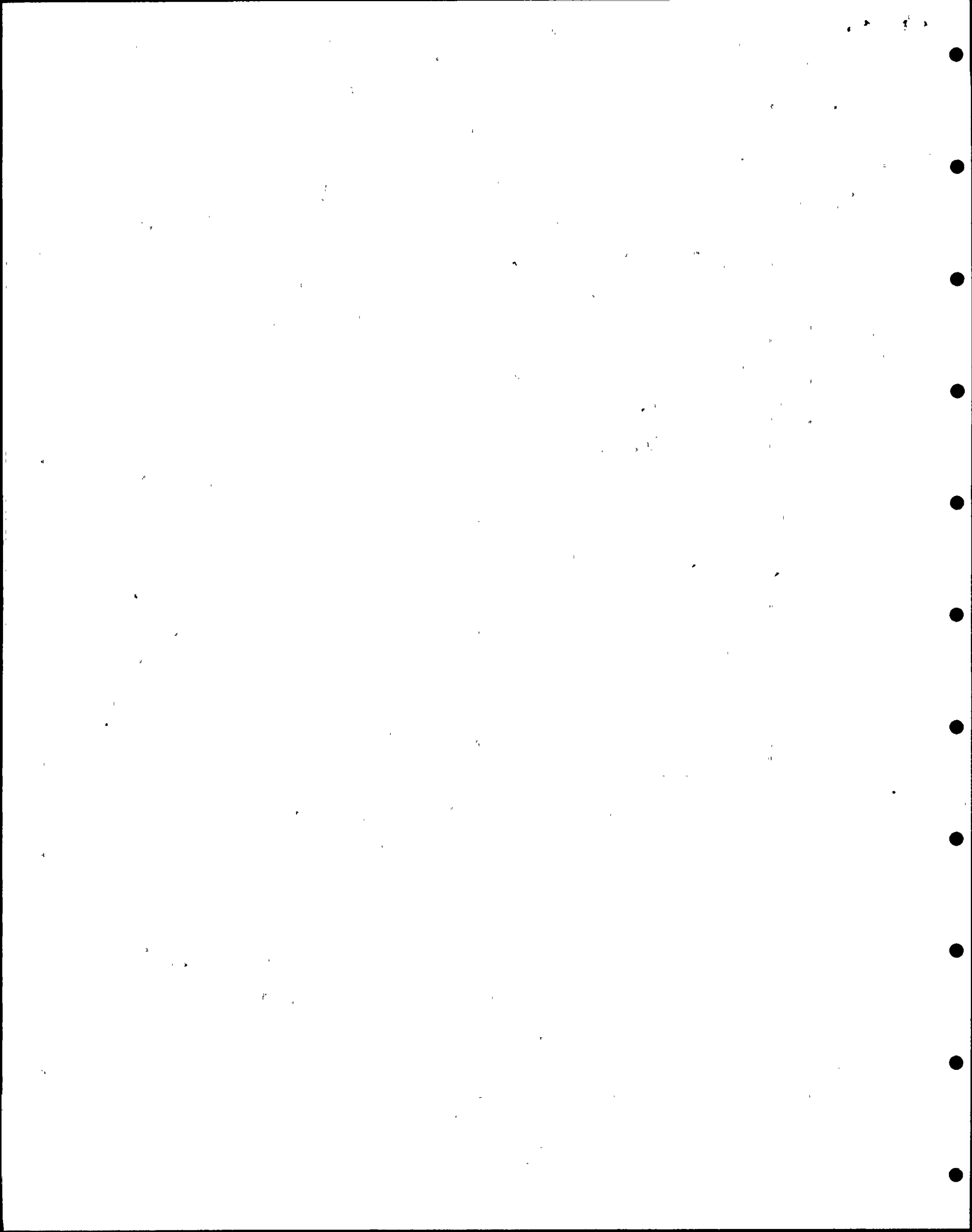
15 Carter Rogers.

16 MR. ROGERS: On Table 10, that gives damping values
17 for Regulatory Guide 1.61. I did not find, and maybe I
18 missed it someplace, a PVNGS position for that regulatory
19 guide. Do we endorse those damping values?

20 MR. BINGHAM: Yes.

21 MR. ROGERS: So we could say that we are in compliance
22 with Regulatory Guide 1.61?

23 MR. BINGHAM: We are, Carter. The reason that we don't
24 have all the other regulatory guides on today is because we
25 are focusing on the seismic qualification portion.



1 MR. ROGERS: But we are using these damping values
2 as far as the accelerations, and so forth, for the equipment?

3 MR. BINGHAM: That's correct.

4 MR. ALLEN: Vince, you had a question.

5 MR. NOONAN: Yes. Under a previous question that was
6 asked about how you supplied response spectra, I think I am
7 hearing something different than when I asked the question
8 about the valve.

9 MR. BINGHAM: Yes, because he asked a question about
10 instrumentation.

11 MR. NOONAN: But if you are doing the job right, you
12 do your seismic analysis -- Whether it is on a piece of
13 equipment or whether it is on a piping system or what, you
14 develop response spectra at the location of where that piece
15 of equipment or valve is. If it is a piece of equipment
16 that is tied to a floor that is mounted on supports and you've
17 got a component that you want to qualify that is at the top
18 of a cabinet, for example, I don't know how the work might
19 be, but if that is the case, the response spectra would be
20 the dynamics up to that location, the mounting location of
21 that component, and that would not vary. It would not be
22 any different for a valve or a piece of electrical gear or
23 anything else.

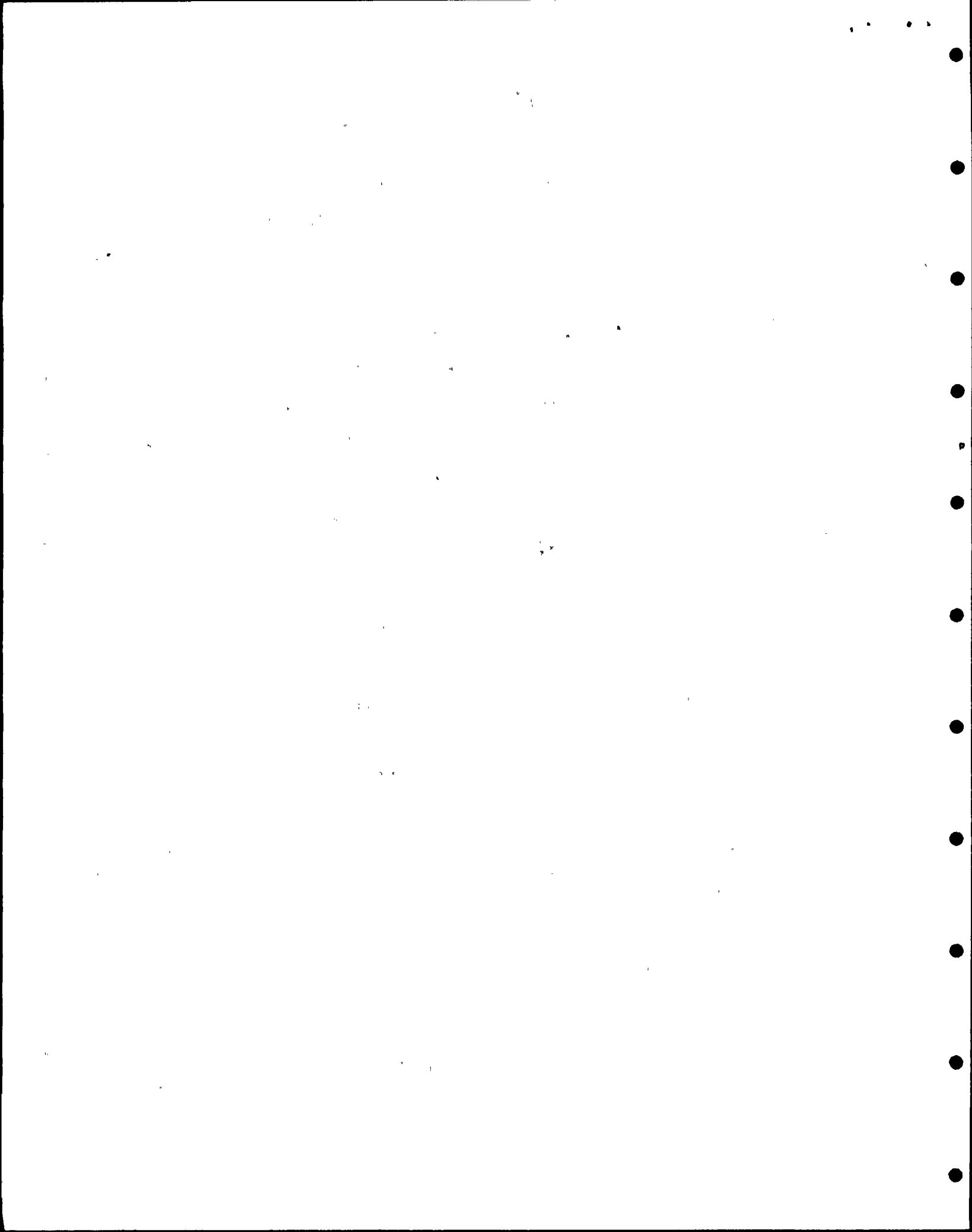
24 MR. BINGHAM: Let me see if I could put this in
25 perspective a little bit and we will reconfirm, because we



1 are not too clear on some of the details that actually were
2 given to the manufacturers. We handle the balance of plant
3 equipment a little bit differently. For example, if there
4 is a cabinet, we will give the response spectra at the base,
5 at the floor or at the wall, wherever it is mounted. We'll
6 say it is at the floor. The manufacturer then must determine
7 what acceleration happens to some component located in the
8 cabinet. On instrumentation, we generally give conservative
9 information to the vendors so that this equipment could be
10 used anywhere within the plant. In other words, you qualify
11 it for a substantially higher value than it might have in a
12 particular location so that you tend to envelope all of the
13 locations in the plant. On the valves, we tend to have the
14 same way of doing things, because in the early phases of the
15 project when you have to order this equipment, you don't know
16 exactly where a particular valve will be as far as in the
17 physical location of the plant. Now, as Bruce indicated, on
18 this plant, we tried to locate valves near supports to
19 minimize the uncertainties of having some valve that had
20 high amplification and some particular problems with supporting
21 it. I will supply the information on the instrumentation
22 later on.

23 MR. ALLEN: Ed.

24 MR. VAN BRUNT: Your response to Vince's question,
25 Bill, brought something to mind. I am thinking mostly now

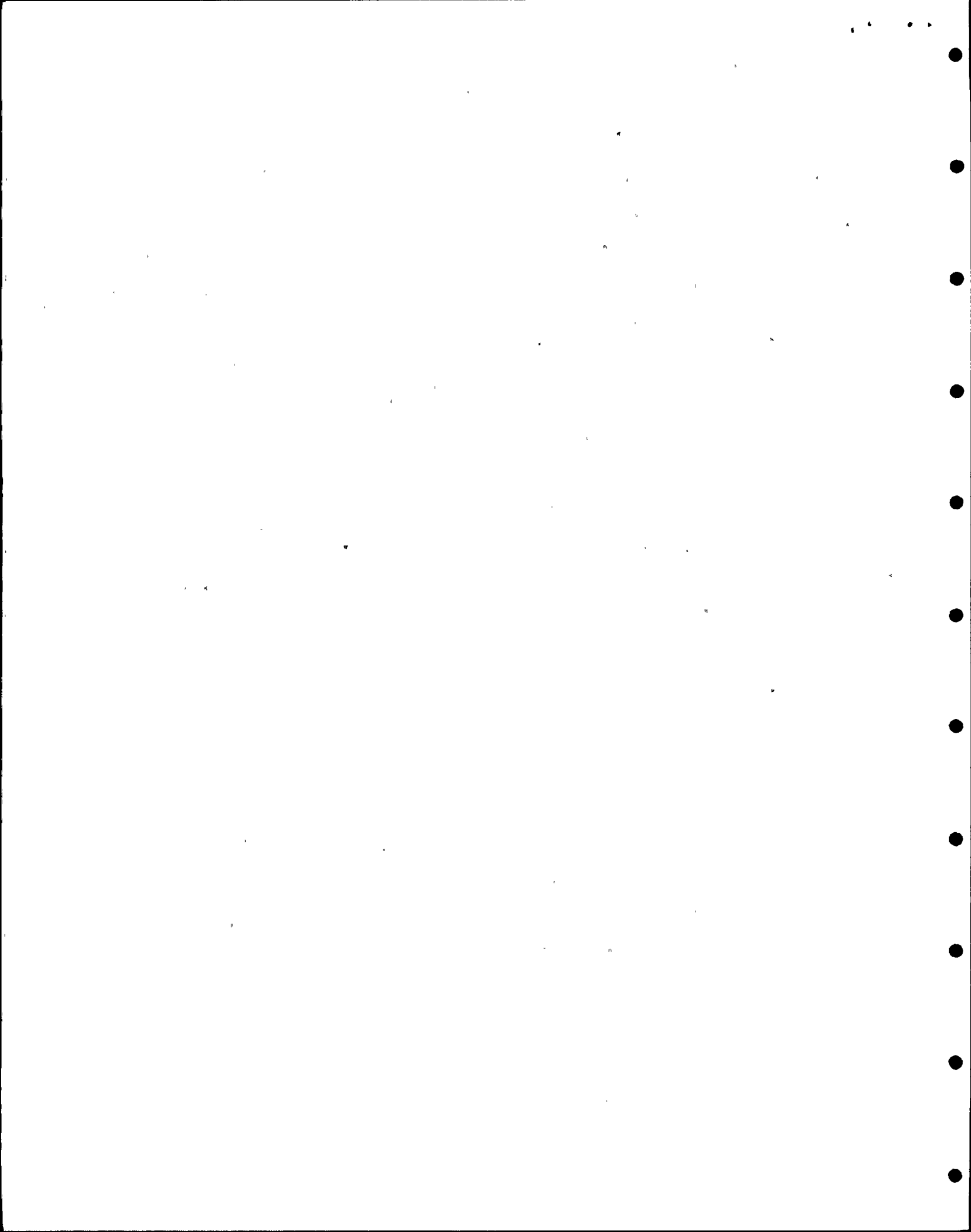


1 of panels that might be wall mounted or something as the best
2 example. You may have located some panel in the third floor
3 of the control building, let's say, and specified that to
4 the vendor, and through some reason as the design evolved,
5 the location of that panel let's say moved to the top floor
6 of the control building. What kind of procedures and controls
7 do you have to go back and assure that the specifications
8 for that panel are adequate or the panel supplied is adequate
9 for this relocation? What is your control on that kind of
10 change?

11 MR. BINGHAM: Generally, that is in our overall design
12 change control program, Ed. Whether it was that or any
13 other issue in the plant, it would be the responsibility of
14 the responsible engineer with the system to show from review
15 of the drawings that the location has changed.

16 MR. VAN BRUNT: I am not really so concerned with what
17 Bechtel does in their change control, because I am very
18 familiar with that and we have discussed that ad nauseum. I
19 am more interested in what you do with the vendor. Here
20 you've got a guy and you have specified something to him for
21 the third floor with some curve and whatever and now you have
22 moved it to the fifth floor and it's got a different curve.
23 What do you tell the vendor, or do you make that judgment
24 yourself based on the data that he gave you?

25 MR. BINGHAM: Ed, what we do is we look at the curve



1 that we have given or we have from the supplier and check
2 that with the new location. If it still is satisfactory,
3 because, remember, we said we get envelope curves, then we
4 will accept it. If it is not, we go back to the vendor and
5 modify the input data.

6 MR. VAN BRUNT: And the testing requirements would
7 then also be modified?

8 MR. BINGHAM: That's right.

9 MR. ALLEN: Norm Hoefert.

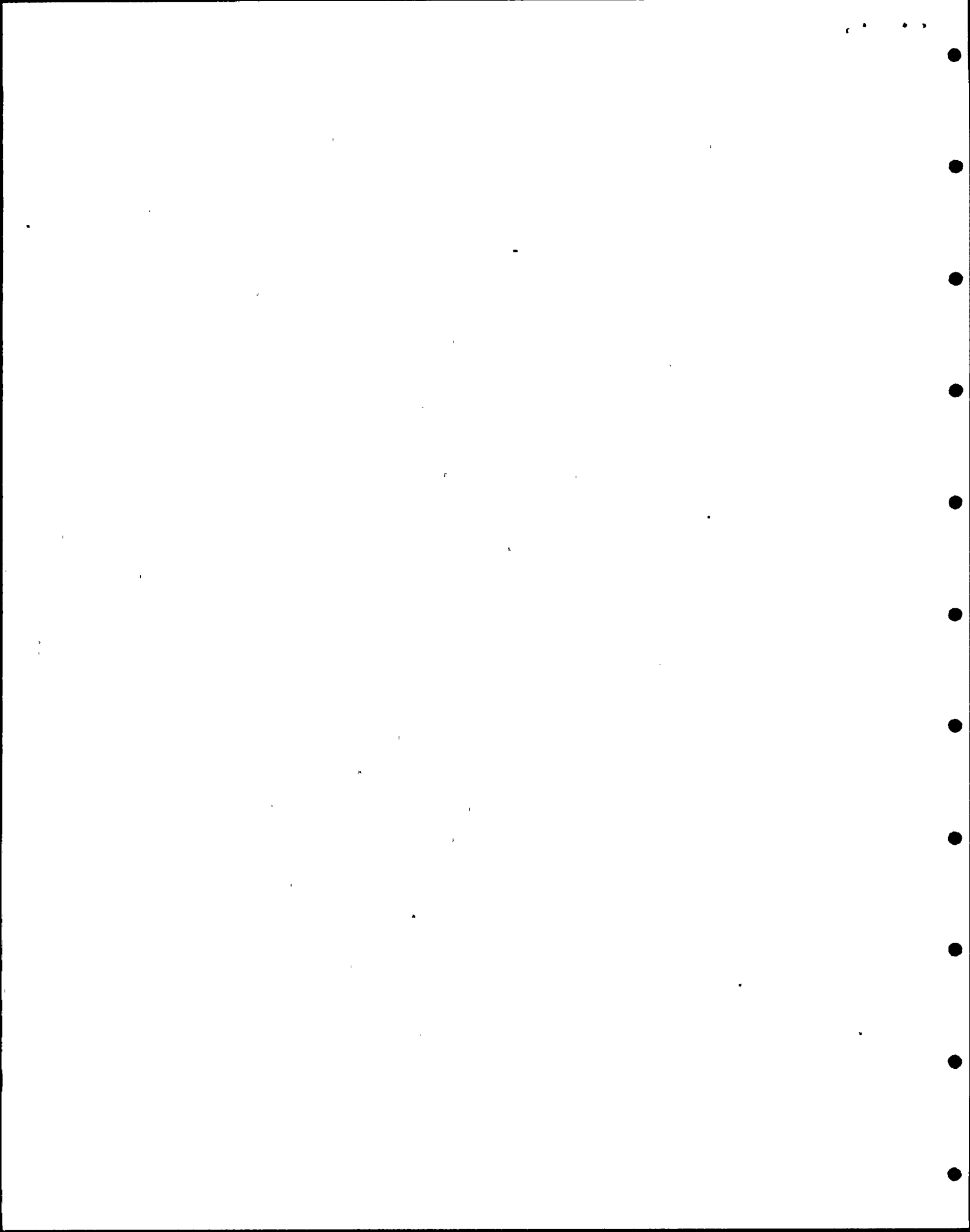
10 MR. HOEFERT: Are your horizontal accelerations and
11 loads considered in one direction or two?

12 MR. SCHECHTER: Two directions.

13 MR. ALLEN: Pete Newcomb.

14 MR. NEWCOMB: You indicate in this Table 10 much of
15 the mechanical structures of the plant. What values or
16 percent of critical damping do you use for electronic
17 instrumentation, this type of thing?

18 MR. LINDERMAN: On your electronic equipment, if you
19 are doing an analysis, you will follow the table. If you
20 are doing testing, you will compare the TRS, the test
21 response spectra, to the required response spectra either in
22 the 2 or 3% curve or the 5% curve. Generally, we are trying
23 to compare on the 5% curve, which is written into IEEE 344.
24 Some of the comparison, however, has been done on the 2 and
25 the 3% curves for the OBE and the SSE.



1 MR. NEWCOME: So as long as you are consistent with
2 the percent of critical damping, do you see any major variation
3 between using a 2% curve and a 5% curve?

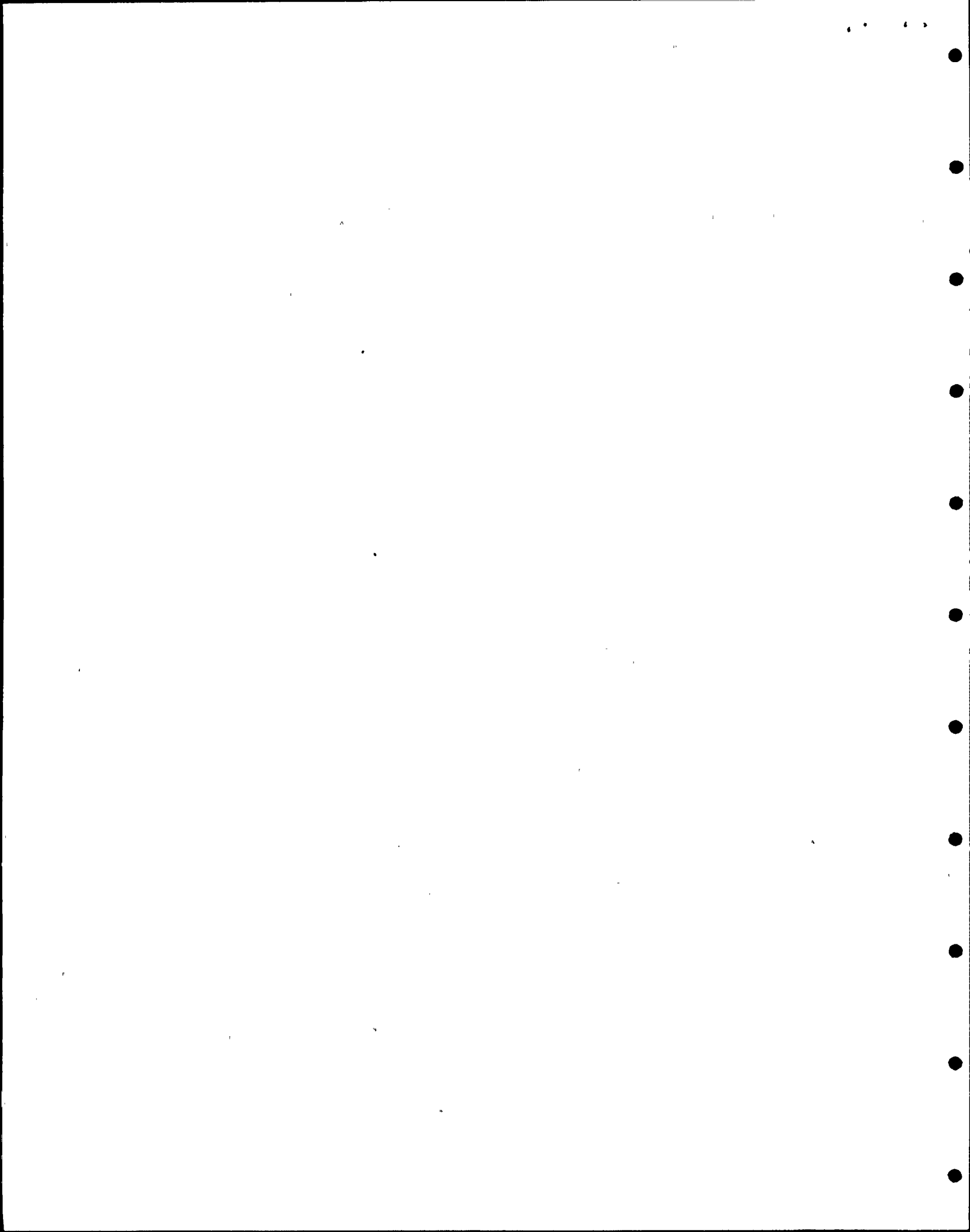
4 MR. LINDERMAN: There is a large discussion as to
5 which is the more conservative. I don't think anyone has
6 really come to the conclusion that one is more conservative
7 than the other, because one can postulate either as most conservative.
8 personally, I like to have a comparison on the 2% and, let's say, a 2% and
9 5%, both of them. Then I know a little bit more about the
10 type of motion that was fed into the test, and what have you,
11 but right now there is only the one.

12 MR. ALLEN: John Barrow.

13 MR. BARROW: Going on with this question a little bit
14 more, on most of the electrical equipment, it seems the
15 vendors have been using 2%. Has Bechtel been giving them
16 direction as to what value to use? They have been pretty
17 consistently using 2%.

18 MR. LINDERMAN: I believe in the specifications, it
19 shows 2%, but some data comes back that is qualified for
20 other plants which were 5%. Other specifications require 5%.

21 MR. ALLEN: Bill, I have a question kind of related
22 to two or three other questions. Assume we are out in the
23 field with a valve, large actuator, specified to be put in in
24 a vertical position. However, when they start to put it in,
25 they find they don't have the ceiling clearance. They had to



1 drop it down to a 30-degree angle. How can we assure
2 ourselves we catch that and then analyze it.

3 MR. BINGHAM: Again, that gets back to the change
4 control program, John. The constructor is not allowed to
5 change the configuration without having approval of the
6 engineer. Part of that approval then would include whatever
7 analysis is required to assure that the valve can be rotated.

8 MR. ALLEN: How do we assure we catch this? I mean
9 the welder is out there and he says it's not going to fit, so
10 he puts it in at 30 degrees.

11 MR. BINGHAM: There is an organization in the field,
12 the quality engineer. That is our first line of defense.
13 We would hope that the superintendent would report it, and
14 usually that is what has happened. At least, my experience
15 has been that when there is an interference, I am usually the
16 first to find out.

17 MR. ALLEN: Are there further questions from the board
18 on this before we move along?

19 DR. ROSZTOCZY: One of your slides addressed the
20 question of what equipment needs to be seismically qualified
21 and it referred back to an FSAR list. Yesterday we discussed
22 the same subject relative to the environmental qualification.
23 The first question is, is there any difference between the two
24 lists, or whatever the list is for the environmental, can I
25 assume that the very same list applies to the seismic?

1 MR. BINGHAM: You should be able to. Dennis will
2 respond.

3 MR. KEITH: The two lists are in a different format,
4 but everything that is Seismic Category I will go through
5 the environmental qualification program.

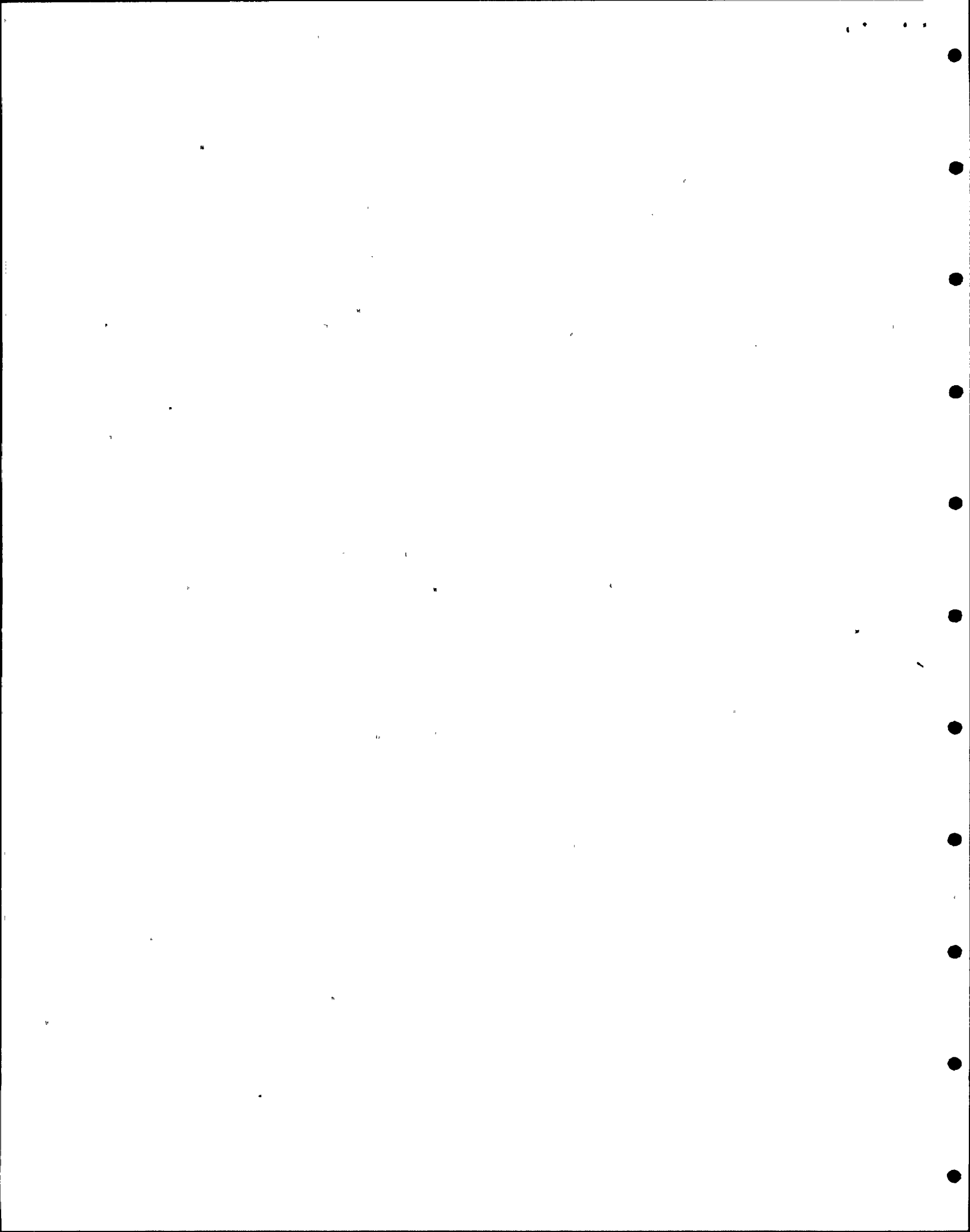
6 DR. ROSZTOCZY: Then based on the discussion we had
7 yesterday, the new list that you are going to provide is
8 going to have on it all the safety equipment as well as
9 systems related to safety; that new list is going to be the
10 list to be used for both environmental and seismic qualifica-
11 tions, and if that new list has something on it that the FSAR
12 list did not have, we are going to see to it that that equip-
13 ment also gets the appropriate seismic qualification included
14 in that list?

15 MR. BINGHAM: That is our intent, yes.

16 MR. ALLEN: John Barrow.

17 MR. BARROW: Dennis, I want to try to clarify what you
18 just said. Shouldn't it really be stated that anything that
19 is Class IE is also seismically qualified? I can name you
20 some things that are seismically qualified, but aren't
21 environmentally qualified such as cable trays, cable tray
22 supports.

23 MR. KEITH: Well, John, that falls under the discussion
24 which Bob Carson went through yesterday on IEEE 627 and
25 mechanical equipment in general. If you pick something like



1 cable trays, there is not much you have to do in terms of
2 environmental qualification, agreed, but, in general, every-
3 thing that we call Seismic Category I must meet environmental
4 qualification requirements.

5 MR. BARROW: If they are applicable.

6 MR. KEITH: If they are applicable, yes.

7 MR. ALLEN: Are there any further questions?

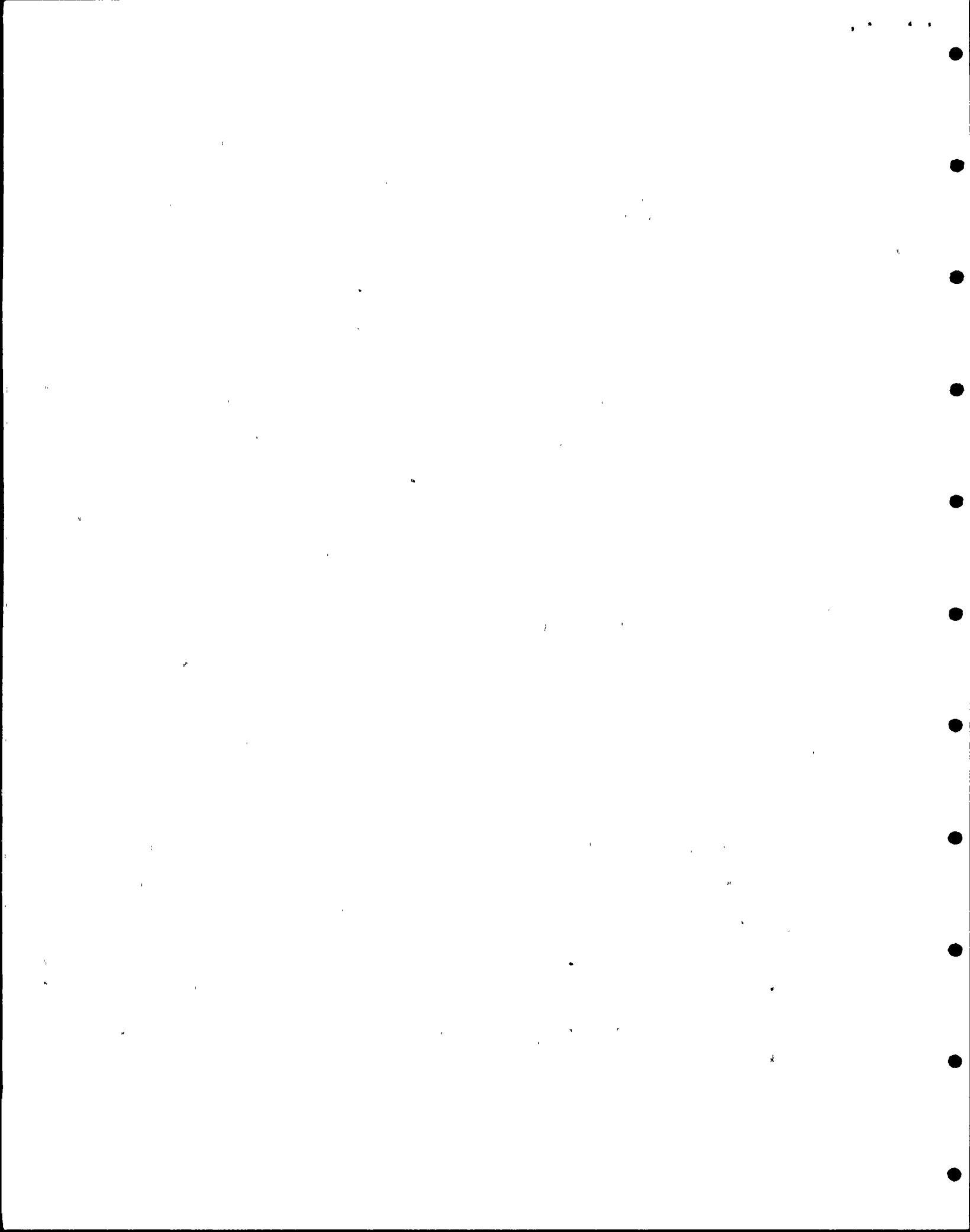
8 MR. ROEDEL: Is your presentation going to cover what
9 is sometimes called the two-over-one or what I think we call
10 Category IX seismic criteria or what is better described as
11 an item that does not need to function during the design
12 basis earthquake that may be located over an article that must
13 function during the design basis earthquake?

14 MR. BINGHAM: No.

15 MR. ALLEN: Are there any further questions from the
16 board before Bill proceeds?

17 MR. BINGHAM: We will now proceed with Section C.2,
18 Standard Review Plans.

19 MR. SCHECHTER: The next figure, Figure 17, shows the
20 documents that provide the requirements for the seismic
21 qualification program. Three Standard Review Plans are
22 listed, 3.9.2, 3.9.3, and 3.10. In addition, there are
23 several General Design Criteria listed and Regulatory Guides.
24 These General Design Criteria and Regulatory Guides are
25 referenced in the Standard Review Plans. I will be covering

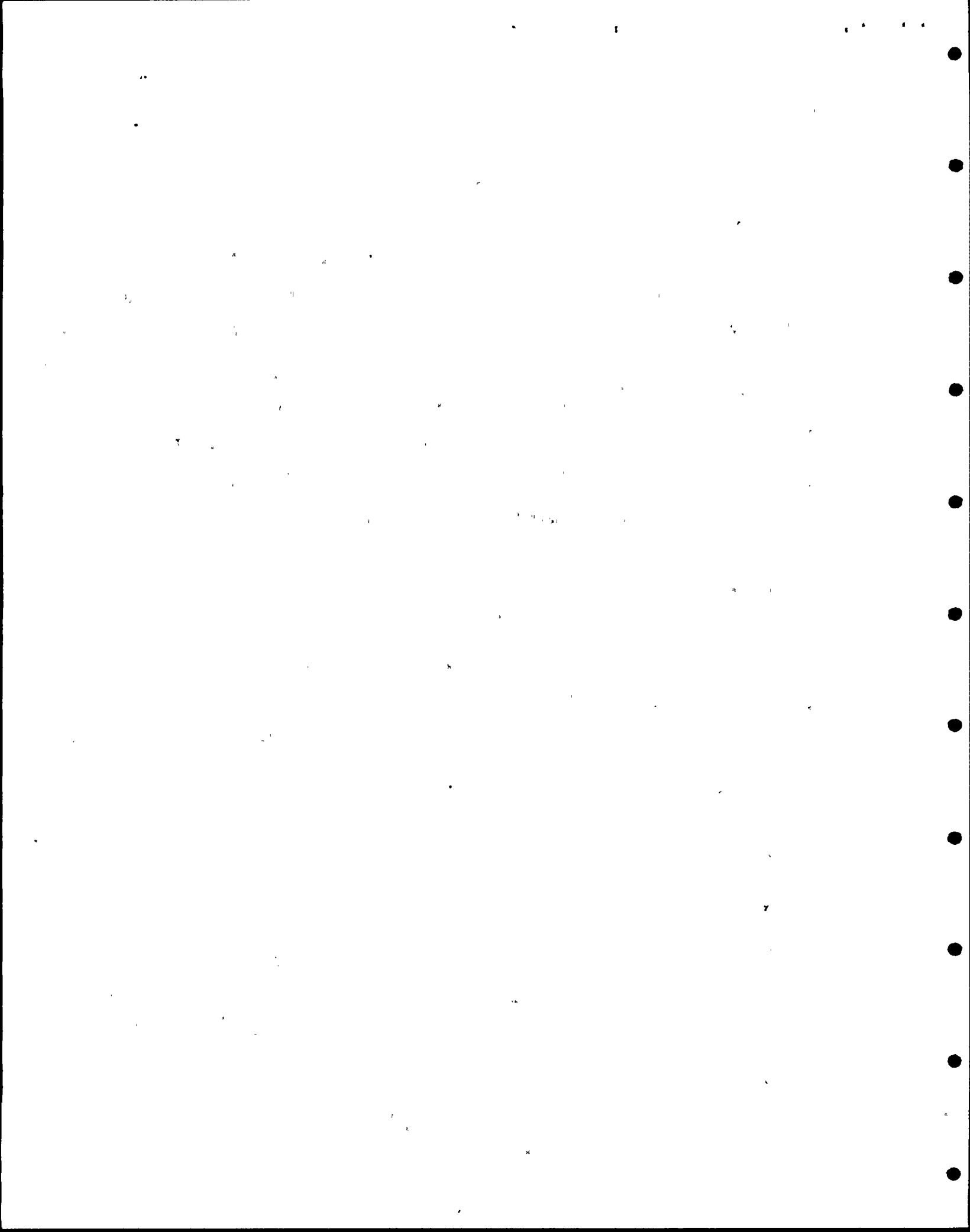


1 all of these documents.

2 Exhibit IIIC-5 represents the first document,
3 Standard Review Plan 3.9.2 entitled Dynamic Testing and
4 Analysis of Systems, Components, and Equipment. Before I go
5 on, we used the words "in compliance." We are going to have
6 to clarify that, but what it means here was that we are aware
7 of the requirements, we agree with the requirements, and
8 that the requirements are imposed on the vendor, on the
9 supplier, and that we would be verifying that the supplier
10 indeed did use those requirements. It gives acceptance
11 criteria to confirm the ability of equipment to function
12 during and after a seismic event. It gives criteria for
13 deciding when testing or analysis may be used. Analysis
14 without testing can only be used when structural integrity
15 alone will assure the ability of the equipment to function in
16 its designed role.

17 Exhibit IIIC-6 goes on to state that the equipment
18 should be tested in its operational condition. The project
19 is in compliance. It gives the characteristics that the
20 seismic input motion must meet. Again, the project is in
21 compliance.

22 Exhibit IIIC-7. It states that the input motion
23 should be equal to or greater than the required response
24 spectrum. Again, the project is in compliance. It states
25 that the input motion should be a multi-frequency input and



1 it should be multi-directional. If not, it gives criteria for
2 when single directional analysis can be used. The project
3 is in compliance, and I might add that for multi-frequency
4 input, we generally use 1 to 33 hertz. Some of the later
5 equipment is qualified using 1 to 40 hertz for the qualification program.

6 Exhibit IIIC-8 says that dynamic coupling between
7 the equipment and related systems must be considered. The
8 project is in compliance. The equipment should be attached
9 to the shaking table in a manner similar to the actual field
10 conditions. Again, the project is in compliance. It gives
11 criteria for testing equipment in place by attachment of
12 devices that will vibrate the equipment. Again, the project
13 is in compliance.

14 Exhibit IIIC-9 gives criteria for allowing the test
15 program to be based on a selective representative sample of
16 the equipment and then it covers the supports, that the
17 supports of mechanical equipment should be capable of with-
18 standing the effects of the seismic event, and it states that
19 the combined stresses of the support structures must be within
20 the limits of Subsection NF of the ASME code. The project is
21 in compliance.

22 Finally, Exhibit IIIC-10 says that the supports
23 should be tested with the equipment in place or you use a
24 pseudo weight or mass that represents the equipment, and the
25 project is in compliance.

1 Exhibit IIIC-11 is the Standard Review Plan 3.9.3
2 entitled ASME Code Class 1, 2, and 3 Components, Component
3 Supports, and Core Support Structures. For the Palo Verde
4 Project, we are in compliance with IEEE 344-1975 and
5 Regulatory Guide 1.100 for the qualification testing of our
6 equipment. Pump and valve support stress limits should be
7 within the requirements of Subsection NF of the ASME code.
8 We are in compliance with the first part of this. The second
9 part, component support stress limits shall meet the criteria
10 of Reg. Guides 1.124 and 1.130, we are in compliance with
11 Reg. Guide 1.124. Reg. Guide 1.130, does not apply, since
12 there are no Class I plate-and-shell supports for the balance
13 of plant components.

14 Exhibit IIIC-12 deals with the requirements of
15 Reg. Guide 1.67. This Reg. Guide deals with the design of
16 the pressure relief valves and as such is not related to the
17 seismic qualification of equipment.

18 Exhibit IIIC-13. The last Standard Review Plan that
19 I want to discuss is 3.10 entitled Seismic Qualification of
20 Category I Instrumentation and Electrical Equipment. The
21 requirements are very similar to Standard Review Plan 3.9.2
22 for mechanical equipment. Again, it gives criteria for
23 determining the acceptance or the ability of equipment to
24 function during and after a seismic event. It gives criteria
25 for deciding when to use testing or analysis to qualify the

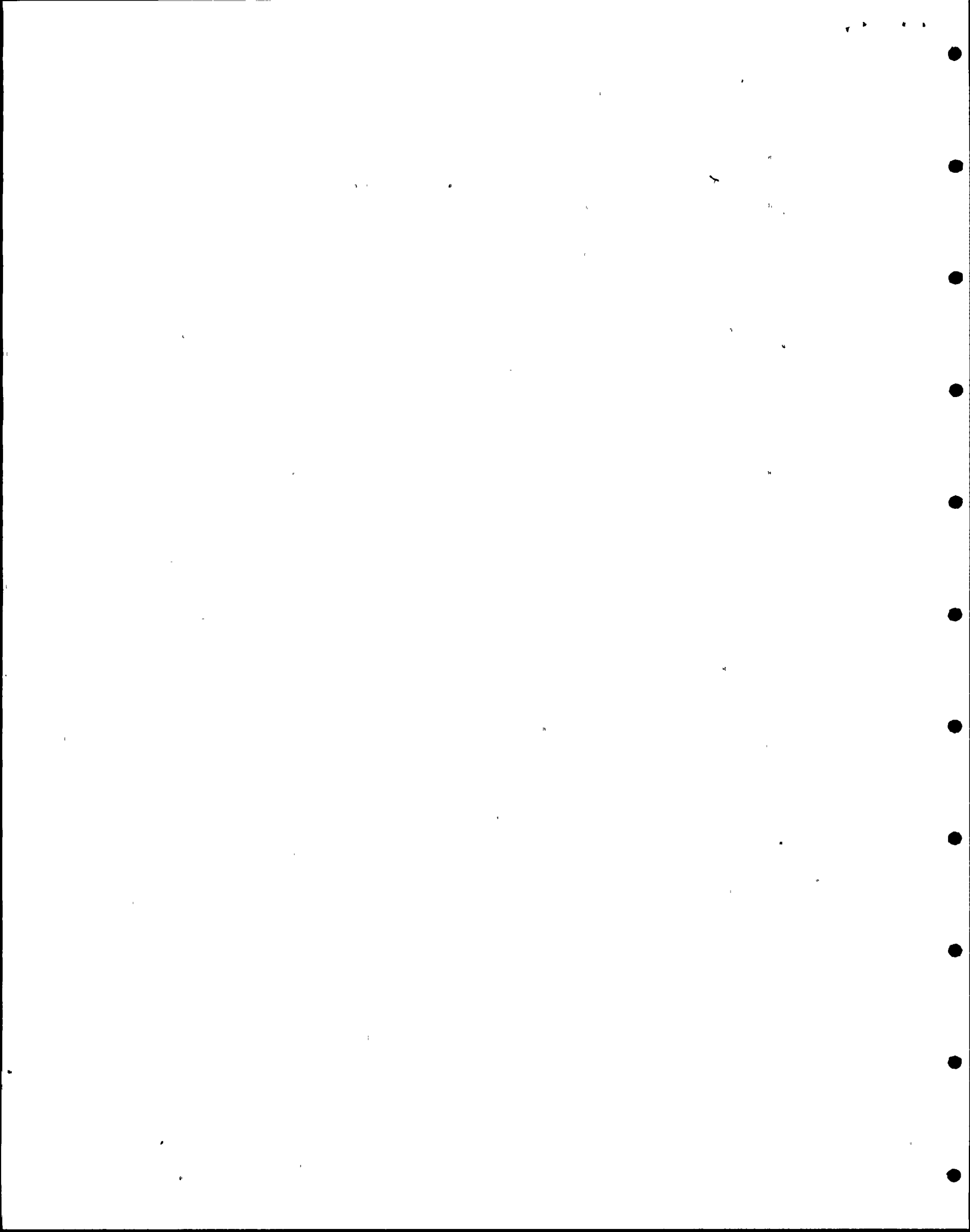
1 equipment. Analysis without testing can only be used when
2 the structural integrity alone will assure the ability of the equipment to
3 function during and after a seismic event. The project is in compliance.

4 Exhibit IIIC-14 gives the characteristics that the
5 seismic input motion must meet. The project is in compliance.
6 It states that the equipment shall be tested in its operational
7 condition and operability should be verified during and after
8 the test. The project is in compliance.

9 Exhibit IIIC-15 states that the input motion should
10 be equal to or greater than the required response spectra.
11 The project is in compliance. It provides the characteris-
12 tics of the input motion, that random vibration input motion
13 should be used and should have multi-frequency. If not,
14 it gives criteria that must be used for single frequency
15 input motion.

16 Exhibit IIIC-16 states that the input motion should
17 be multi-directional. It does give criteria that state when
18 you can use single directional input motion. In other words,
19 you have to justify its use. The project is in compliance.
20 It states that the equipment shall be attached to the shaking
21 table in a similar manner to actual field conditions. The
22 project is in compliance.

23 Exhibit IIIC-17 allows for testing equipment in
24 place by means of attaching devices that will vibrate the
25 equipment, and the project is in compliance. I. allows a



1 test program setup based on a representative sample of the
2 equipment. The project is in compliance.

3 Exhibit IIIC-18 pertains to the seismic design
4 adequacy of supports. It states that the analysis or test
5 shall be performed on all supports of Seismic Category I
6 electrical equipment and instrumentation to assure their
7 ability to withstand the seismic event. Again, the analytical
8 results should include the required input motion that is
9 equal to or greater than the required response spectra, and
10 the combined stresses of the support structures should be
11 within the limits set forth in subsection NF of the ASME code.
12 The project is in compliance.

13 Exhibit IIIC-19 states that the supports should be
14 tested with the equipment installed or that a pseudo or dummy
15 mass be applied that represents the weight of the equipment.
16 The project is in compliance.

17 Finally, IIIC-20 states that documentation required
18 to demonstrate equipment seismic qualification shall be
19 retained for the life of the plant, and the project is in
20 compliance.

21 MR. BINGHAM: Are there any questions?

22 MR. ALLEN: John.

23 MR. BARROW: On Slides IIIC-7 and IIIC-15 both, Item
24 D on both of them, it says that every TRS should be character-
25 ized in the same manner as the RRS and conservatism in

1 amplitude and frequency content should be demonstrated. If I
2 am not mistaken, we have seen some qualification plans and
3 reports especially in electrical where the RRS has been a
4 previous RRS on a previous project or job that the manufacturer
5 has done and then he has proposed to do an analysis to show
6 that it is sufficiently similar to their previous test
7 response spectra -- it is not exactly what ours is, but they
8 propose to do an analysis to show that it is sufficiently
9 close to it to be good for qualification. Are you accepting
10 such analyses?

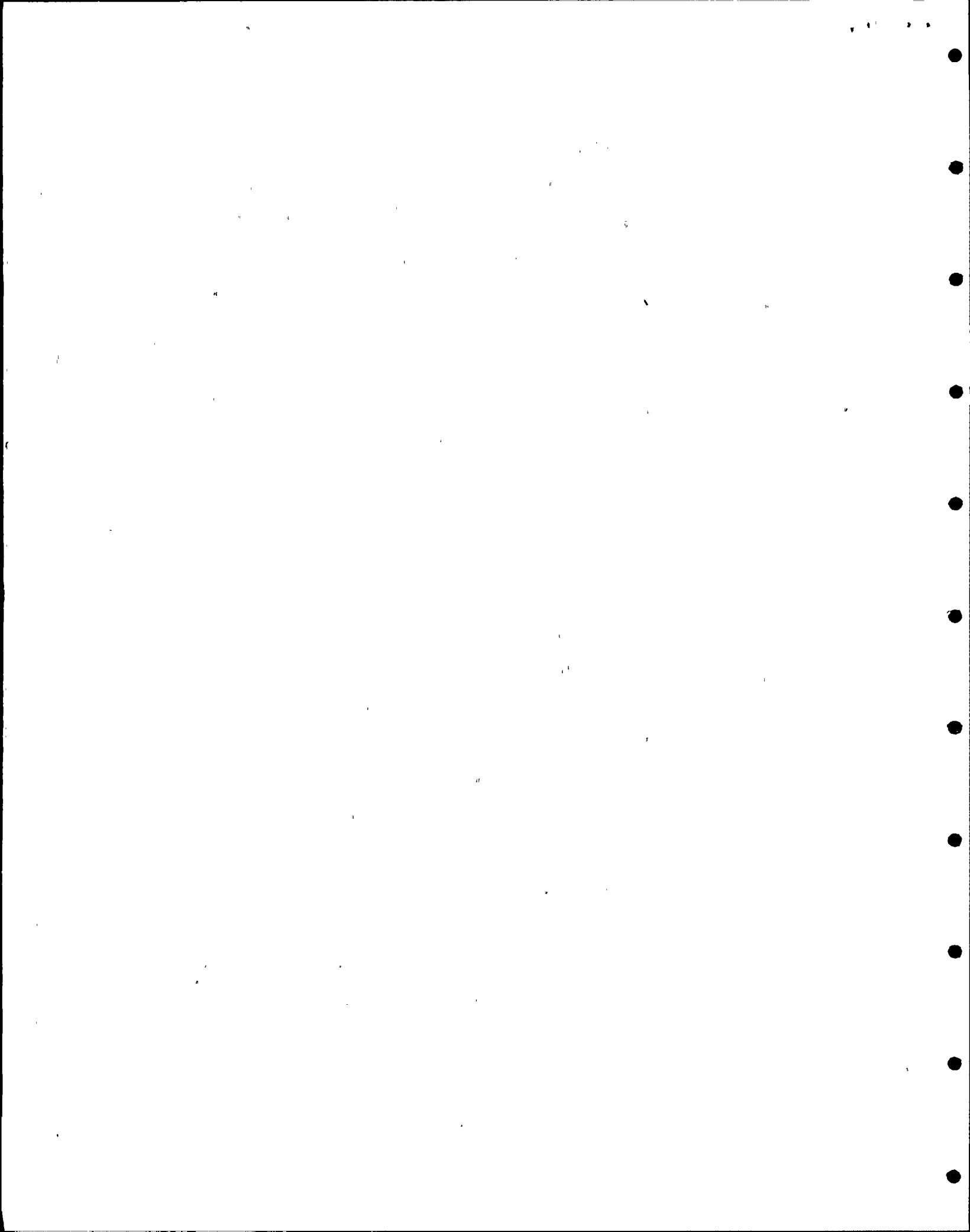
11 MR. BINGHAM: We are not sure we understand the
12 question.

13 MR. ALLEN: John, repeat the question.

14 MR. BARROW: I believe we have seen occasionally test
15 response spectra submitted by vendors on qualification of
16 equipment where the equipment had been qualified on another
17 project to that test response spectra and it didn't entirely
18 envelope our required response spectra and the vendor
19 proposed an analysis, or I think in one case the vendor didn't
20 propose an analysis, and the question we made on the qualifica-
21 tion plan was is an analysis going to be provided to show
22 that it is sufficient?

23 MR. BINGHAM: And the question is would it be acceptable
24 for them to have an analysis in this case?

25 MR. BARROW: Are you accepting analysis to show that a



1 non-enveloping test response spectrum is sufficient to
2 qualify the equipment?

3 MR. BINGHAM: We might accept it. If you would like, we
4 can spend a few minutes and indicate those cases where we
5 would. There will be one example that will come up later on
6 where this case occurs. Perhaps we could wait until that
7 example, and then have a dissertation on why that might be
8 acceptable.

9 MR. ALLEN: You mean on one of the problem vendors?

10 MR. BINGHAM: No, on one of the examples that we are --
11 well, yes, John.

12 MR. ALLEN: Why don't we wait until that time.

13 Ed Van Brunt, did you have a question?

14 MR. VAN BRUNT: Yes. This may duplicate a question
15 that Carter asked before, but I am not sure. In looking
16 through here, and we are looking now at acceptance criteria,
17 I am not sure in the context of acceptance criteria what you
18 mean when you say "in compliance." What does that mean to
19 me?

20 MR. BINGHAM: It means we are in agreement.

21 MR. VAN BRUNT: So you are in agreement with the
22 acceptance criteria. What does that result in? Does that
23 then get fed into the spectra? Is that what you are telling
24 me? Does that get fed into the design, or exactly what do
25 you mean?

1 MR. BINGHAM: What we mean is if you compare the
2 SRP's that we are looking at right now with what we are doing
3 that you would find no disagreement between what a reviewer
4 using that checklist, the SRP, would have when he audits or
5 looks at what is being done on the plant.

6 MR. VAN BRUNT: But are you comparing these criteria
7 against our criteria or are you comparing these criteria
8 against the implementation of our criteria?

9 MR. BINGHAM: Well, yes. Both.

10 MR. VAN BRUNT: Twice or once?

11 MR. BINGHAM: Well, hopefully once. We not only have
12 to look at the criteria, but ultimate implementation criteria.

13 MR. VAN BRUNT: Then secondly, go to Exhibit IIIC-11.
14 You have gone through here and we are in compliance and then
15 suddenly here under Item 2, you say Regulatory Guide 1.124 is
16 accepted and then you go on to say that 1.130 is not
17 applicable. What does "Regulatory Guide 1.124 is accepted"
18 mean? Does that mean you are in compliance with it or that
19 you are interpreting it, or what does it mean?

20 MR. BINGHAM: Generally, and we will cover this when
21 we get to regulatory guides, but generally what we are doing
22 is portraying the commitments in the licensing documents,
23 the PSAR, the FSAR, when we say it is accepted.

24 I believe those are the words, Dennis, that we use
25 in the documents.

1 MR. VAN BRUNT: I guess all I am asking, Bill, is why
2 doesn't it say "in compliance?"

3 MR. BINGHAM: We could change this and say in compli-
4 ance.

5 MR. VAN BRUNT: So there is no intention there to not
6 be in compliance or indicate that there is some minor deviation
7 from the requirements or something?

8 MR. BINGHAM: That's correct.

9 MR. VAN BRUNT: Just to follow up on that, on Exhibit
10 IIIC-12, we are into the same situation now where you have a
11 requirement, and instead of saying "in compliance," there
12 is a dissertation. Again, does that indicate to me or should
13 that say "in compliance" and then this would just be some
14 explanatory words, or what?

15 MR. BINGHAM: Yes. This is indicating that there are
16 only certain portions of the guide that are applicable to this
17 particular issue.

18 MR. VAN BRUNT: Then, in conclusion, at least going
19 through this Standard Review Plan, I could say that as far as
20 all of the criteria that are listed here that it is correct
21 to say that "in compliance" would apply to every one of them?

22 MR. BINGHAM: Yes.

23 MR. ALLEN: Any further questions from the board?
24 Pete.

25 MR. NEWCOMB: On Exhibit IIIC-8, under G, you talk

1 about dynamic coupling between the equipment and related
2 systems. I have a question regarding field installation and
3 how the interface exists between what is tested and how it
4 is installed. Perhaps an example is the easiest way. Many
5 cabinets, for example, have different entry points where
6 maybe flexible conduit is used, fixed conduit is used,
7 cable hangs, whatever. How do you ensure that the installation
8 in the field is verified by the seismic testing performed?

9 MR. BINGHAM: I am not sure I understand your question.

10 MR. NEWCOMB: For example, a fixed conduit input to a
11 cabinet will have one very definite seismic response and
12 seismic effect at that interface whereas a flexible conduit
13 will have an entirely different response or effect. How do
14 you ensure that what you tested is what you installed?

15 MR. BINGHAM: Let's leave that as an open item, John.

16 MR. ALLEN: Okay. Terry, would you mark that down.

17 MR. NEWCOMB: I have one more question. Exhibit IIIC-
18 14, please. Here the requirement discusses that operability
19 should be verified during and after the testing. In the
20 context of seismic testing, how do you define operability?
21 For example, do you mean continuous output or do you mean
22 accuracies, response times, linearities? Are there two
23 definitions between environmental qualification operability
24 and seismic qualification operability?

25 MR. BINGHAM: Are you focusing on electronic equipment

1 in your question?

2 MR. NEWCOMB: Response time of a valve, for example.
3 You can take it anywhere you want. Do you verify all the
4 normal operability characteristics you would do when you had
5 the time say during an environmental test?

6 MR. LINDERMAN: Operability is checked by different
7 ways for different pieces of equipment depending upon how it
8 is qualified. On many of the pieces of equipment, if we've
9 got relays in there, we will actually check for chatter,
10 whether there is chatter or not. We will have the devices
11 change state. Many of the relays then are checked to see
12 if they change within the millisecond change time. They
13 check to make sure that there is no chatter while
14 you are at the change state. I believe that some of the
15 battery chargers, and I don't know whether it is this project
16 or another one, we have tested to show output instead of each
17 individual component not working, but checking that the
18 battery charger was producing the voltage and current that
19 was required. Valves, here again you are checking the
20 devices so that there is no chatter. You are checking the
21 actuator during the test to make sure that it will change
22 state within the rated time. Then you are checking that the
23 overall valve will operate within the time limits. So
24 different equipment has different criteria.

25 MR. NEWCOMB: This testing is performed during the

1 actual seismic event testing.

2 MR. LINDERMAN: Again, depending upon what it is. If
3 we are doing a static pull test on a valve, the valve is tested
4 during the static pull test. The actuator is also qualified
5 by a dynamic test during its qualification test.

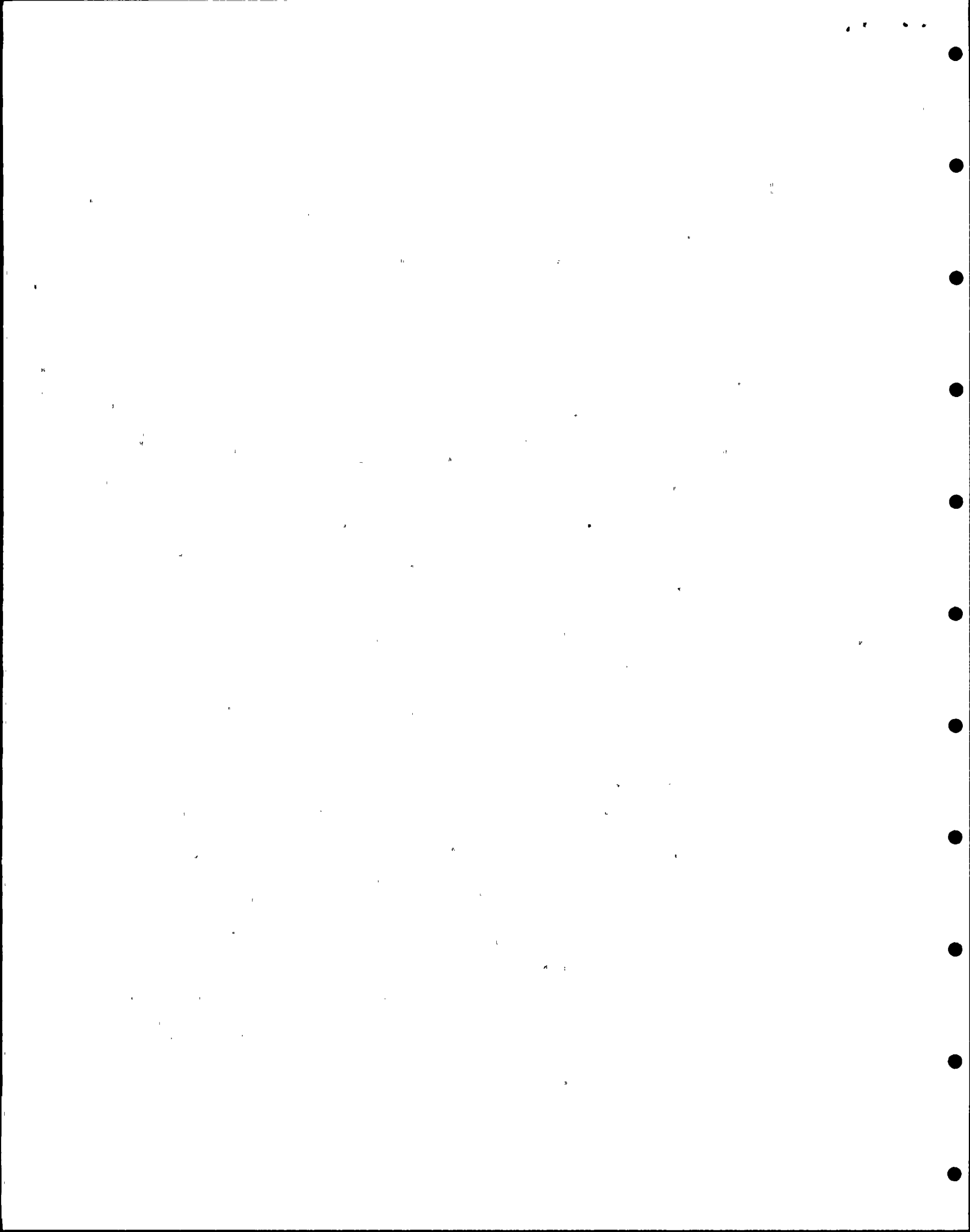
6 MR. BINGHAM: Other questions? Ed Sterling has a
7 question.

8 MR. STERLING: On Exhibit IIIC-19, I think we found
9 the answer to that by an open item a while ago, you say in
10 compliance, and down in this last sentence, you say in such a
11 case, equipment should be tested separately for operability
12 and the actual input motion to the equipment in the test
13 should be more conservative than the support provides. That
14 would tell me that you are supplying the equipment vendor
15 with the actual curves.

16 MR. BINGHAM: That's correct, but the open part was
17 how thorough have we been in doing it, and that is what I was
18 going to respond to.

19 MR. STERLING: Okay, we will leave it an open item,
20 then. The other part of that, the same section there, are you
21 designing the supports to dampen out vibrating motion to the
22 equipment or are you trying to lower the amount of seismic
23 inputs to an instrument support?

24 MR. SCHECHTER: We try to make the supports rigid if
25 at all possible, which would reduce the amplitude to the



1 equipment.

2 MR. ALLEN: Any further questions? Vince.

3 MR. NOONAN: On this particular section, I guess I
4 have a lot of questions. I will try to highlight the ones
5 that I would have. I really don't know how to do this without
6 taking too much of the board's time. This particular section
7 is one we would have a lot of questions on, we in NRC would.
8 Again, I will try to highlight the areas and if we can get
9 some answers, that will be fine. If not, I will maybe ask
10 that it be an open item.

11 For example, on IIIC-5, you say you are in compliance
12 with Statement A. Statement A would almost say that any
13 electrical piece of equipment or valve would be tested.

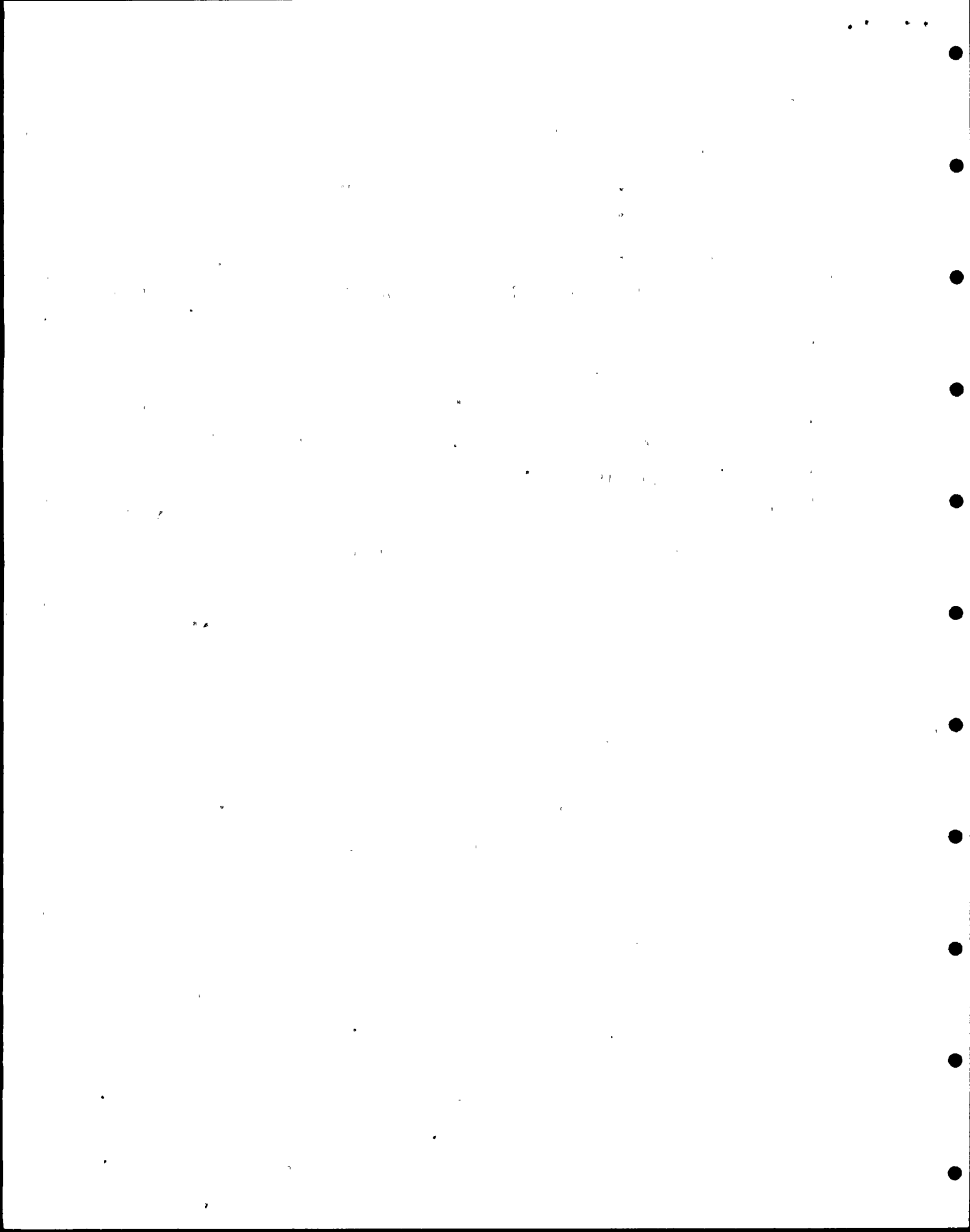
14 MR. LINDERMAN: To show operability of devices, the
15 test would be done. This is true.

16 MR. NOONAN: Can all your valves be tested physically?
17 Is it possible?

18 MR. LINDERMAN: Well, here again we will test the
19 actuator. We may actually analyze the total valve system.

20 MR. NOONAN: Some valves are pretty large and you
21 would have a hard time getting the proper amount of steam
22 flow.

23 MR. LINDERMAN: Well, here again, if you recall, I
24 said we will test the actuator, we will analyze the system,
25 we will do a static pull test to show that the total thing



1 can operate.

2 MR. SCHECHTER: We would use the test method or a
3 combination of the test and analysis.

4 MR. LINDERMAN: It is a combination of test and
5 analysis. Any of the devices would be tested.

6 MR. NOONAN: On the next page, on IIIC-6, large valves
7 that had very high flow rates, high steam flow rates, for
8 example, big valves, there is no way to test those.

9 MR. LINDERMAN: That's correct.

10 MR. NOONAN: So to be in compliance, we would have to
11 say really you are in compliance from the standpoint that you
12 are trying to use analysis to verify that type valve will
13 operate properly in the seismic condition.

14 MR. LINDERMAN: Right. We are using a combination of
15 analysis and testing.

16 MR. NOONAN: On III-7, it says the test input motion
17 shall be characterized in the same manner as the seismic input
18 motion. Given that you have a test response spectrum, would
19 you use the single frequency to try and envelope the test
20 response spectrum?

21 MR. LINDERMAN: No.

22 MR. NOONAN: You would not.

23 MR. LINDERMAN: No.

24 MR. NOONAN: In no case?

25 MR. LINDERMAN: Here again, I am just thinking.

1 Generally the random motion will envelope it, and here again
2 I cannot remember whether it is this project or another
3 project that I think there have been a few pieces that Wyle
4 has had to put some sine beats on top of random to envelope
5 the low frequency end down to 1, 2, 3 hertz.

6 MR. NOONAN: Yes, I understand that part. That is not
7 what really bothers me. The part I would be concerned about
8 is where you use a single frequency sine wave to try and
9 envelope the whole spectra.

10 MR. LINDERMAN: No.

11 MR. NOONAN: You don't happen to have the CPS mass
12 storage unit. That is not one of your items, is it?

13 MR. BINGHAM: A what?

14 MR. NOONAN: CPS mass storage unit. I understand it
15 is in Palo Verde.

16 MR. VAN BRUNT: Vince, would you clarify that question?
17 I am not sure any of us understand what you are asking.

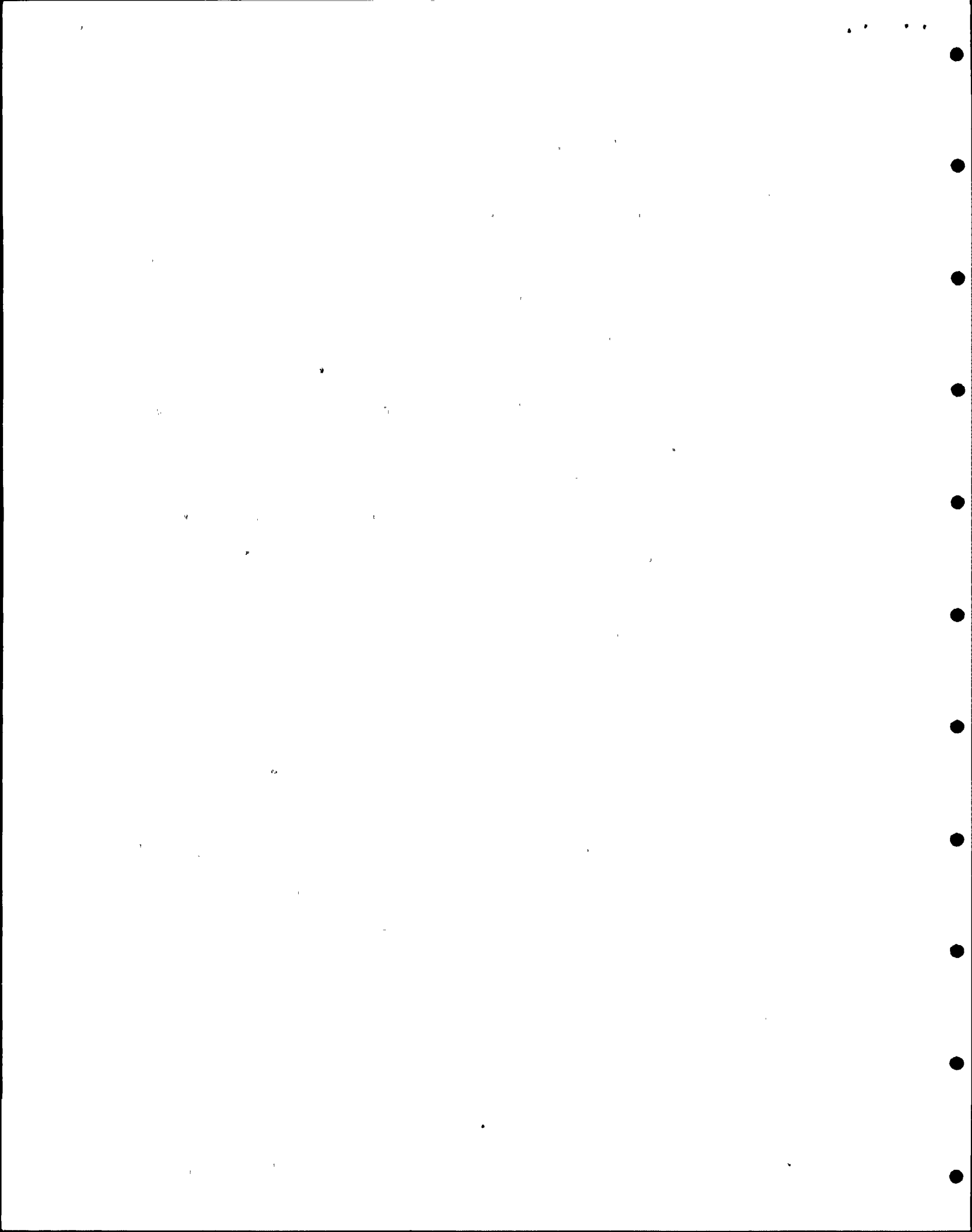
18 MR. NOONAN: The equipment is labeled CPS mass storage
19 unit. It is utility equipment used to facilitate periodic
20 testing and maintenance of the system, rack mounted chassis.

21 MR. ALLEN: A core protection system?

22 MR. NOONAN: Could be. I don't know whether this is
23 Bechtel or this is CE.

24 MR. WOLFE: If it is CPC, it is CE.

25 MR. BINGHAM: Is that what it is, core protection
calculator.



1 MR. NOONAN: Core protection calculator.

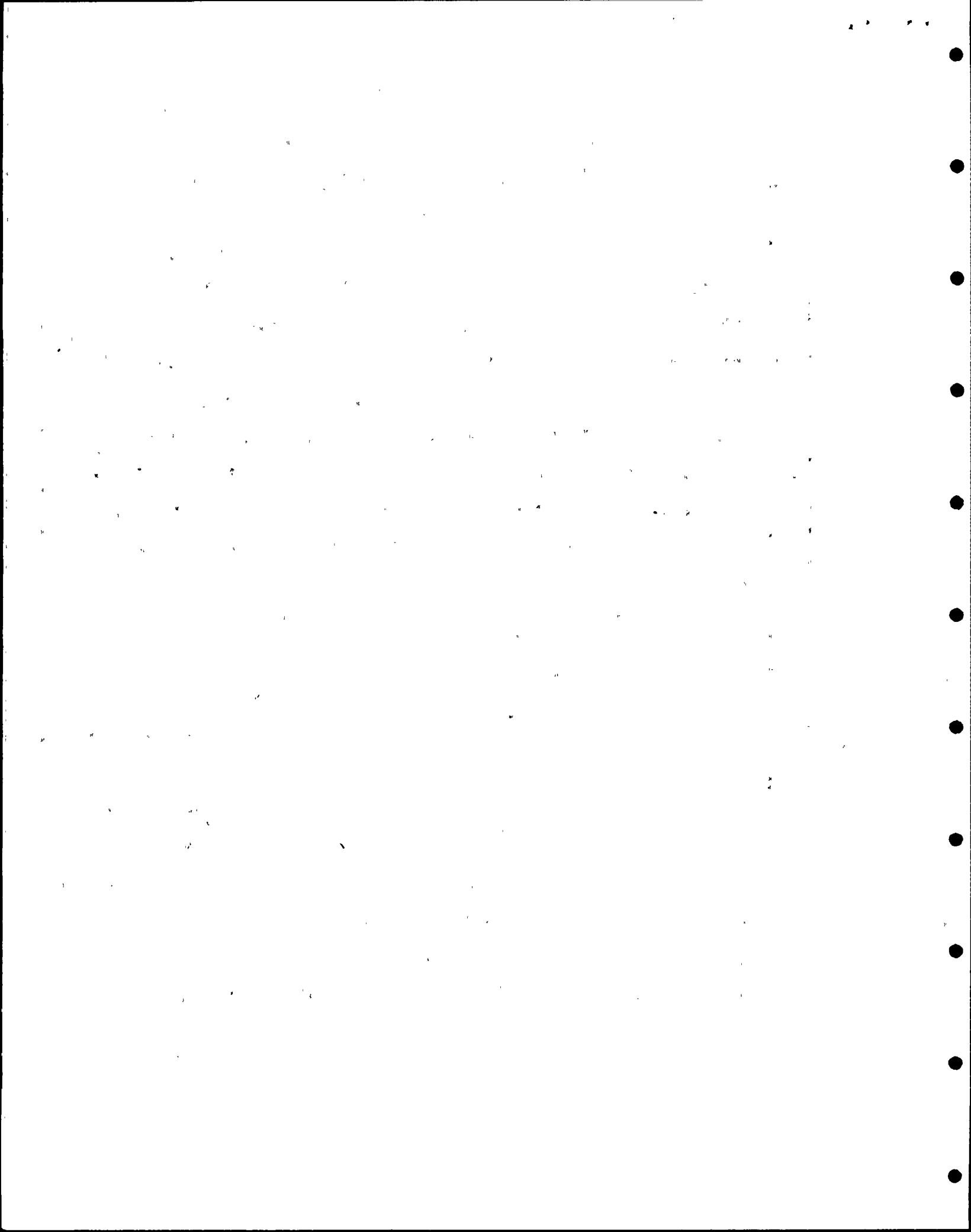
2 I will ask a question that has been raised by
3 Dr. Okrent, of the ACRS? I will expect I will have to answer
4 it. When you do a multi-frequency, multi-input test, we've
5 gotten to the point now where we make very complex test
6 equipment, when you are trying to shape your response spectrum
7 and you are using multi-frequency type of inputs and you've
8 got three different directions going on, or at least two
9 directions with maybe the thing turned, it takes time to
10 establish that spectrum. Do you have any feel for how long
11 in a normal test it would take you to just shape that spectrum,
12 get to where you feel like you have the proper spectrum
13 envelope?

14 MR. LINDERMAN: Can I go ahead and answer that?

15 MR. BINGHAM: Sure.

16 MR. LINDERMAN: On this project, we have not been
17 looking at how long it takes to shape the curve to get the
18 response spectrum. However, on another project, we have been
19 looking into this and we have been looking into some of the
20 standard Wyle Laboratory test methodology to get it and we
21 are finding that within about 10 seconds or so, we are getting
22 about 90% of the response spectrum.

23 MR. NOONAN: I have witnessed some tests personally
24 where it took them maybe on the order of two or three days
25 to get a piece of equipment shaped because of the fact that

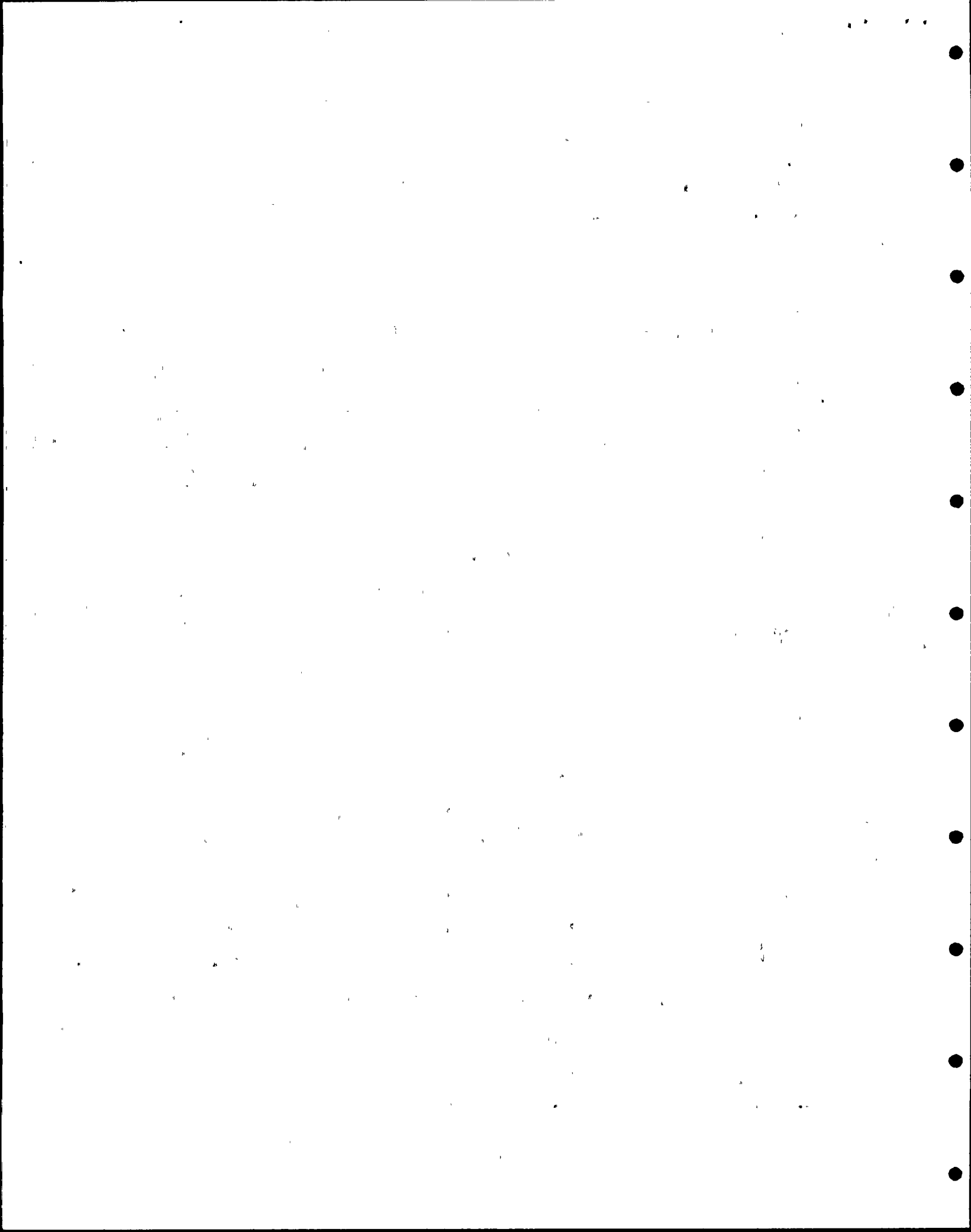


1 they had so much feedback coming in out of the equipment it
2 was giving them a lot of difficulty. The question Dr. Okrent
3 is raising, given that it takes you some time to shape your
4 spectrum, you are putting it under a vibration input, you
5 then take it to your SEE level and you run it, now you take
6 it and put it out in your plant and you see it is going to
7 operate under your SSE level, does that give you any concern?

8 MR. LINDERMAN: I misunderstood your first question
9 when I answered it. What you are talking about is when we are
10 trying to get the table to actually shake with the equipment
11 on it. Generally with the testing laboratories that we have
12 been involved with and the tests that I have experienced
13 myself, they have shaped the curve without the equipment on
14 the table. Then they mount the equipment on the table
15 and they start going through their OBE testing, they will
16 double-check their shaping of their curves so that when
17 they get to the SSE testing, then they are only essentially
18 doing one SSE curve.

19 MR. NOONAN: But you do five OBE's.

20 MR. LINDERMAN: The specification requires a minimum
21 of two OBE's for this project. They are doing at least that
22 number. They may do a couple extras because of problems. On
23 one of the pieces of equipment that we will have on here you
24 will notice that they actually went through 13 OBE's total
25 when they were looking at the total two direction because of



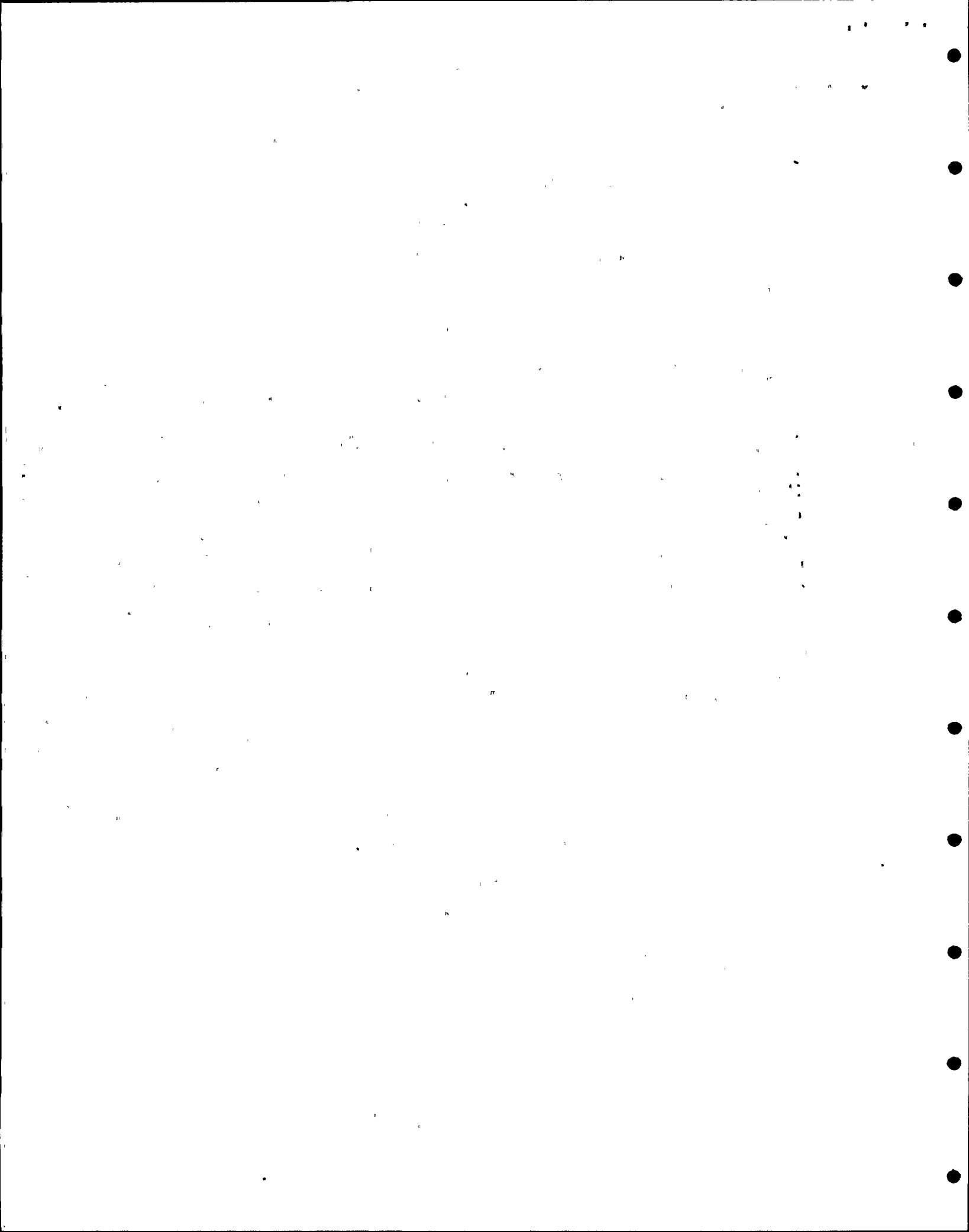
1 some fallacy in the equipment and there was a little bit more
2 testing. The question that I answered about the 10 seconds
3 was how long and how well your input motion shaped the
4 response spectrum.

5 MR. NOONAN: The concern Dr. Okrent has is, given that
6 we put all this time on the equipment and shaping the spectrum,
7 say like, for example, the one where you said you had 13 OBE's,
8 then you put it up to the SSE level for 10 or 15 seconds, now
9 you install this equipment in the plant, does that give you
10 any concern as to the confidence that this thing will take
11 another SSE?

12 MR. LINDERMAN: The equipment is supposed to be
13 refurbished by the supplier and most of the devices will be
14 changed out and it doesn't give me great concern, because
15 generally the equipment will take it. It is whether it
16 malfunctions or not, whether the relay has some chatter in it.
17 So structurally, yes, it is going to take it. It is going to
18 take another and it is going to take another and it is going
19 to take quite a few of them. The devices will generally take
20 it, too, whether it chattered or not, and it is not really
21 overstressing the equipment.

22 MR. ALLEN: Vince, before you go on, I want to talk to
23 Ed a little bit and Ed is going to have to leave here in a few
24 minutes, so why don't we take about a 15-minute break.

25 (Thereupon a brief recess was taken, after which



1 proceedings were resumed as follows:)

2 MR. ALLEN: I think, Vince, you have a few more
3 questions.

4 MR. NOONAN: Yes, just a few more. I won't take too
5 much longer.

6 On IIIC-8, when you talk about fixture design under
7 Paragraph H, are there any cases where you do the testing for
8 your vendors?

9 MR. BINGHAM: No.

10 MR. NOONAN: It is all done by them? So, in other
11 words, your fixture design for different equipment is for
12 your equipment only.

13 On IIIC-11, you said you had no plate and shell
14 supports for BOP.

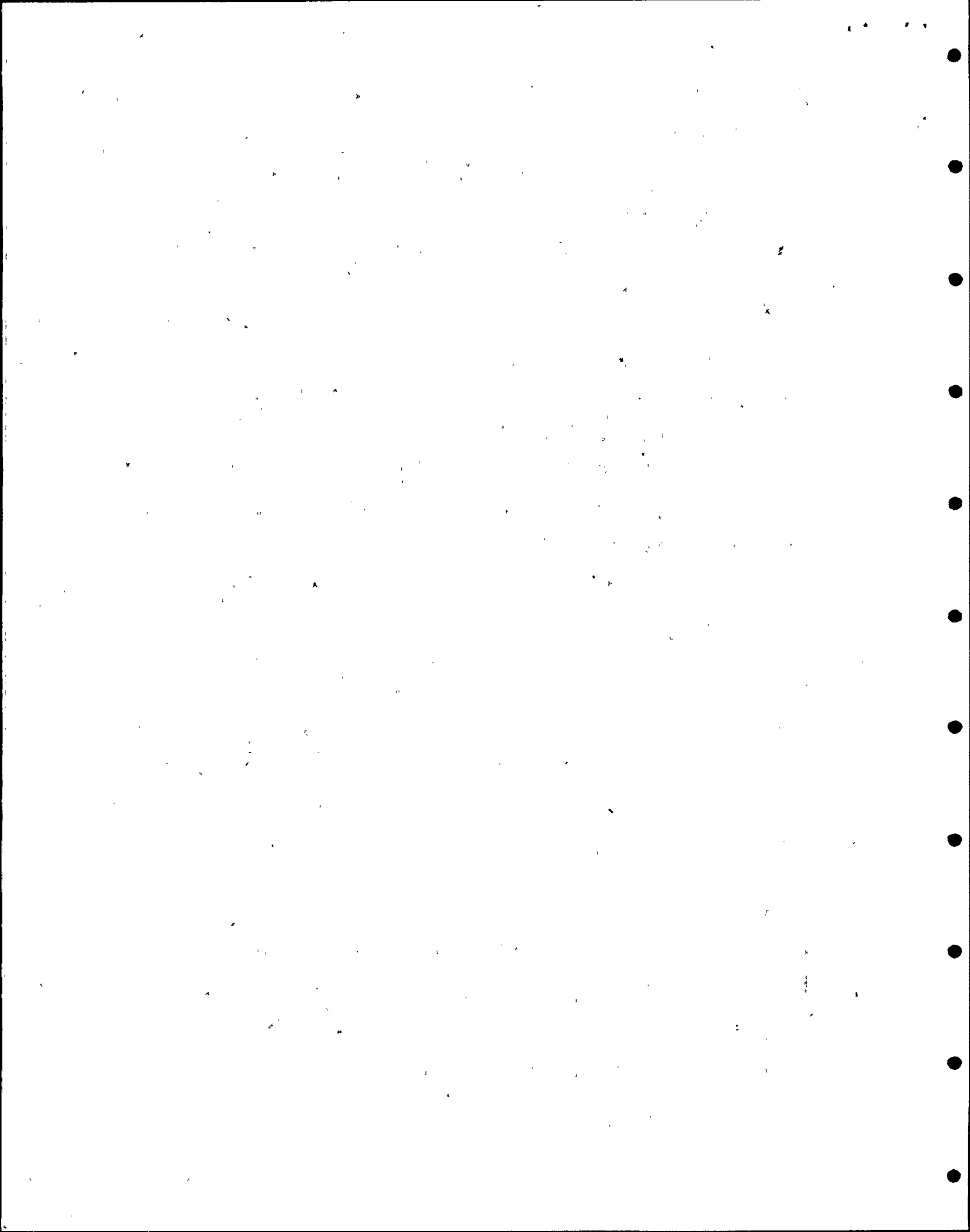
15 MR. BINGHAM: That is correct.

16 MR. NOONAN: None at all?

17 MR. SCHECHTER: Supports, that's correct.

18 MR. NOONAN: On IIIC-12, safety-related overpressure
19 protection devices, relief valves, and so forth, there is an
20 EPRI program going on right now testing safety valves. Are
21 you in any way keeping track of that program and what is
22 occurring.

23 MR. ROGERS: The answer is yes, we are. I am
24 the APS EPRI technical contact and Bill Quinn is the APS
25 licensing contact. We followed that program through
26 the Combustion Engineering - Three Mile Island



1 owners group that studied various Three Mile Island things.
2 We have input our actual pipe runs, and we have reviewed the
3 programs that have recently been published by EPRI. We are
4 very much involved with that study.

5 MR. NOONAN: The only other question I wanted to get
6 back to is on IIIC-15, Paragraph E, random vibration input
7 motion. Can you go into a little more technical detail as
8 to how you would shape your spectrum and what your frequency
9 spacing would be?

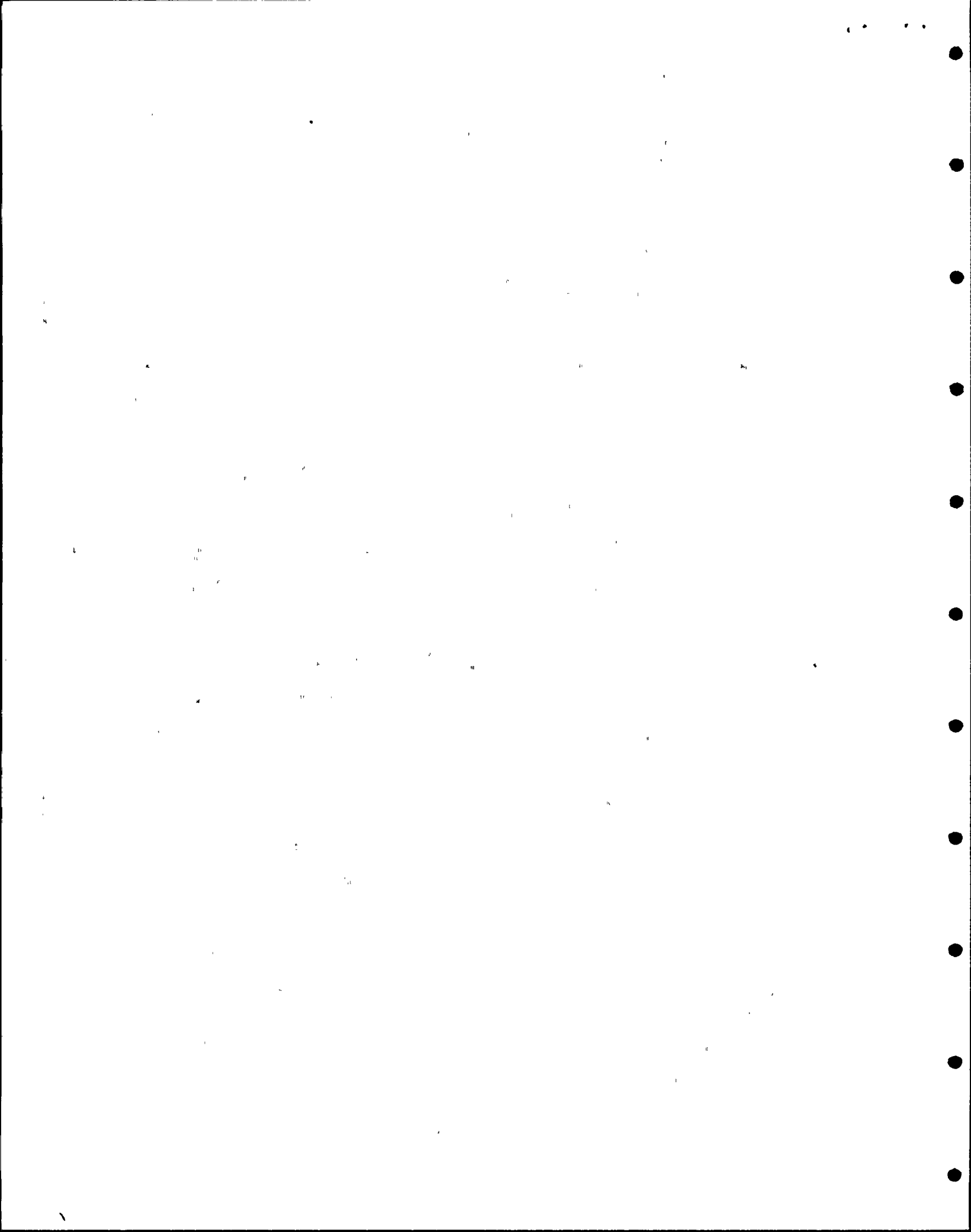
10 MR. LINDERMAN: The different laboratories have their
11 different methodologies to shape their curve.

12 MR. NOONAN: Well, let me get to the point. Does the
13 lab use a random noise generator or do they shape by using
14 different sine beats?

15 MR. LINDERMAN: Wyle Lab has been doing most of the
16 testing. They use a random noise and they shape it through
17 third octave filters. Each filter has a third octave band
18 with the filter on it.

19 MR. NOONAN: If you went to some lab where they did
20 not have that piece of equipment and they had to use sine
21 waves to develop it, would you put on a requirement that they
22 also use third octave spacing?

23 MR. LINDERMAN: I would want a little bit closer than
24 third octave spacing if they are using sine beats. I know
25 Westinghouse has a methodology. I am aware of theirs. The



1 only lab that I am aware of that uses that is Acton Lab and
2 I am trying to go back and remember what series of curves
3 they did use when I reviewed one document that Acton had done
4 where they had used sine beats, and I think they had more
5 than third octave filter.

6 MR. NOONAN: Closer than third octave?

7 MR. LINDERMAN: Closer than third octave. This is
8 right.

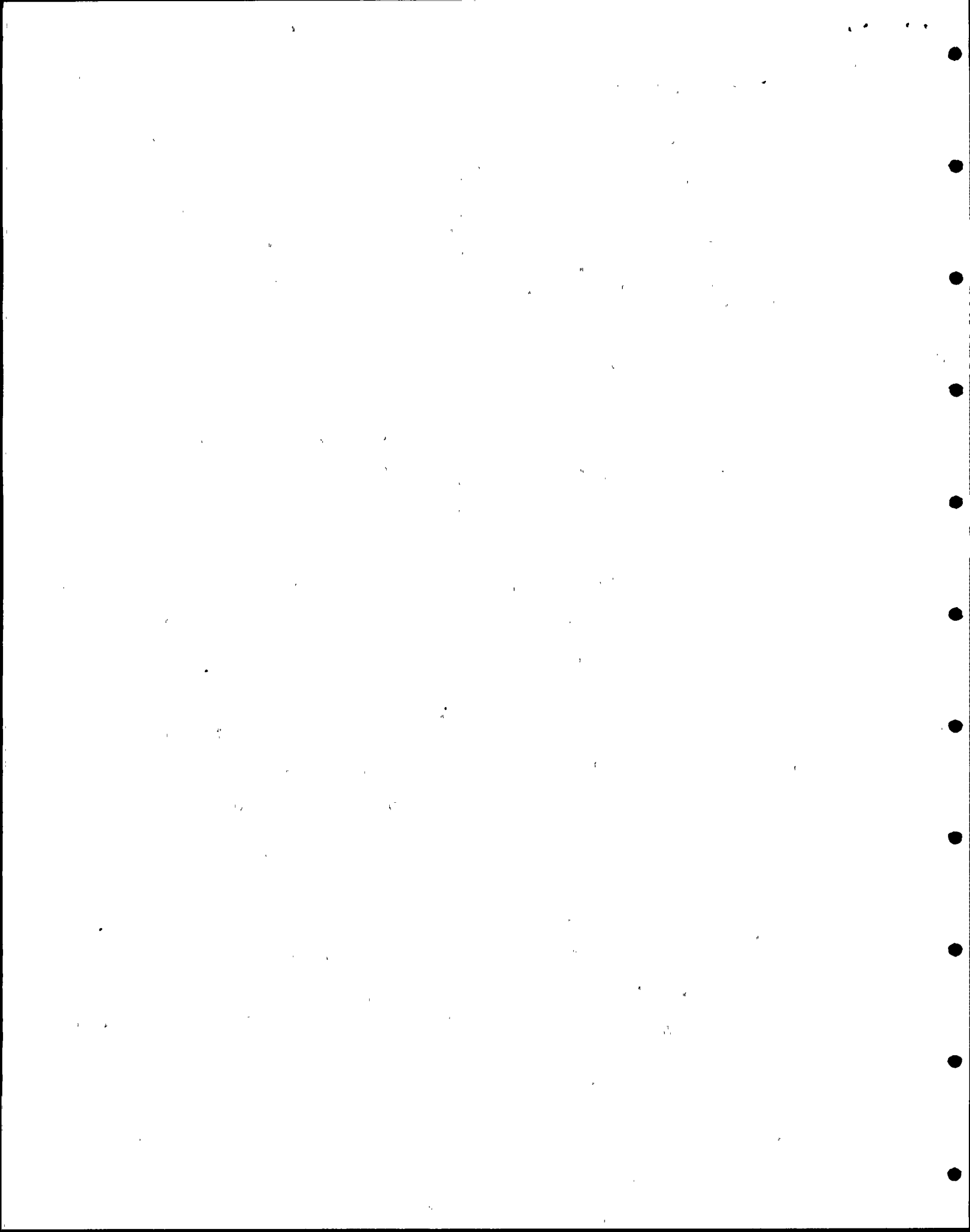
9 MR. NOONAN: But in any case, then it would be third
10 octave or less?

11 MR. LINDERMAN: Third octave or less would be the
12 spacing.

13 MR. NOONAN: I guess the last thing I want to bring up
14 was you make a statement on IIIC-16 where you say that unless
15 it can be demonstrated that the equipment response in the
16 vertical direction is not sensitive to the vibration motion,
17 and so forth. Do you have equipment that has been tested to
18 single sine wave type testing or single sine beat testing
19 that you plan to use? I was wondering how you were going to
20 make a determination.

21 MR. LINDERMAN: I am thinking back through and remember-
22 ing all of the packages that we have checked, that we have
23 reviewed, from the suppliers supplying it, and I don't think
24 I recall of any of them using single frequency.

25 MR. NOONAN: I am not trying to give the impression we



1 are against single frequency, because I am not. I am just
2 saying that if you had a piece of equipment that had been
3 tested to single frequency and that test had been done
4 properly, then, fine. I am just wondering how you make the
5 determination and say for your location in the plant that
6 that is adequate.

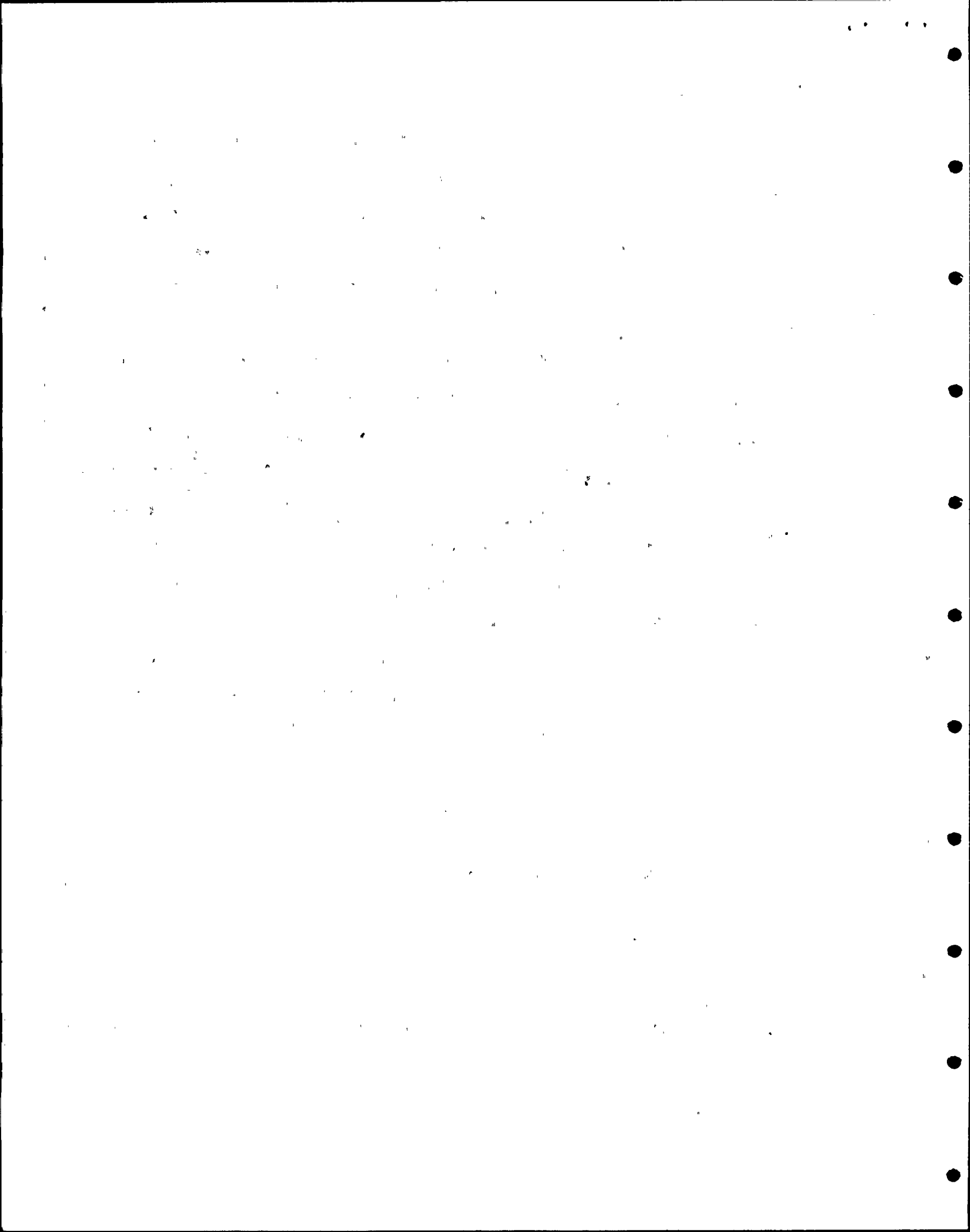
7 MR. LINDERMAN: If someone should come in with a
8 single frequency test, we would first look at the response
9 spectrum of the actual location where the equipment is
10 located. Then we would start looking at what is the malfunctioning
11 mode of the equipment being qualified, what different
12 frequencies it could be exposed to, the number of modes that
13 we would expect in that, and this type of methodology is what
14 we would have to look at.

15 MR. NOONAN: Well, the only concern I would raise, and
16 it is just a comment, is that given that you had a piece of
17 equipment that was done using, say, a single frequency type
18 envelope and you knew that equipment had resonances at a
19 higher frequency area, then I would seriously question the
20 validity of that test.

21 MR. LINDERMAN: That's right. I would, too. The only
22 time I would really want to look at single frequency would
23 be on a single device. Then you know about what is happening.

24 MR. NOONAN: Thank you.

25 MR. ALLEN: Vince, do you have any further questions?



1 MR. NOONAN: No.

2 MR. ALLEN: Are there any additional questions from
3 anyone on the board before we move along? Zoltan.

4 DR. ROSZTOCZY: Are all the seismic tests that you are
5 performing for this program being done on full-size equipment?

6 MR. BINGHAM: I don't think so. If you would like
7 further information, John, you could have that as an item.

8 MR. ALLEN: Why don't we put that down on the list to
9 verify that.

10 MR. BINGHAM: I think there are some exceptions.

11 DR. ROSZTOCZY: I would be interested to know when you
12 have exceptions, and then in the cases where you are working
13 with scaled equipment, are you specifying additional instru-
14 mentation for the purpose of verifying the calculation or
15 method that will be used to extrapolate the data to full-scale
16 size.

17 MR. ALLEN: Any further questions?

18 DR. ROSZTOCZY: One more question. You mentioned
19 documentation at the end, and I think the words were that yes,
20 you are maintaining the documentation on this. I am not sure
21 if this is the appropriate time, but sometime today I would
22 like to hear a description of how APS is planning to maintain
23 equipment qualification and seismic qualification documentation.
24 How do you plan to set it up? How do you plan to maintain it
25 for the life of the plant?

1 MR. BINGHAM: Do you want to hear that today or would
2 you like that as an open item for response?

3 DR. ROSZTOCZY: If possible, I would like to hear it
4 today to the extent that you can do it.

5 MR. ALLEN: Okay, we will do that before the end.

6 DR. ROSZTOCZY: It is the type of question that I
7 would like to know if it is going to be one file, are you
8 going to have a file which is called, let's say, equipment
9 qualification file and then all the information that we
10 discussed like specifications, calculations done, test results,
11 everything is going to be in this file, or, as an alternate,
12 are these going to be in different files, how many files are
13 involved, who is going to keep them, what location are they
14 going to be kept, and so forth.

15 MR. BINGHAM: Any other questions, John?

16 MR. ALLEN: Any further questions?

17 MR. BINGHAM: Let's go on with the presentation, then.
18 What we are going to cover is Item 3, the General Design
19 Criteria, and Item 4, the IEEE Standard 344, and then we will
20 ask for questions at that time.

21 MR. SCHECHTER: Exhibit IIIC-21 covers the General
22 Design Criteria that are referenced in the Standard Review
23 Plans. These are from 10 CFR 50, Appendix A. The first one
24 has to do with the quality standards and records. It says
25 that the structures, systems, and components important to

1 safety should be designed and tested to quality standards
2 commensurate with the safety function to be performed and that
3 the records should be maintained throughout the life of the
4 plant. The project meets the requirements of Appendix B,
5 10 CFR 50.

6 Exhibit IIIC-22, General Design Criterion No. 2,
7 design bases for protection against natural phenomena. The
8 structures and the equipment important to safety are designed
9 to Seismic Category I requirements. The project is in
10 compliance.

11 Exhibit IIIC-23, General Design Criteria No. 4,
12 pertains to environmental and missile design bases. This
13 criterion is not applicable to seismic qualification of
14 equipment.

15 Exhibit IIIC-24, General Design Criteria No. 14,
16 reactor coolant pressure boundary. Again, this criterion is
17 not applicable to seismic qualification of balance of plant
18 components.

19 Exhibit IIIC-25, General Design Criteria No. 15.
20 The reactor coolant system and protection systems shall be
21 designed with sufficient margin to assure that the design
22 conditions are not exceeded during any condition of the plant
23 normal operation, including anticipated operational occurrences.
24 The project is in compliance.

25 The next document that I would like to discuss,

1 shown in Exhibit IIIC-26, is IEEE 344-1975. It is entitled
2 IEEE Recommended Practices for Seismic Qualification of
3 Class IE Equipment. The requirements in here are very similar
4 to requirements that have already been mentioned in the
5 Standard Review Plans, but I will go over them briefly. The
6 first one has to do with assurance that the equipment can
7 perform. We need to verify the performance of the equipment
8 during and after an SSE preceded by a number of OBE's.

9 Exhibit IIIC-27. For qualification by analysis,
10 five OBE's should be used preceding the SSE, and for qualifi-
11 cation by test, one or more OBE tests that produce the equiva-
12 lent effect of five OBE's [or a site specific value]. The
13 value that the project is using is two OBE's based on the spe-
14 cific value for the site. The project is in compliance with
15 the requirements.

16 B, qualification should be done by analysis, test, or
17 a combination of these two methods. We agree with this requirement.

18 C, the margins specified in IEEE 323-1974 shall be
19 employed. The project is in agreement with this.

20 Exhibit IIIC-28. This section has to do with
21 analysis. For analysis, there are two general approaches.
22 For static analysis, the response of the equipment is assumed
23 to be the peak value from the required response spectra and
24 then this response is multiplied by a factor of 1.5. For
25 dynamic analysis, a mathematical model is prepared of the

1 equipment that represents its mass and stiffness characteris-
2 tics and then a modal extraction is performed to obtain the
3 frequencies and mode shapes. If the lowest frequency is
4 greater than 33 cycles per second, then the equipment is con-
5 sidered rigid and you can use a static factor applied to the equipment.

6 On Exhibit IIIC-29, if the frequencies are lower than 33
7 cycles per second, then you can either use a response spectrum
8 analysis or a time history analysis to obtain the responses of
9 the equipment. For combining the responses, you can go ahead
10 and use a square root sum of the squares method if you do not
11 have closely spaced modes. If you do have closely spaced
12 modes, then you have to use an absolute sum of the responses
13 on the closely spaced modes. The project agrees with this criterion.

14 Exhibit IIIC-30 deals with testing. Again, it states
15 that the input motion shall conservatively simulate that postu-
16 lated, therefore the response spectra developed from the motion
17 on the test table should be equal to or greater than the re-
18 quired response spectra. The project agrees with it. The
19 equipment should be attached to the shaker table in a manner
20 that simulates the actual field attachments. The project
21 agrees with that.

22 Exhibit IIIC-31. C requires that sufficient
23 monitoring equipment be used to monitor the performance of
24 the equipment before, during, and after the test. The project
25 is in compliance. D states that exploratory vibration tests

1 can be used to aid in the determination of the test method
2 that would best qualify the equipment. The project agrees
3 with this requirement. E states that seismic qualification
4 tests shall be performed with the equipment subjected to
5 normal operating conditions. The project is in agreement
6 with that.

7 Exhibit IIIC-32 provides criteria for deciding
8 between single and multi-frequency testing. The project is
9 in compliance. It states when multi-frequency or single-
10 frequency input motion should be used, and the project is
11 in agreement.

12 Exhibit IIIC-33 sets criteria for the use of
13 single directional tests, and if that criterion is not met,
14 then it requires multi-directional tests to be performed.
15 The project preference is biaxial testing. The project is
16 in agreement.

17 Exhibit IIIC-34 allows for large or complex equip-
18 ment the use of both testing and analysis methods. The
19 project agrees with this.

20 MR. BINGHAM: Are there any questions?

21 MR. ALLEN: George.

22 MR. SLITER: Would you please elaborate on Exhibit
23 IIIC-27, Item C, margins specified in IEEE 323-1974 shall be
24 employed where applicable. Is this the aging part of the
25 test program?

1 MR. LINDERMAN: This has to do with the seismic. It
2 is essentially the 10%. We are talking about the seismic
3 right now, and I think the margin that we were talking there
4 is the 10% over.

5 MR. SLITER: And I assume, also, margins in the aging
6 before seismic?

7 MR. LINDERMAN: Yes.

8 MR. ALLEN: Further questions? Vince, go ahead.

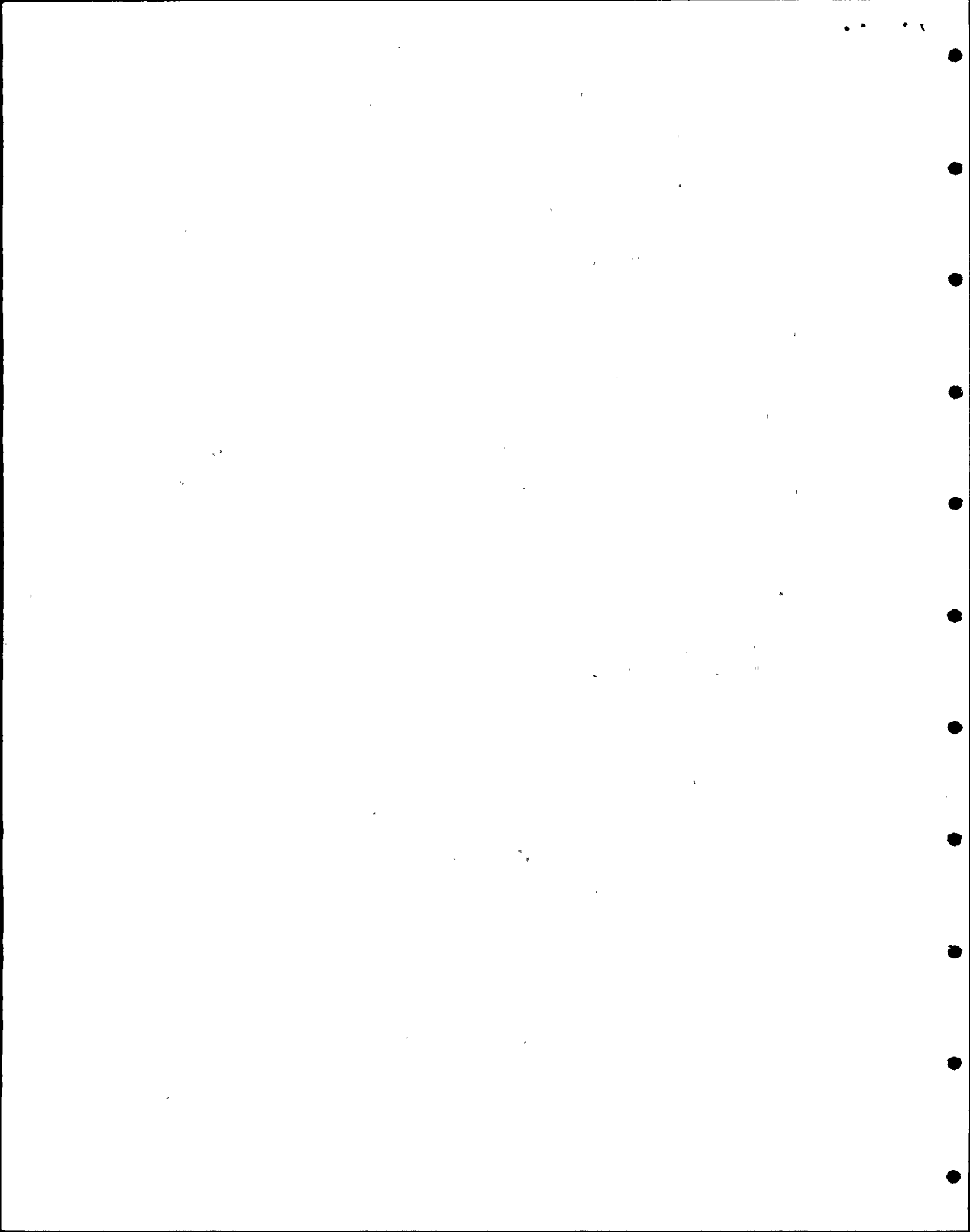
9 MR. NOONAN: I guess the philosophy, going back to the
10 same type of question on margins, you always intend to
11 envelope every part of this response spectra. Can you give
12 me some of your thoughts on that?

13 MR. LINDERMAN: Generally, we envelop the total curve;
14 however, at the low end, that is at one, two, possibly at three
15 hertz, some of the tests do not envelope it. At that time,
16 we do check to make sure what resonances there are at the low
17 frequency end. If there are no resonances in the low fre-
18 quency end, then we will accept not enveloping the complete RRS.

19 MR. NOONAN: As a comment, normally we say you have to
20 envelope it, and so forth, but sometimes that is not really
21 practical. I will give you a personal comment that if you
22 could stay within plus or minus one and one-half dB of the
23 envelope, I think that would be sufficient.

24 MR. BINGHAM: One and one-half?

25 MR. NOONAN: One and one-half dB's based on voltage and



1 the power.

2 MR. BINGHAM: Are there other questions?

3 DR. ROSZTOCZY: You were talking about General Design
4 Criteria 2 and 4. No. 2 refers to natural phenomena and 4
5 refers to environmental conditions associated with normal
6 operation, maintenance, postulated accidents, and so on.
7 The general design criterion is not specific on any load
8 combinations, what load has to be combined with what other
9 load. How do you handle seismic loads and accident loads,
10 including the type of loads that we discussed yesterday like
11 vibration, expected vibration caused as a result of the
12 accident? Do you combine those with the seismic load and do
13 you test the equipment for the combined load?

14 MR. BINGHAM: First of all, loading combinations are
15 covered in the design criteria. As we indicated yesterday,
16 there are some combinations that we were discussing and had
17 as open items to review that have not been considered, or at
18 least have not been tested. One of these is the new issue
19 of LOCA motion and its impact as well as some internal fluttering
20 from two-phase flow I believe is what was discussed yesterday.

21 I think, John, what we would like to do in order
22 to assure that we give the proper response is leave this as
23 an open item, please.

24 DR. ROSZTOCZY: As a comment on that, in one case where
25 this received a great attention and it was brought to a resolution

1 was the BWR containment question of combination of accident
2 loads and seismic loads. The requirement was that they had
3 to be combined. So long as you combine the loads, we know
4 it is acceptable. I think that ought to be looked at in the
5 very near future.

6 MR. BINGHAM: I appreciate the comment. We do under-
7 stand the concern.

8 MR. ALLEN: Further questions?

9 DR. ROSZTOCZY: Yes, I have one more question. This
10 is General Design Criterion No. 14. It is Exhibit IIIC-24.
11 Your statement on the right-hand side is that it is not
12 applicable to seismic qualification of balance of plant
13 components. I am not sure exactly where is the dividing
14 line between balance of plant components, but one item which
15 we will be concerned with is pump seals.

16 MR. BINGHAM: This is reactor coolant pressure boundary
17 we are referring to.

18 DR. ROSZTOCZY: Yes. Do you provide any pumps which are
19 part of the reactor coolant pressure system line?

20 MR. BINGHAM: Not that I know of.

21 MR. KEITH: No. The only pumps which are part of the
22 reactor coolant pressure boundary are the reactor coolant
23 pumps.

24 DR. ROSZTOCZY: So then it is on the balance of plant
25 components.

1 MR. KEITH: Right.

2 MR. ALLEN: Further questions? If not, then let's
3 move along.

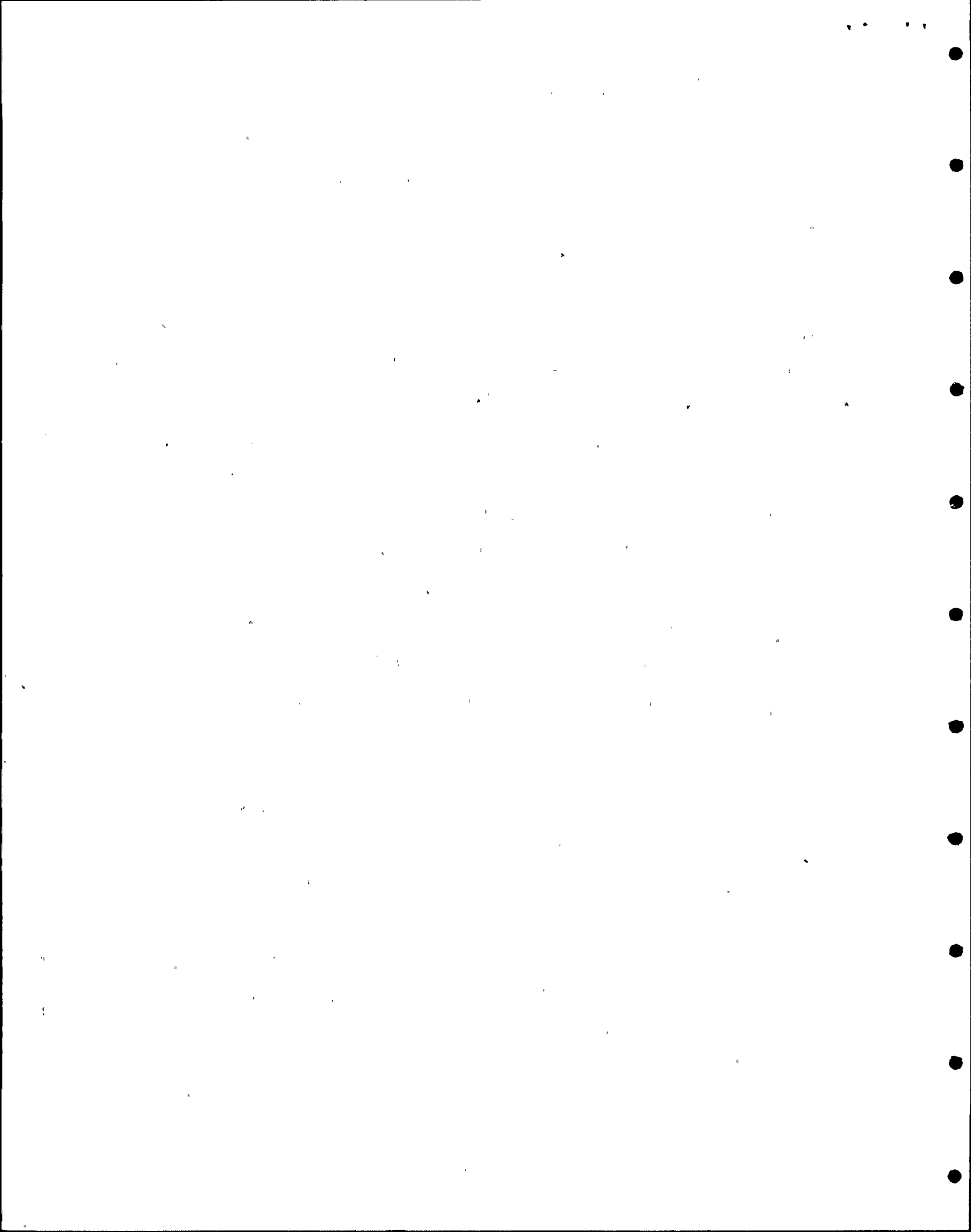
4 MR. BINGHAM: That brings us to the final section,
5 which is C.5, Reg. Guides.

6 MR. SCHECHTER: These Reg. Guides are the ones that
7 were mentioned in the Standard Review Plans. Exhibit IIIC-35,
8 Reg. Guide 1.20, entitled comprehensive vibration assessment
9 program for reactor internals during preoperational and
10 initial startup testing. This Reg. Guide is not applicable
11 to seismic qualification of balance of plant components.

12 Exhibit IIIC-36, Regulatory Guide 1.48 entitled
13 Design Limits and Loading Combinations for Seismic Category I
14 Fluid System Components. The guide sets for the design limits
15 and loading combinations for various ASME components. Loading
16 combinations for the project are presented in the FSAR
17 Chapter 3.9. The design limits are in accordance with ASME
18 Section III.

19 Exhibit IIIC-37, Regulatory Guide 1.67. We had
20 already mentioned this Reg. Guide earlier. It deals with
21 the design of pressure relief valves and, as such, it is not
22 applicable to seismic qualification of equipment.

23 Exhibit IIIC-38, Reg. Guide 1.68 entitled Initial
24 Test Programs for Water-Cooled Nuclear Power Plants. Again
25 this Reg. Guide is not applicable for seismic qualification



1 of equipment.

2 Exhibit IIIC-39, Regulatory Guide 1.92, which deals
3 with combining modal responses. The first criterion is combination
4 of modal responses and it states that when you do not have
5 closely spaced modes, you can use the method of the square
6 root of the sum of the squares for combining the responses.
7 When you do have closely spaced modes, you have to use one
8 of the three methods mentioned in the Reg. Guide for combining
9 the closely spaced modes. The project is in agreement with
10 this portion of the Reg. Guide.

11 Exhibits IIIC-40 and 41 give the requirements for a
12 combination of effects due to three spatial components of an
13 earthquake. In A, it describes a response spectra method
14 where you go ahead and combine the responses in each of the
15 three directions by a square root sum of the squares method.
16 The project is in agreement. In a time history analysis where
17 you go ahead and you compute the responses in each of the
18 three directions separately, you can go ahead and use the
19 square root of the sum of the squares method for combining
20 the responses. The project is in agreement with that method.
21 Finally, C, in a time-history analysis where you
22 calculate the responses from all three directions at one time,
23 the response you get is the combined response.

24 Exhibit IIIC-42. This is Regulatory Guide 1.100,
25 Seismic Qualification of Electric Equipment. This Reg. Guide

1 modifies the criteria set forth in IEEE 344-1975. The first
2 item is that you can only use the 1.5 static coefficient when
3 you have frame type equipment. Otherwise you have to go
4 ahead and provide justification for that factor. The project
5 agrees with that criterion.

6 Exhibit IIIC-43. No. 2 tells you that the test
7 response spectra must closely envelope the required response
8 spectra to verify the adequacy of test input motion. We are
9 in agreement with this. I might note that again in the low
10 frequency range, sometimes it does not envelope and we look
11 at that on a case-by-base basis. Item 3 there says that a
12 sine sweep test or single frequency test is unacceptable
13 unless the justification is provided, and we agree with that
14 requirement.

15 Exhibit IIIC-44, Regulatory Guide 1.124 entitled
16 Service Limits and Loading Combinations for Class 1 Linear-
17 Type Component Supports. The project is in agreement with
18 this Reg. Guide.

19 The last one, Exhibit IIIC-45, Reg. Guide 1.130,
20 sets the service limits and loading combinations for Class 1
21 plate-and-shell type support components. It is not applicable,
22 since there are no Class 1 plate-and-shell supports for
23 balance of plant components.

24 MR. BINGHAM: Any questions? Pete.

25 MR. NEWCOMB: I have a quick one. In previous discussion,

1 you had Table 10 showing critical damping factors from Reg.
2 Guide 1.61. You haven't discussed 1.61 any further here.
3 Is there more applicability of that to your efforts?

4 MR. SCHECHTER: I think that when I covered Reg. Guide
5 1.61, I mentioned that equipment suppliers also make use of
6 Reg. Guide 1.61 to obtain their damping values that they
7 should use.

8 MR. NEWCOMB: Do you make use of Reg. Guide 1.61?

9 MR. SCHECHTER: For the design of structures, we do.
10 For the design of piping, we also make use of that Reg. Guide.

11 MR. ALLEN: Any further questions? Vince.

12 MR. NOONAN: I have one question on IIIC-40. I am sure
13 you are all aware of the five plant shutdown problem we went
14 into a year or so ago. I expect now all your computer
15 programs when they do the intramodal type calculation do not
16 use the algebraic method.

17 MR. BINGHAM: That's correct.

18 DR. ROSZTOCZY: Exhibit IIIC-38. The requirement
19 relates to testing conducted during the initial test program
20 and your position is that this is not applicable to seismic
21 qualification of equipment. I was under the impression that
22 some testing is usually done in the initial testing phase;
23 namely, to apply some loads at some part of the as-built
24 system and then measure responses at other locations physically
25 to verify your calculations that you have done for the system.

1 Wouldn't that fall under this requirement?

2 MR. KEITH: Yes. Our start-up program will include a
3 program like you are talking about where we have the system
4 running and shut valves and stop and start pumps and things
5 like that and measure the vibration at various points. Our
6 interpretation had been just that that didn't specifically
7 tie in with seismic qualification, but we will be doing that.

8 DR. ROSZTOCZY: Does that program include also maybe
9 applying some loads to the system and measuring responses for
10 the purpose of checking some of your seismic calculations?

11 MR. KEITH: Simulating a seismic load, is that what
12 you're --

13 MR. ROSZTOCZY: You simulate some load. It doesn't
14 have to be seismic load, but you simulate some load at one
15 point and you measure the response to that load and then you
16 check this against the method that you used for seismic.

17 MR. NOONAN: He is talking about doing a modal type
18 of frequency test system like the aircraft test usually does.

19 MR. BINGHAM: Presently, no.

20 MR. ALLEN: Anyone on the board have additional
21 questions?

22 MR. BINGHAM: May I ask to have a clarification? Is
23 there some suggestion that that is a requirement or might
24 be a requirement?

25 DR. ROSZTOCZY: I do not know. I will have to check on
 it.

1 MR. ALLEN: No further question? Then let's proceed,
2 Bill.

3 MR. BINGHAM: This brings us to Section IV, Equipment
4 Qualification Process, and we will also cover Section V,
5 Documentation, at the same time. I would like to make one
6 comment for the board that many of the things that you will
7 hear now have been discussed during the presentation that we
8 had yesterday, so I will be a little brief in the description.
9 What I am basically trying to portray are the details of the
10 process and the elements of some of the check plans that we
11 have so that you will understand them a little bit before we
12 get into the actual examples, which have the check forms
13 filled out.

14 You recall Figure 7 showed the equipment qualifica-
15 tion process and I went through that in detail in yesterday
16 morning's session.

17 Exhibit IV-1. The purpose, of course, is compliance
18 with the design criteria, that we are in compliance with the
19 regulations, codes, and standards, and with the specifications.

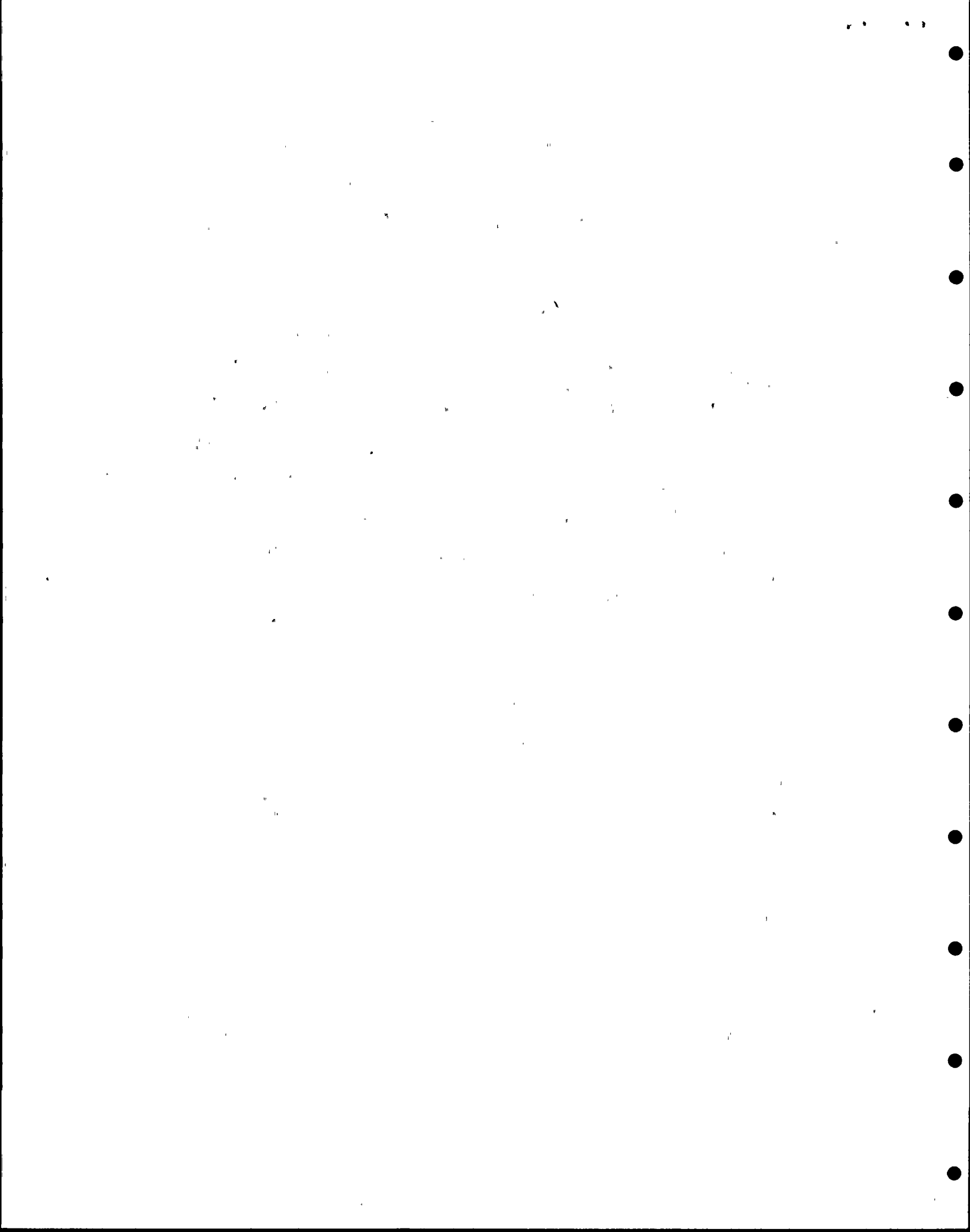
20 Exhibit IV-2. The specifications are to implement
21 the design criteria, establish hold and test points. We have
22 in addition to that review by the responsible engineers and
23 specialists as required, and we develop inspection plans so
24 that we can assure that there is an on-hand, if you will,
25 in the supplier's or the testing laboratory's facilities, a

1 review of the actual tests of actual equipment.

2 Exhibit IV-3. You have heard description of the
3 qualification methods, the testing, analysis, operating
4 experience, ongoing qualification, combination of methods,
5 and also a description of the qualification procedures.

6 Figure 18 is an overview of the process. We talked
7 yesterday about the supplier submittal essentially to the
8 qualification team that consists of APS and Bechtel. On the
9 APS side, their nuclear services group has a review. They
10 also have a checklist that I will indicate the elements of.
11 In Bechtel, we have seismic reviewers headed by Mr. Linderman
12 and we have environmental reviewers headed by Mr. Carson as
13 well as stress reviewers as required for the particular
14 piece of equipment. All of this information is fed to the
15 responsible engineer for that piece of equipment. Comments
16 are coordinated. Those comments then are sent to the vendor.
17 If the resolutions are not acceptable, of course, we keep
18 working with the supplier until they become acceptable. Once
19 they are acceptable, then the records go to Records Retention.

20 Exhibit IV-4. In the procedures or plans, APS has
21 their own checklist, Bechtel has an environmental checklist,
22 there is a seismic checklist, and these are combined or will
23 be combined into one package as part of the total documentation.
24 There will also be specialist reviews, maybe attached to the
25 program, and there will be a rereview of already accepted

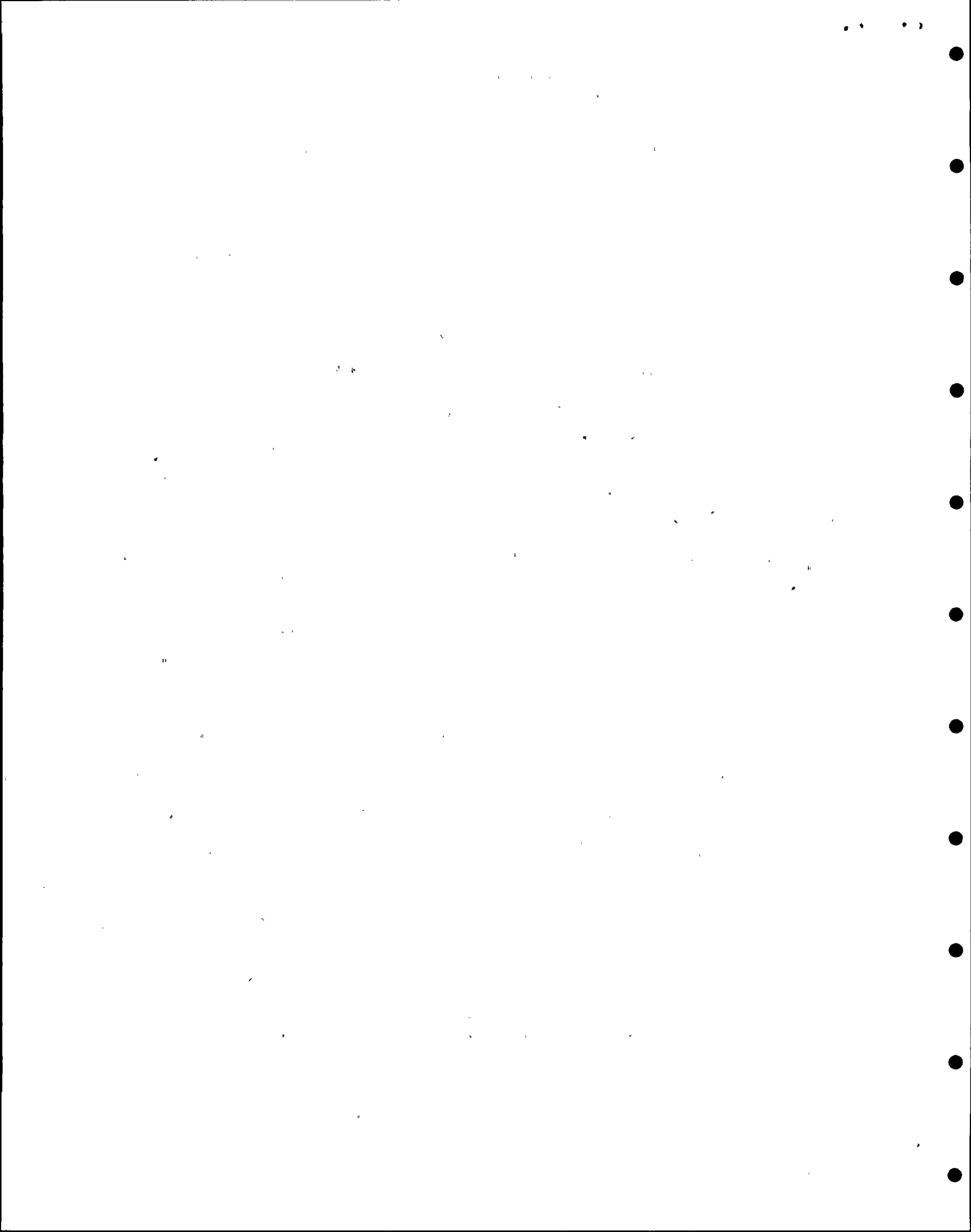


1 documentation to assure it is in compliance with the elements
2 of NUREG 0588.

3 Qualification reports. As I indicated, there is an
4 APS review, there is a responsible engineer and specialist
5 from Bechtel who review, there is a review of all documenta-
6 tion, there may be an amendment to the FSAR to include the
7 summary data, and, of course, we have to assure that we have
8 demonstrated auditable compliance with NUREG 0588.

9 Exhibit IV-5. These are the elements of the APS
10 check-off list. This list is not part of and does not have
11 to be part of the documentation package. It is in their
12 records to demonstrate that they have diligently reviewed the
13 environmental and seismic reports that come to them and have
14 resolved all comments that they might have successfully with
15 Bechtel and the supplier. Of course, they will look at all
16 the key elements, the description of the equipment and the
17 environmental service conditions, and then they will look at
18 the methods of 323 and flag any exceptions. They will look
19 at any special maintenance procedures. They will look at the
20 program and plan, is it in the requirements, are the performance
21 limits correct, how do the failure definitions stack up with
22 the requirements, and then they will look at the operating
23 experience program and plan.

24 Exhibit IV-5A. Finally, they will review for
25 analysis assumptions, how the mathematical models are derived



1 and justified, and any ongoing programs.

2 Exhibit IV-6. The environmental qualification
3 checklist will cover the description and location of the
4 components. It will look at operability requirements, the
5 designator, time, operation, function, the designated
6 environment, the qualified environment from the supplier, the
7 margin, the equipment mounting and orientation, (Exhibit IV-7)
8 the qualification method, type, sequence, specimen, instrumen-
9 tation, aging method, humidity aging, performance characteris-
10 tic monitoring, the instrumentation calibration, and the
11 component interfaces. There will be an evaluation, and from
12 that a list of deficiencies. These deficiencies are flagged
13 on a work order that is followed and tracked with a separate
14 system to assure compliance.

15 This is Exhibit IV-8 and is a chart similar to what
16 you saw yesterday that has the environmental service conditions
17 as supplied and the qualification margin. That is part of
18 the checklist.

19 On Exhibit IV-9, we are now looking at the seismic
20 qualification checklist and that will have again a component
21 description and location, equipment qualification method,
22 vibration inputs of loads, response spectra, required
23 acceleration, the qualification test data looking at frequency,
24 axis, number of tests, frequency range, TRS, lab mounting,
25 verification of functional operability, and test results.

1 There will be a section on the analysis of the test data
2 looking at the model type, looking at the computer codes used,
3 the combination of dynamic responses, the damping, support
4 considerations, and the critical structural elements. Finally,
5 there will be a list of deficiencies and those will be put on
6 a work order and will be followed to assure completion.

7 On Figure 7, we talked about the qualification
8 testing, and now if we can go to Exhibit IV-10, the testing
9 will be actual equipment or prototype, the lab procedures,
10 sequence will be covered, there will be an analysis of the
11 method as submitted by the manufacturer, and we require that
12 they provide a description of their other methods if they
13 use them.

14 This is Exhibit IV-11. It is an explanation of
15 the audit of testing. We did discuss this yesterday. I
16 would like only to highlight the issues that we talked about,
17 that it would be conducted by what we call a supplier quality
18 representative as part of our procurement department that
19 goes out in the field, maybe supplemented with the engineer.
20 We will review the test procedures, plans, and reports. We
21 review the report data at the manufacturer's facility or at
22 the testing laboratory. We review the procedures for perform-
23 ing the tests, collecting and reducing the data. We will
24 verify the capability of test equipment and instrumentation to
25 perform tests. We will verify instrument calibration and make
sure it is traceable to the National Bureau of Standards.

1 We will verify tests performed in accordance with procedures
2 and any deviations that may be noted. We will verify the
3 results and conclusions to assure that they reflect the test
4 data. We will examine internal review processes, sign off
5 procedures, and quality assurance procedures. We will verify
6 the existence of an aging library or extensive literature
7 data bank if referenced in the reports.

8 This is Exhibit V-1. I will briefly summarize
9 what we discussed yesterday, that all documentation will have
10 its own log number. There will be a report number, and a
11 subject title, and any proprietary information will be noted
12 by subject and where it is located.

13 Exhibit V-2. We indicated that the records would
14 be made complete before they are given to APS and any
15 references to proprietary information would be part of them.

16 Yesterday we indicated that there would be a data
17 summary update on the FSAR. The elements are shown in
18 Exhibit V-3. We will describe the type of equipment, the
19 component, the equipment location, building, elevation, the
20 manufacturer, the model number, the Palo Verde Nuclear
21 Generating Station specification number. The environmental
22 designator, the qualification methods, qualification
23 environment, the time base, the seismic qualification
24 including the method, the excitation method, and the frequency
25 range. We will also discuss operability, time when required,

1 demonstrated.

2 Continuing on Exhibit V-4, the accuracy which was
3 required, what was demonstrated. We will report on the
4 environmental qualification. We will indicate the report
5 number and any pertinent revision number, and we will indicate
6 the qualification life in years.

7 Are there any questions?

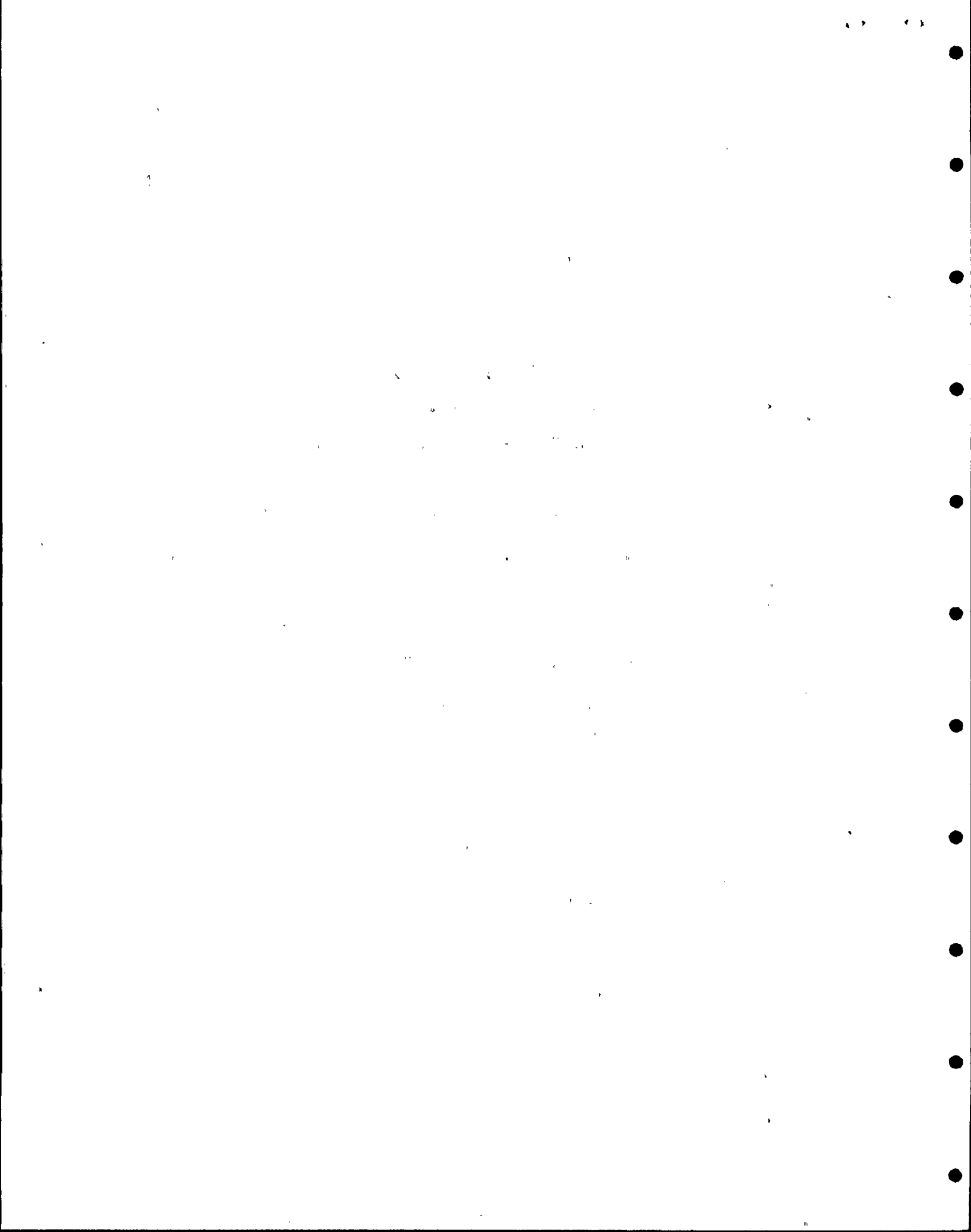
8 MR. ALLEN: John Barrow.

9 MR. BARROW: Going back to Exhibit IV-4, I wanted to
10 clarify something. On the plans and procedure review and
11 qualification reports review, discussing the APS checklist,
12 you show the APS checklist for plans and procedures. On the
13 qualification portion, you show APS review. In actuality,
14 the APS checklist will be used both in the review of plans
15 and procedures and in the review of reports. I wanted to
16 clarify that fact, that our review on the reports is being
17 done with the same checklist.

18 Then on the next page, I think, Bill, you made the
19 statement that our checklist wouldn't be in the final report,
20 and we had hoped that the final checklist that we do on the
21 final report after it is signed off will eventually be put
22 with the report in a final document.

23 MR. BINGHAM: That's fine if you so desire.

24 MR. BARROW: That was the intent. Also, on Exhibit
25 IV-5, I think 344-1971 under Item III should be 344-1975.



1 MR. BINGHAM: That's correct.

2 MR. ALLEN: That would be an open item then to correct
3 our slide. Do you have it?

4 MR. QUAN: I've already got it.

5 MR. NEWCOMB: I might add that also includes 323-75.
6 It should be '74.

7 MR. BARROW: The last question I have is in Exhibit
8 IV-11, I can see where most of the items on here fall, the
9 supplier representative would be knowledgeable to be able
10 to check, for instance, examine internal review process,
11 sign off procedures, verify existence of an aging library,
12 but going up to the second and third and fourth bullets, are
13 the SQR's also knowledgeable enough to review test procedures,
14 plans, and reports for compliance, to review test data, and
15 especially to review the actual procedures for performing
16 the tests?

17 MR. BINGHAM: No, they are not.

18 MR. BARROW: In the case that they are not, does
19 Bechtel have a way to supplement their expertise?

20 MR. BINGHAM: We generally will send an engineer with
21 them into the shop.

22 MR. ALLEN: Further questions? Norm.

23 MR. HOEFERT: My question concerns the performance of
24 tests which have to be done after the plant is operational --
25 replacement of life-limiting components, certain maintenance

1 items, and so forth. Has this been looked at to determine
2 if these tests can indeed be performed during plant operation
3 or are we going to be faced with situations where we may have
4 to shut certain systems down or maybe the whole plant to
5 perform tests required to keep equipment qualified? Who is
6 looking at that and how?

7 MR. BINGHAM: The reason I am a little confused is
8 just what test you might think you would be rerunning.

9 MR. HOEFERT: Well, specifically replacement of life-
10 limiting components.

11 MR. BINGHAM: I understand the question is on the items
12 that would have to be maintained and replaced, and we are
13 looking at that and we are making sure that that information
14 will be put into the maintenance procedures, and we are also
15 making sure that the equipment is available to make those
16 changes without having to shut down systems or shut down the
17 plant because of access reasons.

18 MR. HOEFERT: Is this somehow tabulated or documented
19 in your checklist?

20 MR. BINGHAM: It is not in the checklist, but it is
21 supposed to be covered as part of the maintenance reviews
22 that are conducted on the plant.

23 MR. ALLEN: Ed Sterling, do you have a question?

24 MR. STERLING: My question gets back to, it started
25 yesterday, who decides what is aged, and so forth. I suppose

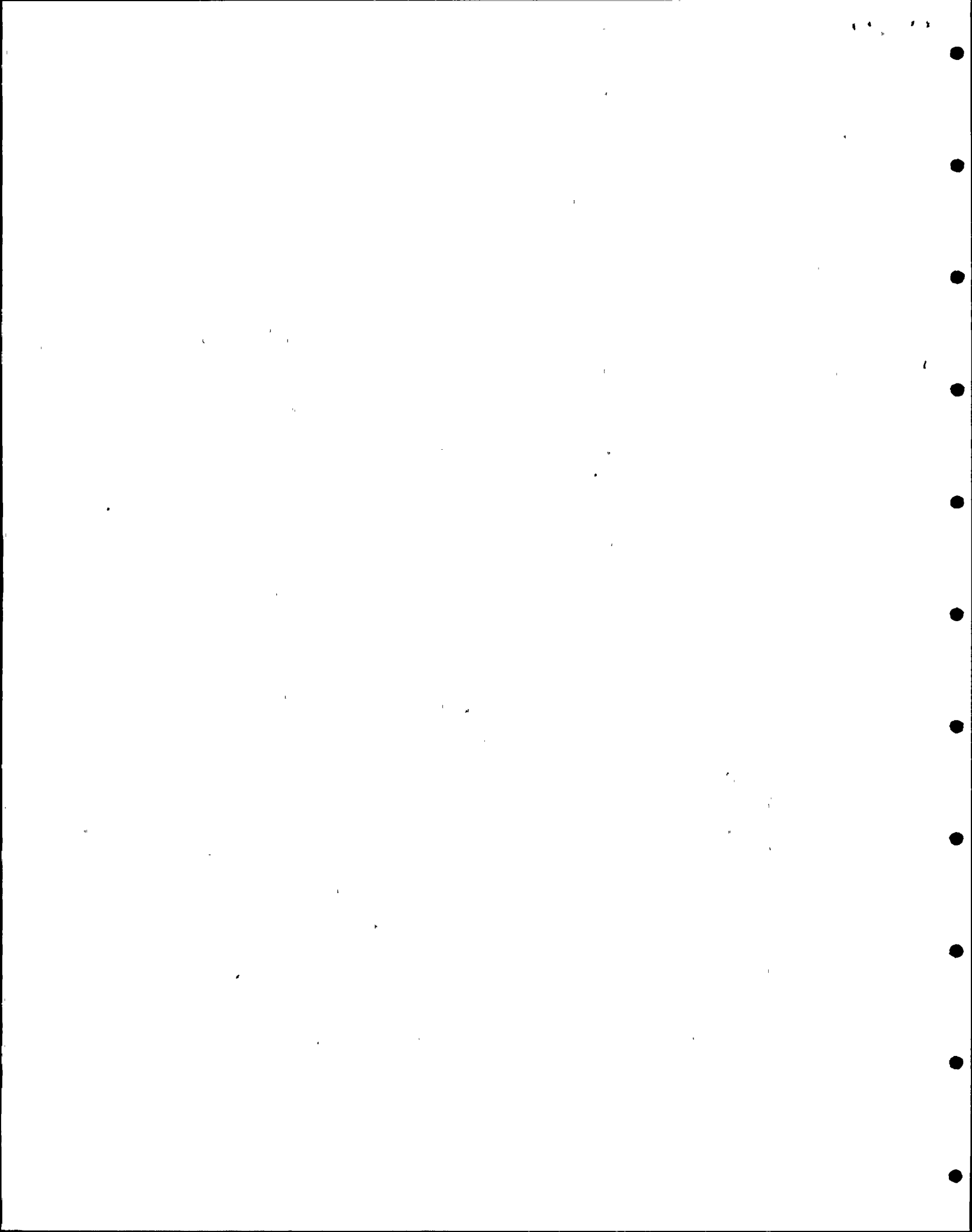
1 this might be an appropriate place to ask it. You had on
2 your schedule way back in the presentation, equipment qualification
3 meetings that were held with all the vendors to bring them
4 up to speed on the requirements of the project, what they had
5 to qualify to. Maybe you could go over the scope of those
6 type of meetings. Were we trying to encourage them to do
7 type testing? Were we trying to direct them in some way to
8 perform the most preferred tests rather than just what they
9 felt was the way to go themselves?

10 MR. BINGHAM: We will talk about that a little bit in
11 problem areas, Ed. We had the meetings, as you know, with
12 many of the vendors in order to assure ourselves that they
13 are very serious about their commitments to meet the require-
14 ments of IEEE 323-1974, whatever they might be for the
15 particular piece of equipment. What those meetings have come
16 out with have been not very satisfactory results, in some
17 cases because of technical impracticability, in some cases
18 because of commercial issues. In some cases, we are finding
19 that techniques of doing the work are not clear and that the
20 vendors are just not willing to perform any tests or to spend
21 money to conduct the tests, and then we are finding that
22 vendors are going out of business. We have a little bit of
23 all of those, which we will talk about later. Our program is
24 ongoing. We do have detailed schedules, follow-up, in order
25 to assure that we do meet the overall schedule. We have not

1 presented those to the board, because that is kind of the
2 detailed working of the system, but they do exist.

3 MR. STERLING: Just to expand a little further, since
4 the field is just starting to develop aging criteria and also
5 finding out what types of materials have aging and which ones
6 can be neglected, is there a check between the vendors where
7 one vendor might tend to neglect one type of material, they
8 claim it does not have an aging mechanism so they would not
9 age that one, whereas another vendor may with the same type
10 of material have successfully found a way to age it and would
11 have done something? Is there a correlation between vendors
12 as far as who is aging what and what criteria they use?

13 MR. BINGHAM: Well, there are a lot of programs to
14 compile what is going on by the various vendors for various
15 pieces of equipment. We are aware of the problem that
16 because of uncertainties, we need to bridge that gap, and at
17 least for Palo Verde, we are doing two things. One, we are
18 rereviewing the vendors and their programs to determine whether
19 there is consistency, or if one vendor can learn from another,
20 so to speak, where we can inform them "Don't tell us you can't
21 do it, because we know Vendor A is doing it," and we will
22 help them in that manner. Second, we are looking at other
23 projects to see where we are having difficulty in not being
24 able to accept or having to accept a method that may not be
25 the best for us for our particular application to see if other

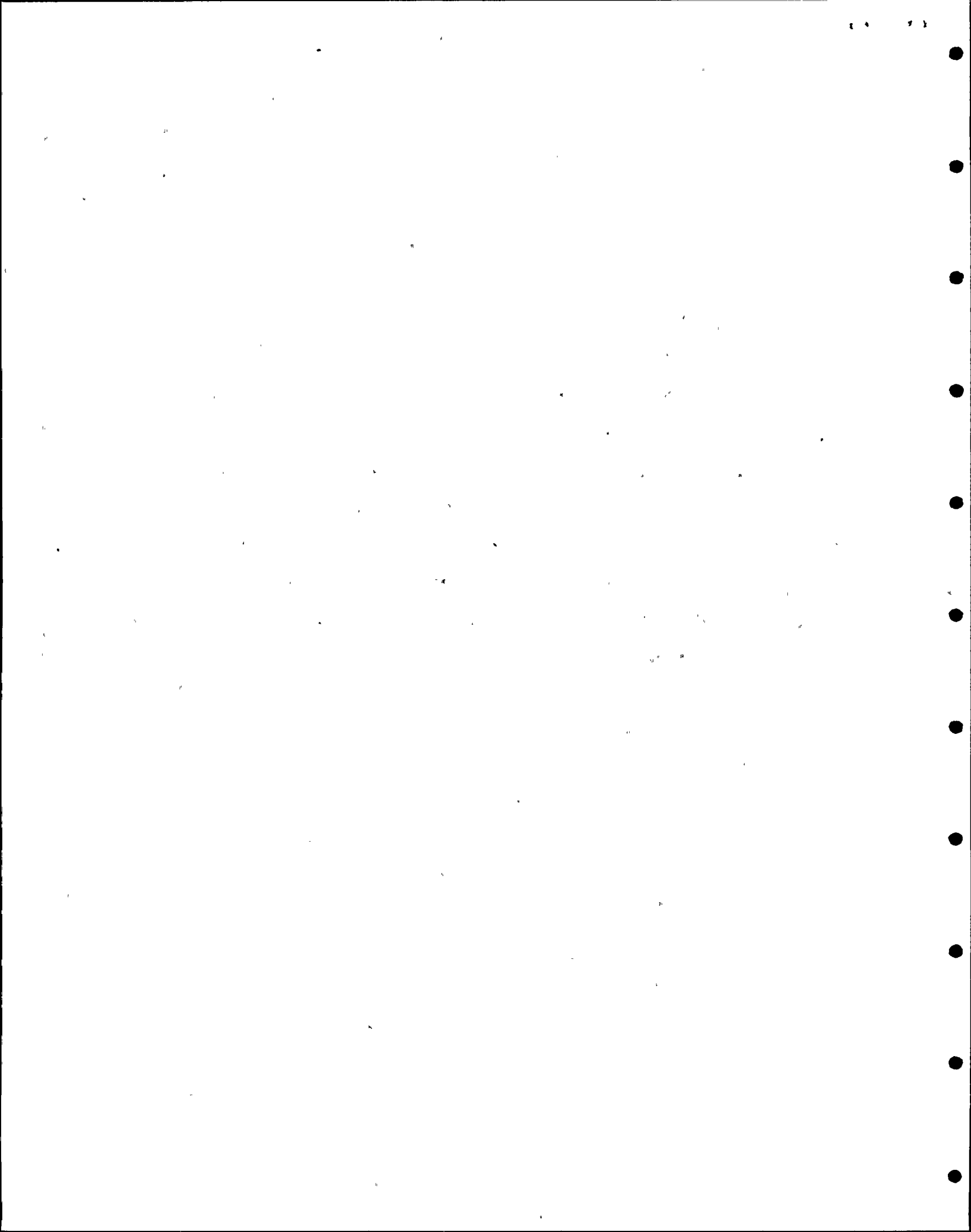


1 projects within Bechtel -- there are many of them that are
2 going through qualification, not only plants that are in the
3 construction permit stage, but plants that are also in the
4 operation stage. So we have those two programs that
5 supplement and try to bridge the gap between these type
6 suppliers.

7 MR. ALLEN: Further questions?

8 DR. ROSZTOCZY: The procedures as you describe them
9 are oriented toward showing compliance with certain require-
10 ments. Your real goal is to assure that this equipment is
11 going to function under appropriate accident conditions. There
12 are some differences between these two. Regulations are not
13 perfect. They might address certain aspects of qualification
14 and they might be somewhat short in some other areas. If
15 you sometimes have knowledge that might not be in the regula-
16 tions, what requirements do you have that the vendors have
17 knowledge in terms of making a judgment whether the equipment
18 will function according to their knowledge and their under-
19 standing and, if they are asked to make such a judgment, then
20 is this documented in any form.

21 MR. BINGHAM: Yes, this judgment would stem from the
22 work orders that I discussed. The reviewer first would go
23 through and define any deficiencies, which I think would be
24 fairly obvious. Either it meets the criteria or it doesn't.
25 Let's take your case of judging whether that would be acceptable



1 or not and taking the case that we discussed in seismic where
2 you might not envelope the lower frequencies. There would be
3 a work order written. That work order would be reviewed by
4 our technical experts and APS as well and it would say we
5 looked at the response spectra, that we looked at the
6 frequencies of the equipment, and it is acceptable for this
7 application for that not to envelope the lower frequencies.
8 That then will be signed off and become part of the documenta-
9 tion package.

10 DR. ROSZTOCZY: Are your reviewers ever asked a
11 question like, "Are you aware of something which might prevent
12 this equipment from functioning under accident conditions?"

13 MR. BINGHAM: Yes, we do from time to time, but I don't
14 know of any formal documentation that we have asked that
15 specific question. What we try to do with our responsible
16 engineers is to have them in a training or updating session
17 in order to inform them of what is going on, the important
18 items to be concerned about. I think we conducted our most
19 recent one in the environmental section. Mr. Carson conducted
20 that maybe some two months ago or so where he had all the
21 responsible engineers in the room, went through all the
22 procedures, all the new things that they need to think about,
23 and we have documented those type of sessions.

24 MR. SLITER: Mr. Bingham mentioned that it would be
25 desirable to have consistency among the qualification programs

1 of vendors. This goal is one of the hoped benefits of the
2 EPRI sponsored equipment qualification data bank that is now
3 being established under contract to NUS Corporation and I
4 would ask that both Bechtel and APS encourage vendors to
5 contribute data to the data bank. Solicitations for data
6 will be sent out in the next couple of weeks to utilities and
7 equipment vendors.

8 MR. BINGHAM: Any other questions?

9 MR. LaGOW: On Exhibit IV-11 for audit of testing,
10 you don't have a bullet here that says you verify that the
11 equipment was in the proper operating mode at the time it was
12 exposed to the environment, that you are checking. Maybe it
13 is implicit in your specification, but I think this is a
14 very important point, that it should be in the proper operating
15 mode so that you can see if the relays are chattering if
16 they are being vibrated, so you can see that it is being
17 radiated, if you are getting spurious signals in logic
18 circuits, and when you are changing pressure to see that no
19 membranes are moving around and opening or shorting equipment.

20 MR. BINGHAM: We can modify the slide, John. These
21 were the highlights, but that should have been highlighted.

22 MR. ALLEN: Okay, why don't we modify the slide to
23 show that.

24 Are there any further questions?

25 Okay, Bill, go to the next subject.

1 MR. BINGHAM: I am reminded that on our checkoff sheets,
2 although I didn't show it on the highlight slide, I will add
3 it, John, that we do indicate the replacement schedule for
4 any piece of equipment or component that has to be replaced
5 shorter than the specified life. I think Mr. Hoefert asked
6 that question. That is where the information first occurs,
7 and then that information would be transferred to the main-
8 tenance requirements.

9 MR. HOEFERT: Could you repeat that? I didn't catch
10 that.

11 MR. BINGHAM: Sure. On the checkoff sheet, we do
12 indicate the specified time for components that have to be
13 replaced in less than the qualified life of the plant, and
14 I indicated that it was not shown on Exhibits IV-6 and 7 and
15 we will add that point to it.

16 MR. ALLEN: Let's go to the next section.

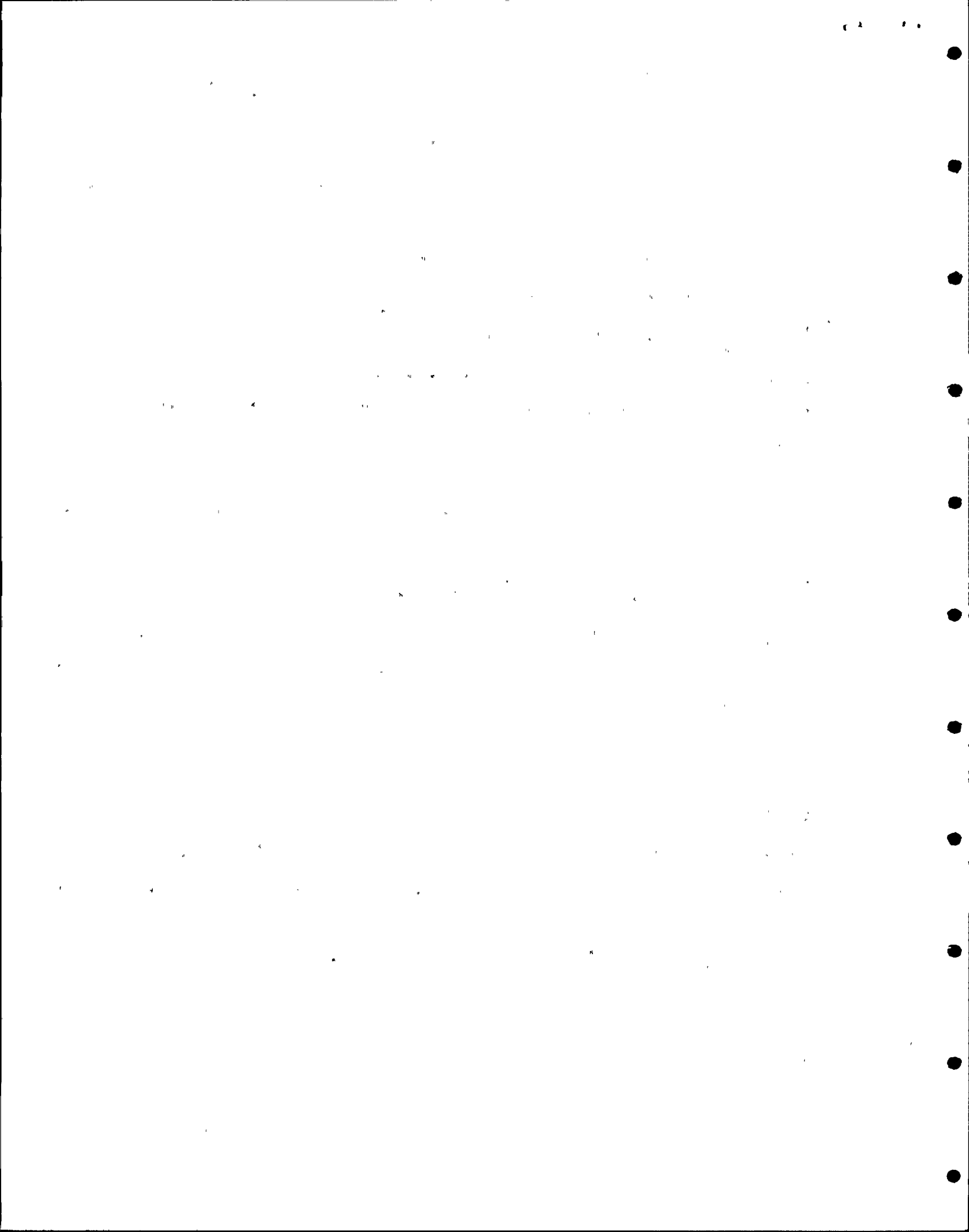
17 MR. BINGHAM: Our next section is Section VI, Example
18 Qualifications. If you will look at the agenda, Enclosure
19 iii, we have split that into Environmental and Seismic and we
20 have indicated that we have examples for the balance of plant
21 ESFAS, which is the actuation system, the balance of plant
22 instrumentation, diesel generator, battery charger, and then
23 cables under environmental only to discuss what is being done
24 there. It is our intent to present the BOP ESFAS environmental,
25 then seismic, as the example, and we will go through those in

1 detail. We were not intending to spend a detailed discussion
2 of the other items, but they are in your handout. So if it
3 is permissible, John, what we would suggest is that we go
4 through the environmental qualification checklist, we
5 entertain questions on it, we go through the balance of plant
6 ESFAS seismic checklist and entertain questions on that, and
7 then if the board would care to review other of the checklists,
8 we would be pleased to put them on and go through those in
9 detail.

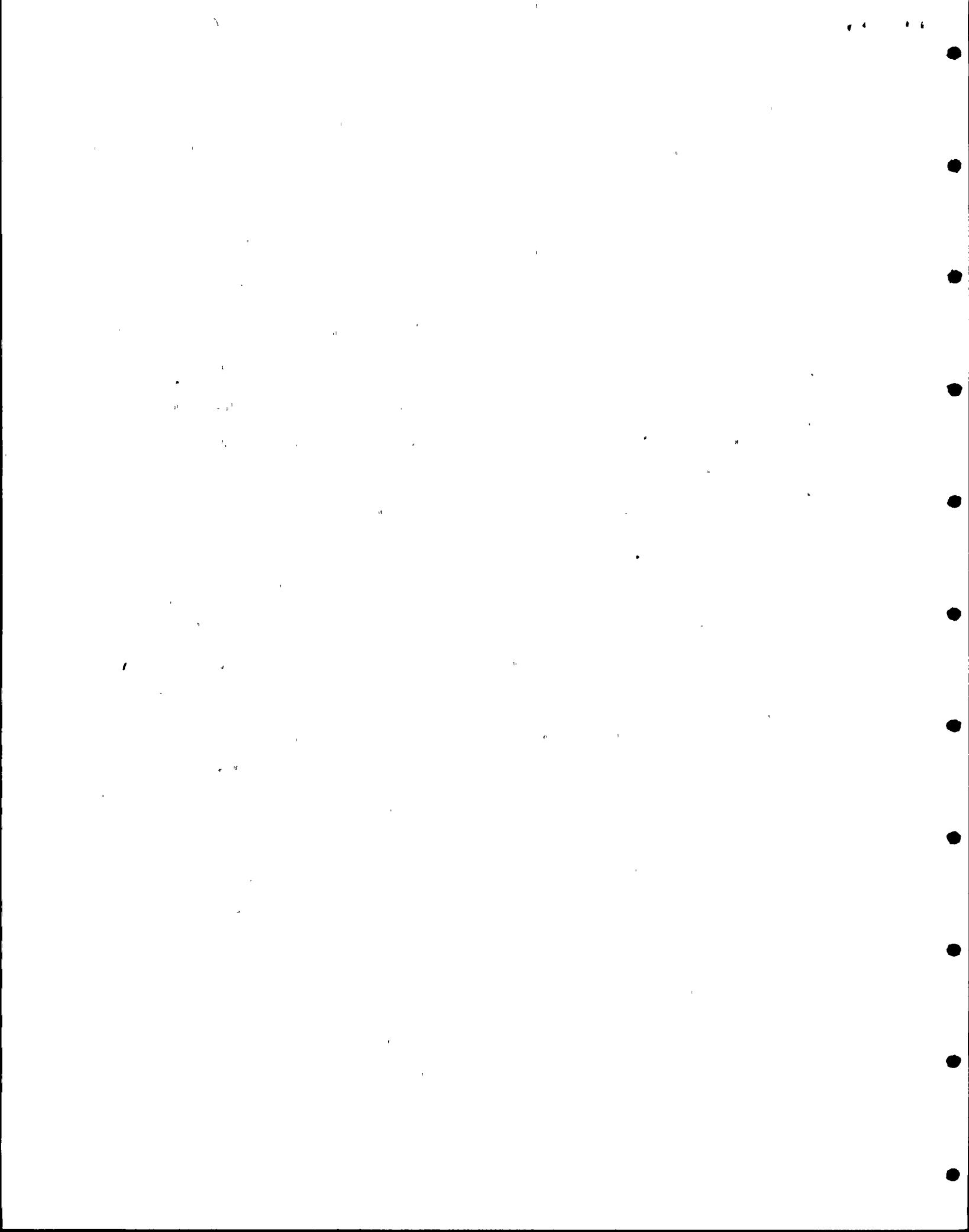
10 MR. ALLEN: Fine.

11 MR. BINGHAM: I will ask Bob Carson if he would start
12 with the balance of plant ESFAS environmental checkoff sheet.

13 MR. CARSON: This is Exhibit VI-1 covering the
14 Engineered Safety Features Actuation System supplied by General
15 Atomic Corporation. As was indicated yesterday by Mr. Bingham,
16 the life of this program, the life of this design phase on
17 the plant, has been going on for several years and, as
18 indicated, much of the balance of plant equipment was purchased
19 in the time period 1975, '76, '77, '78. This particular item
20 of equipment, the purchase order was issued in 1976, the
21 testing program was conducted in late 1978, so we are working
22 here with interpretations by Bechtel, the engineers, by the
23 vendors in that time frame. They were working to IEEE 323-
24 1974 and the interpretations that were in place at that time
25 as understood by the vendors and by us in the program.

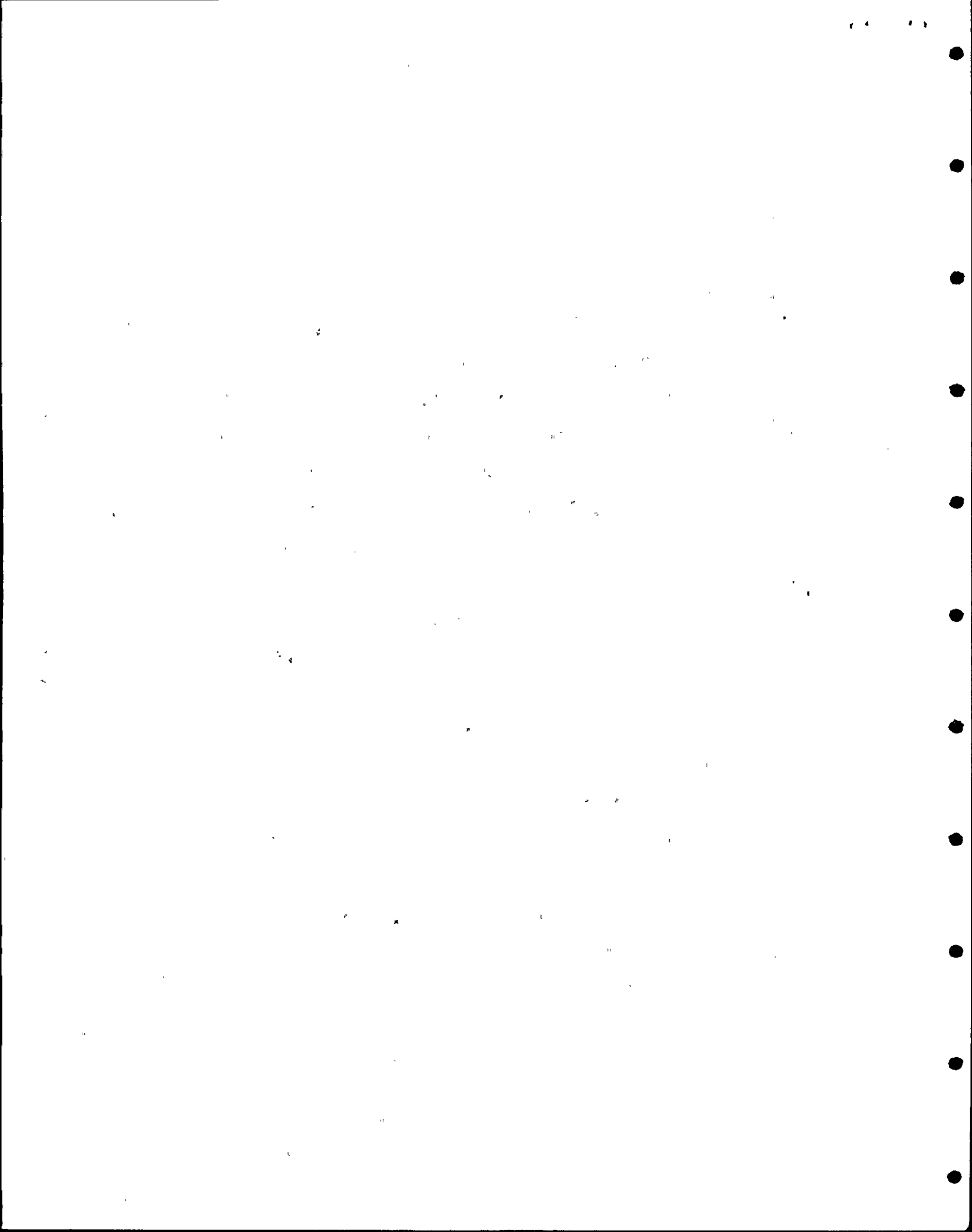


1 This particular equipment is located in the control
2 building at elevation 140, which is the control room elevation.
3 It is Environmental Designator No. IV, which would be Table 5
4 in your handout which we had pictured yesterday afternoon.
5 The applicable design basis accidents for which this equipment
6 must function would be the LOCA or the main steam line break
7 and, as was indicated on the environmental sheet, there is
8 very little change in the environment in the control room
9 under either of those design basis events. The equipment is
10 to operate during the first 30 minutes of the design basis
11 event and it must operate continuously during that time period.
12 The function of the equipment is to provide actuation and
13 sequencing for the emergency safety features indicated, and
14 control when these equipments operate to mitigate the conse-
15 quences of the specific accidents. The environment is
16 indicated in the designator sheet, so that indicated environ-
17 ment would be attached to the information. That would be
18 the information as indicated in Table 5 for the control
19 building and this would be the control room. The temperature
20 is very well controlled, atmospheric pressure, relative
21 humidity in the order of 20 to 90% in this particular area --
22 I'm sorry, attention is called that this is the control room
23 area. Humidity is 30 to 50%, very, very well controlled.
24 Radiation, no difference between the normal environmental
25 conditions and the accident environmental conditions, because
this is a very highly controlled area with special air



1 conditioning equipment. No chemical environment at all.

2 Exhibit VI-2. In this particular section, we are
3 comparing the designated service conditions and does the
4 suppliers qualifed service meet or exceed the FSAR require-
5 ments. The radiation effects were not considered due to the
6 fact that they were indicated as being very low at that time.
7 We are now rereviewing all of this equipment on the basis of
8 the indicated radiation of 10 to the third rads, but we do
9 not expect to find that there is any problem with any items
10 in this equipment. Margins were not specifically indicated
11 in terms of radiation, and all the other effects of margins are
12 as is indicated in Exhibit VI-7, which is the end sheet of
13 this particular checklist. As you will notice here, this
14 is the environmental conditions as qualified by the supplier.
15 This particular equipment was tested in the temperature range
16 40 to 104 degrees, atmospheric pressure, note the humidity
17 20 to 95%, no radiation was considered, no chemicals were
18 considered during these tests. The design basis accident
19 as indicated at the time of the purchase order was this set
20 of parameters here (indicating). On this part of the sheet
21 (indicating), these are qualification margins, and now we
22 are looking at qualification margins as applied to the
23 environmental designator parameters, and you will notice here
24 we are saying that the margin in temperature was 30 degrees
25 on the low end and 24 degrees on the high end because Table V



1 indicates that the maintained temperature in the control room
2 is 75 plus or minus 5 degrees. Pressure was not applicable.
3 Relative humidity is 30 to 50%, they tested 20 to 95%, so
4 there is wide margin on the humidity factor. No radiation
5 and no chemicals. This particular equipment is made up of
6 typical modules as manufactured by the vendor, General Atomic,
7 and after ambient temperature verification was made of the
8 successful performance, all of this equipment was burned in
9 for 160 hours at a temperature of 120 degrees. After the
10 burn in, there was a verification made of the successful
11 operation, of operational logic, and that was done at ambient
12 temperature and also at a high temperature of 124 degrees
13 with standing water in the bottom of the cabinets to simulate
14 a high humidity condition. It was also tested at a low
15 temperature of 40 degrees plus or minus 5 degrees F with a
16 relative humidity of 20%. All of these informations are
17 contained in the test reports. This equipment is arranged for
18 horizontal mounting, floor mounting, and it will be welded to
19 embedded channels in the floor. The test situation was that
20 it was tested while horizontal. The qualification method was
21 in accordance with 323-74 by type testing.

22 On Exhibit VI-4, the tests were not specifically
23 conducted in accordance with the indicated sequence of 323
24 and the differences were that the temperature margins were
25 not applied in Steps 6 and 7; that is, there were no

1 temperature margins applied in the DBA and the post-DBA
2 operational point. As you will notice in Paragraph D.4) of
3 this exhibit, to conduct a heat aging, there was no specific
4 Arrhenius plot determined for this equipment, because it is
5 not a single component. It is not a single material equipment.
6 It is made up of a variety of items of various materials and
7 it was tested and aged on the basis of temperature cycling,
8 since this is in the area of very well controlled atmosphere,
9 75 plus or minus 5 degrees maintained by safety-related air
10 conditioning equipment, redundant equipment, so those limits
11 will not be deviated from. The assumption was made that there
12 would be two air conditioning failures. Even though we have
13 redundant equipment, the assumption was made that there would
14 be two complete failures of the air conditioning system per
15 year during the design life of the plant, 40 years, and then
16 there was a 40% margin attached to that particular assumption,
17 so we were looking at possible failures of air conditioning
18 of 124 times in the life of the plant. That was then simu-
19 lated by this single covering two-hour period, at which time
20 the equipment was operated at 40 degrees F, assumed air
21 conditioning failure in which the temperature rose over a
22 five-minute period to 120 degrees F for 20 minutes and then
23 back down over a 90-minute period to a 40-degree F level.
24 That cycle was repeated 124 times and this was considered in
25 this program to be equivalent to aging of 40 years for this

1 type of equipment.

2 In the period of this testing covering 248 hours,
3 every 24 hours equipment was operated in the auto test mode.
4 After the aging conducted here, the equipment was operated in
5 the normal environment at high temperature again and the
6 equipment was then operated on a whole system basis, the
7 entire system comprising the BOP. The ESFAS cabinet was
8 hooked up and was operated in the auto test mode for some
9 120 hours, which would be under full power and logic operation,
10 sequential operations, in the equipment. This equipment was
11 also seismically tested, and that will be explained by
12 Mr. Schechter.

13 Exhibit VI-5 indicates that there was no specific
14 humidity aging done, but the effects of humidity were taken
15 into account at the various temperatures over the range of
16 20 to 95% whereas the indicated humidity in this area is
17 maintained in the order of 30 to 50%. Dry heat was applied
18 for the cyclic operation, which simulated aging. The
19 performance characteristics that were required was that the
20 logic operations were to be proper under any conditions to
21 which the equipment was subjected, and the performance
22 characteristics monitored were the operation of the logic and
23 all the operations were successful.

24 The performance characteristics were monitored
25 continuously. They were also monitored during the seismic

1 testing. The test report indicates that the test instruments
2 were in current calibration, and that would be indicated in
3 the test reports from the laboratory, the numbers of which
4 appeared on an earlier exhibit.

5 Exhibit VI-6, interfaces. The interfaces of this
6 equipment include cables attached to the equipment and enter-
7 ing through the proper places. This equipment is fed from
8 below through openings in the floor and there were simulations
9 of cable going into the equipment during the testing procedures.
10 The judgments made on the testing program, the cyclic
11 operation simulating aging, the successful burn-in, the
12 testing cycle for more than 100 hours, the judgment is that
13 this equipment is qualified for 40 years, and the test reports
14 are indicated here. There are no specific indicated replace-
15 ment parts needed to be put into this equipment on a periodic
16 basis.

17 This then is the checklist for the independent
18 review of the program. As I indicated earlier, this program
19 was conducted in the time period 1976 through '78. This
20 equipment has been delivered to the field and is currently
21 installed.

22 MR. BINGHAM: Questions?

23 MR. ALLEN: I have one to start off with, I guess. I
24 thought you had indicated a while ago that this checklist
25 had this life limiting component information on it plus special

1 requirements such as sweeping out cabinets every so often.
2 I didn't see that on here.

3 MR. CARSON: That would be here under the evaluation.
4 Qualified life time is 40 years. If the qualified life time
5 had been less than 40 years, which would indicate some life
6 limiting components, that would have been specified here by
7 specifying the time and the replacement schedule and the
8 replaceable items, and that information would appear here.

9 MR. HOEFERT: I can see where that would apply to a
10 life limiting component, but it doesn't really seem to cover
11 periodic maintenance, operational checks that may have to be
12 done.

13 MR. CARSON: This particular equipment is self-testing.
14 Self-testing features are built in, so there are no specific
15 tests that you have to go through. Operational maintenance,
16 if by that you mean every so often you are supposed to go in
17 and dust it off or polish the glass, that sort of thing is
18 included in the vendor's instruction manuals that come with
19 the equipment and are provided to APS and would be maintained
20 in their maintenance file. These indications here are only
21 replacement items which are necessary to maintain the
22 qualification of the equipment.

23 MR. HOEFERT: Certain vendors have identified certain
24 of these preventive maintenance tasks in their qualification
25 reports and those are the ones I am talking about.

1 MR. CARSON: There are certain reports in which state-
2 ments are made like the qualified life is contingent upon
3 application of periodic maintenance indicated in the instruc-
4 tion manual number so-and-so, and if that is the condition
5 under which the vendor says that it must be operated, we ask
6 specific questions about that and ask them if that is in fact
7 correct, and if they insist that these maintenance procedures
8 must be indicated, we will so indicate that and again point
9 you to their instruction manual where they say you have to
10 check the gasket material every time you open the bearing
11 housing or you must replace the gasket every time you open
12 the bearing housing, something of that sort.

13 MR. HOEFERT: Are you requiring the vendors to identify
14 the difference between preventive maintenance which is
15 required to maintain the equipment qualified and preventive
16 maintenance which is not for that purpose?

17 MR. CARSON: Yes, because we require and are requiring
18 on a basis -- We are investigating this with all of our
19 vendors. At present, we are requiring them to identify any
20 item, any component, any material item that is subjected to
21 age deterioration and we are requiring them to tell us what
22 the lives of those materials or components are and tell us
23 the replacement schedule that is necessary to maintain the
24 qualified life. We are saying the qualified life of the
25 equipment is 40 years based on the fact that every four years,

1 you replace this, and we are asking them to define what those
2 items are that need to be replaced and the replacement
3 schedule. That information will be supplied to APS for
4 inclusion in their operating procedures.

5 MR. HOEFERT: Again, you went back to replacement, and
6 those I can see would be included on your checklist. What
7 about tasks which are not replacement tasks? Are those going
8 to be included under Section A?

9 MR. CARSON: Not specifically, because those are not
10 items that have specifically to do with the qualification and
11 maintenance of the qualification of the equipment. If he is
12 saying, as I indicated before, every so often you have to
13 polish the glass on the meters or sweep the dust out of the
14 bottom of the cabinet, that is a routine preventive mainten-
15 ance type of thing which would be included in the instruction
16 manuals that the vendor provides to you.

17 MR. HOEFERT: I just have a concern that it is going
18 to be very hard to differentiate those tasks which are
19 required to maintain it qualified and those which are not,
20 because I have seen some reports where the vendor has put
21 down that a certain maintenance task had to be performed to
22 maintain it qualified.

23 MR. BINGHAM: How should we handle this particular
24 issue, John?

25 MR. ALLEN: John wants to clarify something.

1 MR. BARROW: Specifically, the one that Norm is talking
2 about I believe is one that we saw -- I can't remember if it
3 was load centers or switch gear where we saw a requirement
4 the vendor was going to push on us to vacuum the transformer
5 windings every three months or six months, or something like
6 that, vacuum all the dust off the transformer windings in
7 order to maintain qualification. As I recall, back then our
8 response was that that seemed hardly necessary, that the
9 equipment should be designed so that it could sit in the
10 ambient conditions that we specified it to be in without
11 having to have that kind of detailed maintenance to keep it
12 qualified. But if, like Bob said, you had a requirement that
13 you would go back to the vendor and negotiate with him, if
14 he turns out to be very adamant about that, you don't seem to
15 have a place on your form to indicate such requirement. All
16 you have a place for is indicated life limiting components,
17 but not specific actions that are required to keep qualifica-
18 tion over and above normal periodic maintenance. They don't
19 discuss normal periodic maintenance in their qualification
20 report, just maintenance required for qualification. I think
21 that is what he is getting at.

22 MR. HOEFERT: That is exactly what I am getting at.

23 MR. BINGHAM: I understand the point. What I had
24 asked the Chairman was how we should proceed with the issue.

25 MR. ALLEN: Well, I thought you said a while ago that

1 you intended to use that spot there for that purpose.

2 MR. BINGHAM: If it is required to maintain the
3 qualified life, it will be on that sheet. What I hear
4 suggested is there may be some gray areas that we need to
5 pay attention to and shouldn't they also be included on the
6 sheet. I suspect that either we take the course of eliminating
7 the gray areas or determine that we should include some
8 information on this particular sheet so that it has special
9 instructions, and that gets into the maintenance procedure.

10 MR. ALLEN: It sounds to me like you need to do both,
11 eliminate the gray areas and then ensure that type of informa-
12 tion will be identified on that sheet somewhere.

13 MR. BINGHAM: Fine.

14 MR. ALLEN: Further questions? George.

15 MR. SLITER: On Exhibit VI-4 on Item 4, you have a
16 box called Arrhenius Methods to check whether heat aging
17 was conducted. Does a check in this box imply that the way
18 that the Arrhenius method was applied was reviewed and that it
19 is acceptable and do you have some method on your form for
20 explaining yes, Arrhenius was used, but there may be some
21 issues in the way it was applied?

22 MR. CARSON: This specific indication is to indicate
23 whether or not the vendor used an Arrhenius method for aging,
24 and if he used the Arrhenius method, we would require and he
25 would have to give us in the test reports the basis for

1 determining the Arrhenius curve and show us how he used it.
2 If there were any questions about his application of the
3 Arrhenius method or his determination of the Arrhenius method,
4 those questions would be asked and cleared up prior to the
5 acceptance of the report so there would not be any question
6 on this when it finally got resolved. He would use the
7 Arrhenius method and, if used, it would have been previously
8 determined that the application of that method was reasonable.

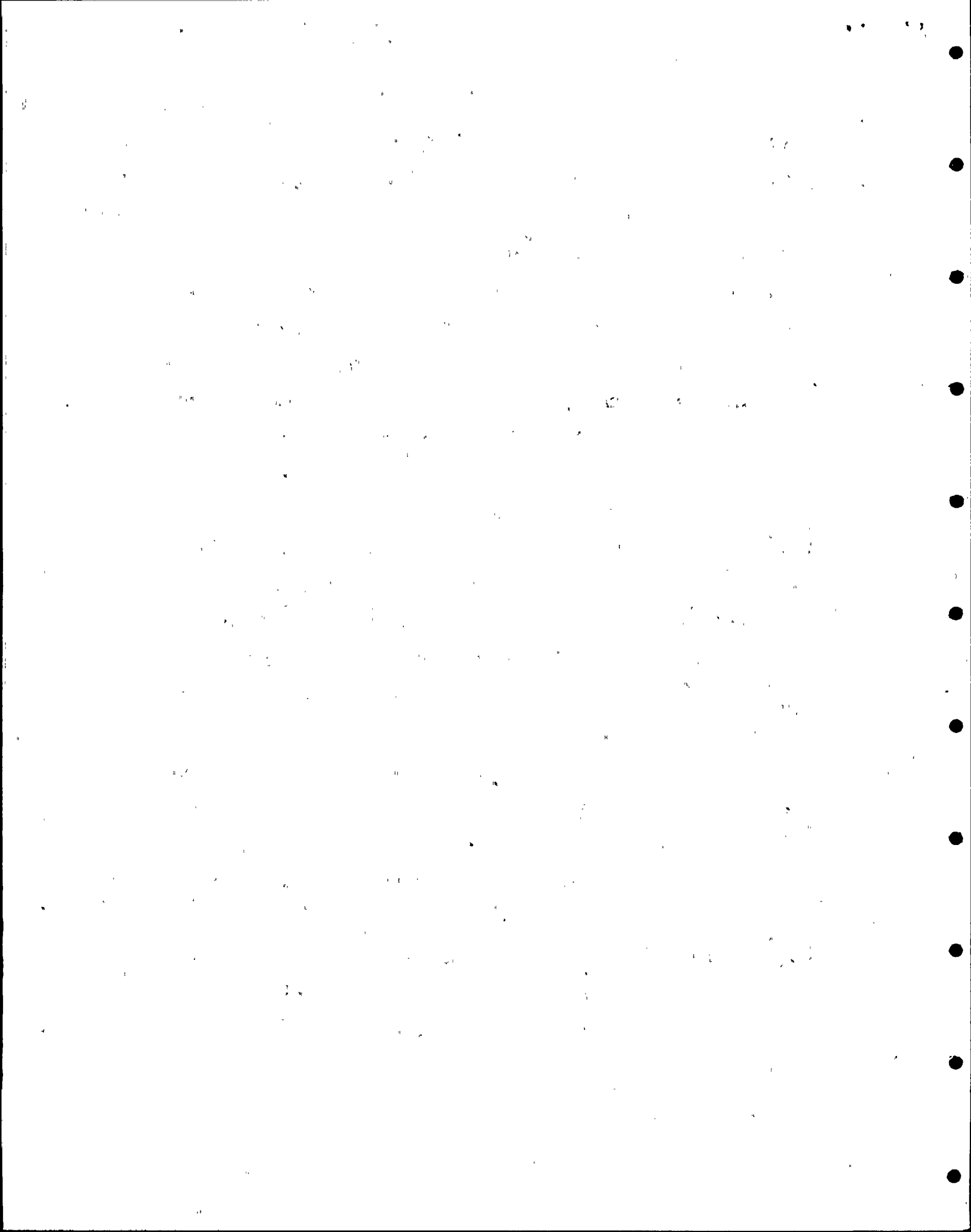
9 MR. SLITER: Are there any final checklists near the
10 end of that cycle?

11 MR. CARSON: Yes.

12 MR. BINGHAM: Let me make a clarification. We are
13 working with this form to make sure that it is a good check-
14 off list, and looking at Section 4, we believe we should have
15 a box that says is the method acceptable, and we will add that.

16 MR. SLITER: Are there any organic materials in this
17 piece of equipment?

18 MR. CARSON: There are organic materials, yes, because
19 this is made up of standard modules, as I indicated, that
20 are built by General Atomic. Those modules have relays in
21 them. They have various other equipment. They have circuit
22 boards. They have other types of equipment that do include
23 organics. It was this particular thing that really prevented
24 the use of an Arrhenius method because of the fact that they
25 have numerous types of material in there and it would be



1 essentially impossible to put together an Arrhenius method
2 for this equipment. That is why the aging cycling was chosen
3 as being a reasonable method at that time to indicate the
4 effects of aging in the assumed worst condition that would
5 apply in this area; that is, the complete failure of the
6 redundant Category I air conditioning systems.

7 MR. SLITER: I have two questions about the temperature
8 cycling. Is it true that this was not meant to be any kind
9 of an accelerated testing completed, this cyclic type
10 approach?

11 MR. CARSON: Well, by the cyclic type of testing, that
12 simulated an accelerated aging. The fact that it was
13 operated and burned in early would be really the same sort
14 of thing that you would do if you were using techniques from
15 IEEE 650. You are burning in for infant mortality type of
16 failures. It was then cyclically operated under the extreme
17 temperatures that we felt might accrue in that area. The
18 whole equipment was then operated, as I indicated, for some
19 160 hours after these cyclic operations to again look for
20 any failures of materials or components or individual items
21 within the equipment. So the whole sequence of events was
22 looked at as an accelerated aging method.

23 MR. SLITER: Is the duration of these cycles,
24 approximately two hours, is that assumed to be the approximate
25 time that if an air conditioning failure took place, that

1 would be the cycle?

2 MR. CARSON: Yes. It was anticipated that any air
3 conditioning failure would be corrected and the temperature
4 would be gotten down to the original level within a two-hour
5 period.

6 MR. SLITER: In its normal operating mode, would this
7 equipment be continuously activated such that there may be
8 self-heating effects?

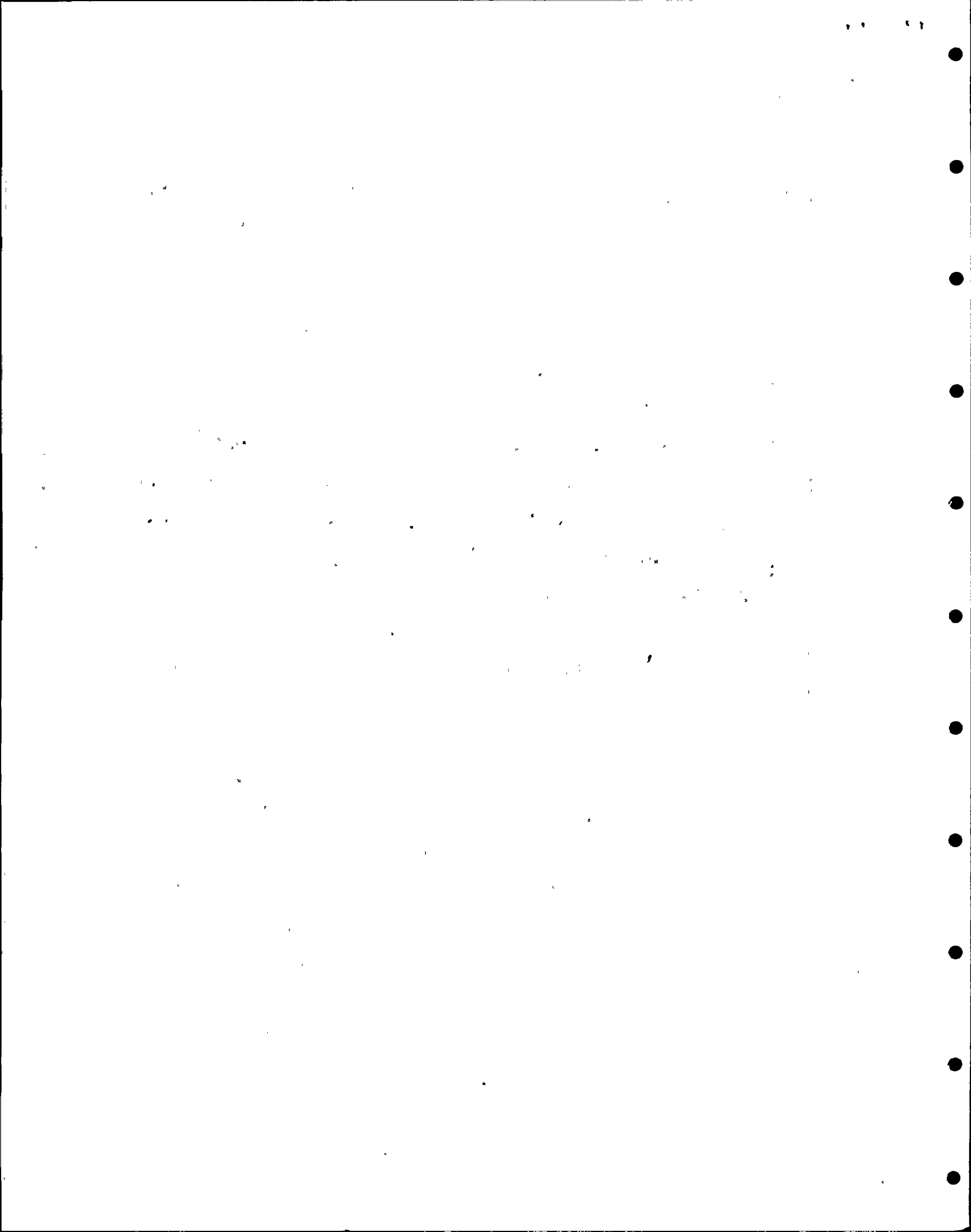
9 MR. CARSON: This equipment is continually energized
10 and it is also in continuous test mode, self-test mode, so
11 there is some internal heating, but with the types of
12 components in here and the mode of operation, internal heat
13 generation is extremely low. The internal heat rise is in
14 the order of 3 to 5 degrees over the ambient.

15 MR. SLITER: So then in 1978, you did accept this
16 as an acceptable method.

17 MR. CARSON: As I indicated, under the interpretation
18 of 323-74 that were prevalent in the industry at that time,
19 this was considered to be a reasonable method for this type
20 of equipment in this very highly controlled atmosphere..

21 MR. SLITER: Would your judgment change now in 1980?

22 MR. CARSON: In 1980, for this type of equipment, we
23 would be looking at methods incorporating the IEEE 650
24 approach in which the items of equipment in the cabinets
25 would be analyzed, significant aging if exhibited on the
components would be identified, and the whole analytical



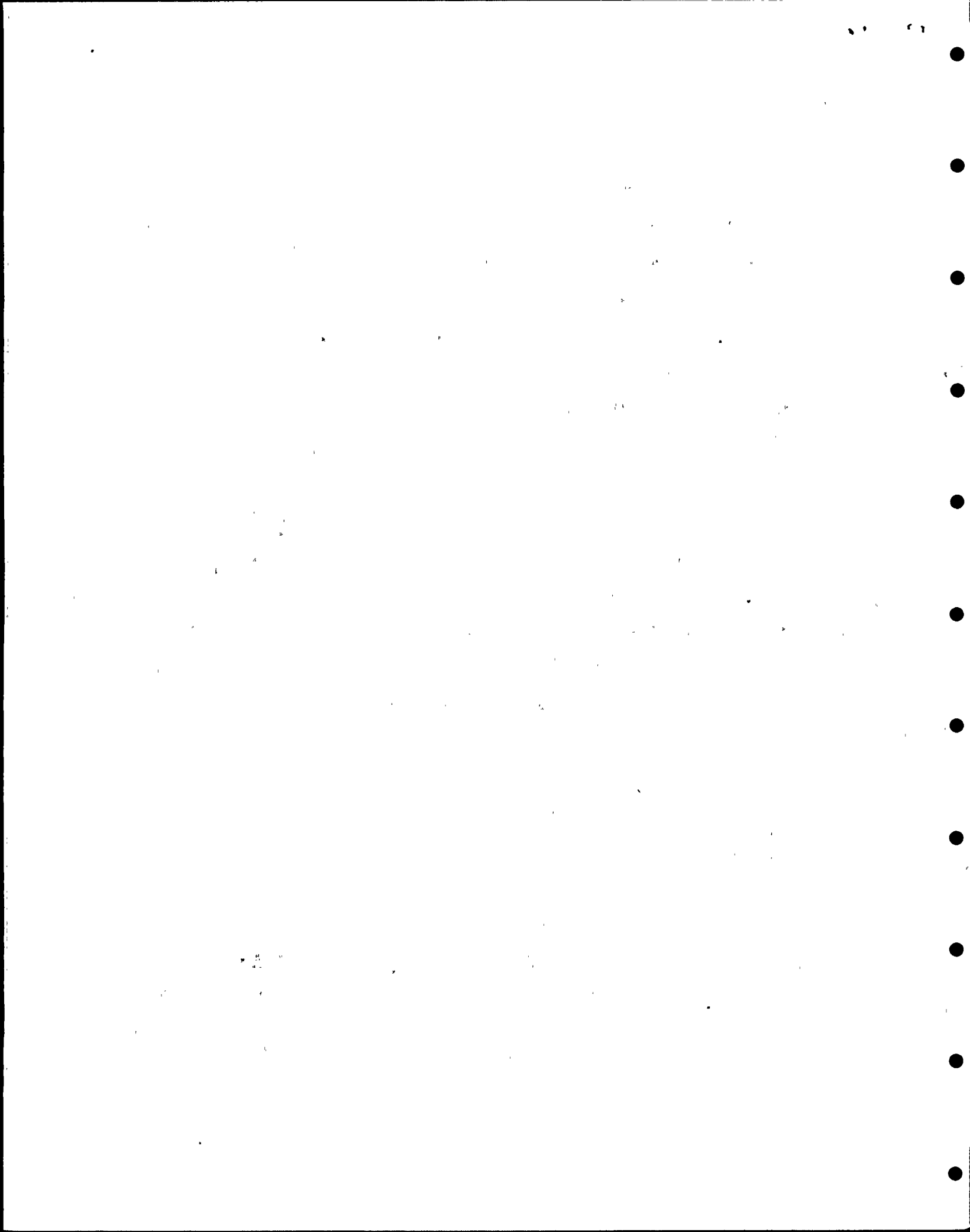
1 and type testing sequences shown in the table in IEEE 650,
2 we would look at that and also recognize the fact that certain
3 components are indicated as being not significantly age
4 sensitive during a 40-year period.

5 MR. BINGHAM: I would like to make one clarification
6 on the environment to make sure that you do understand that
7 we are assuming not single failure, but double failure of safety
8 equipment and have put that equipment through that sort of an
9 environment.

10 MR. SLITER: I was wondering whether we were in a
11 position yet as far as your knowledge of aging technology is
12 concerned to now go back and take this cyclically-applied
13 environment and make some estimate as to, for example, if we
14 had instead of a 1.4 margin, only a margin of, say, 1 in
15 terms of cycling, but then take the additional margin and get
16 an equivalent accelerated aged life or some such thing. Do
17 you think this would be possible at this time or do you think
18 it is still beyond the technology?

19 MR. CARSON: I really don't understand what you are
20 saying.

21 MR. SLITER: If you cycle the temperature to this
22 extent, suppose we now assume that there are no failures of
23 redundant air conditioning, you now have this cyclic tempera-
24 ture profile applied, you could interpret that cyclically
25 applied profile as an accelerated Arrhenius type approach



1 and use the Arrhenius theory to back out what an equivalent
2 life would be in terms of, say, its baseline temperature,
3 75 degrees plus 5 degrees Fahrenheit margin.

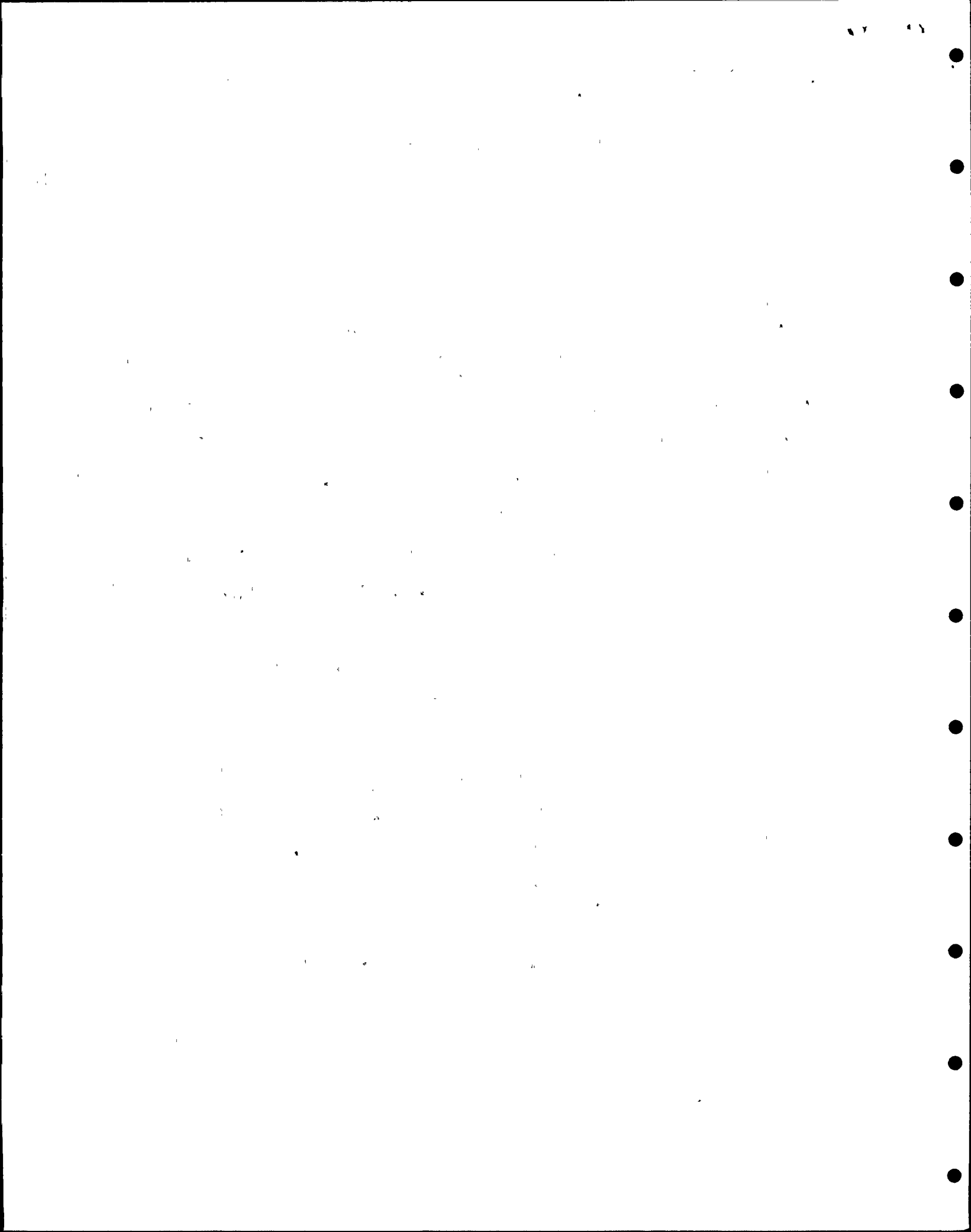
4 MR. CARSON: This could be done. This could be done
5 on the basis that you would investigate the equipment and the
6 materials within this total equipment and determine what is
7 the life-limiting material, and that material could then be
8 looked at on an Arrhenius plot or that material could be
9 studied and the excursions of temperature and time could
10 be applied to that to say that for this material, since this
11 is the worst one in there, and the temperature equivalent is
12 so many years and we did it 124 times, that is the equivalent
13 of so many years. Such an analysis or re-analysis of this
14 equipment has not been contemplated.

15 MR. BINGHAM: Other questions, John?

16 MR. BARROW: A couple of little questions on the form.
17 On Exhibit VI-4 under Item C, the yes/no box under the test
18 sequence being equal to a more severe or not, it's got to be
19 one or the other. It either is equal to or more severe or
20 it wasn't, so is the form incomplete without that marking on
21 it? Is that just an oversight is the question.

22 MR. CARSON: In this context, yes. We would indicate
23 that this was equal to or more severe in our estimation than
24 the required sequence.

25 MR. BARROW: The other question was there doesn't



1 seem to be any date on this form. If this is a Xerox of an
2 actual form used for qualification review, I take it it is
3 not necessarily complete at this time, since it is not dated.

4 MR. BINGHAM: John, as we discussed the other day, we
5 are coming to grips with putting the whole package together
6 with a cover sheet and a check-off that all the elements are
7 there and all the signatures and that sort of thing. What we
8 are putting up here is something to depict the elements so
9 that the board can understand what is going on. We are not
10 presenting today the complete QA documentation package which
11 will have to have all the good stuff on it.

12 MR. ALLEN: But it will be dated.

13 MR. BINGHAM: Oh, yes. Everything will be dated.

14 MR. ALLEN: Additional questions? Ed Sterling.

15 MR. STERLING: On VI-4 again, on Item 4, the other box
16 has an explain and justify in the title there and yet as I
17 read what is underneath that box, it is just an explanation.
18 There is no justification. Do you intend on your final
19 documentation to be justifying considering the fact that there
20 are some methods that may be used in good use and some that
21 are not?

22 MR. CARSON: Could you rephrase that question, please?

23 MR. STERLING: Yes. The justified portion of that box
24 has not been written down. You have an explanation of what
25 you have done, but you haven't justified it.



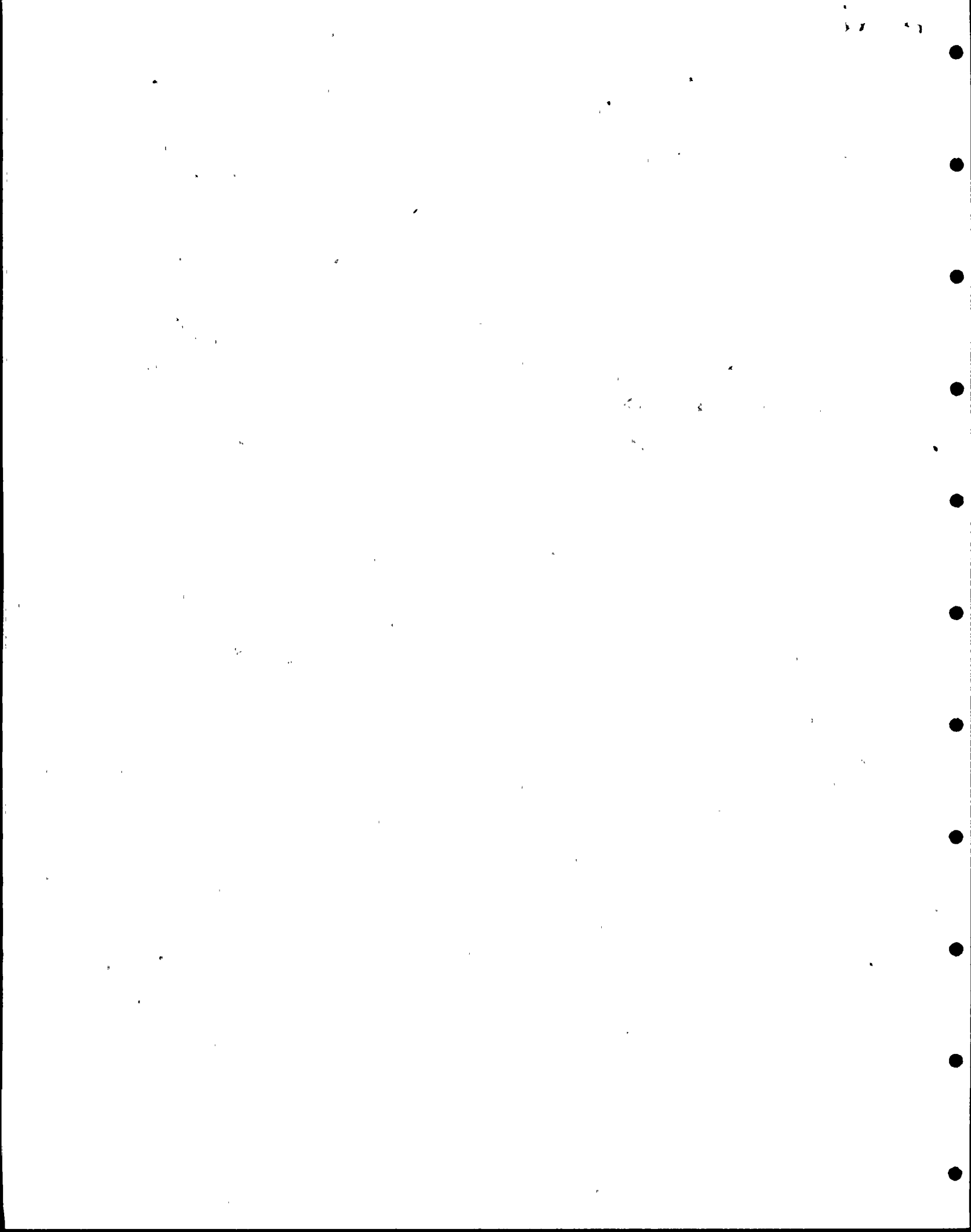
1 MR. CARSON: The parentheses at the bottom provide the
2 factor of 1.4 margin for projected air conditioning failures.

3 MR. STERLING: That is just an explanation.

4 MR. CARSON: That is an explanation, but for this
5 particular equipment, we look at that as the justification
6 for using such a cycle on the basis that this is, as Bill
7 pointed out, in an area that is served by redundant safety-
8 related air conditioning systems and, therefore, what we are
9 looking at is not a single failure of the system, we are
10 looking at the failure of two independent systems, and we are
11 saying that that just can't happen and, therefore, we are using
12 that as a justification for using this method.

13 MR. STERLING: You have explained your margin, but
14 this Item 4 is aging. It should have a justification as to
15 the technique of aging you are using. If you are not using
16 the Arrhenius method and you are going to modify that, but
17 you are using another method, you should justify the use of
18 that method. So whatever method you pick, whether it is a
19 straight-line method or whatever, you should justify the use
20 of that method on those materials that you intend to age.

21 MR. BINGHAM: I think, John, that the point that you
22 are getting to is the degree of completeness of the justifica-
23 tion, and I suspect that as we go through and re-review all
24 of this information with APS that the final product will have
25 the required justification and explanation in it. I think



1 that our intent is to cover that.

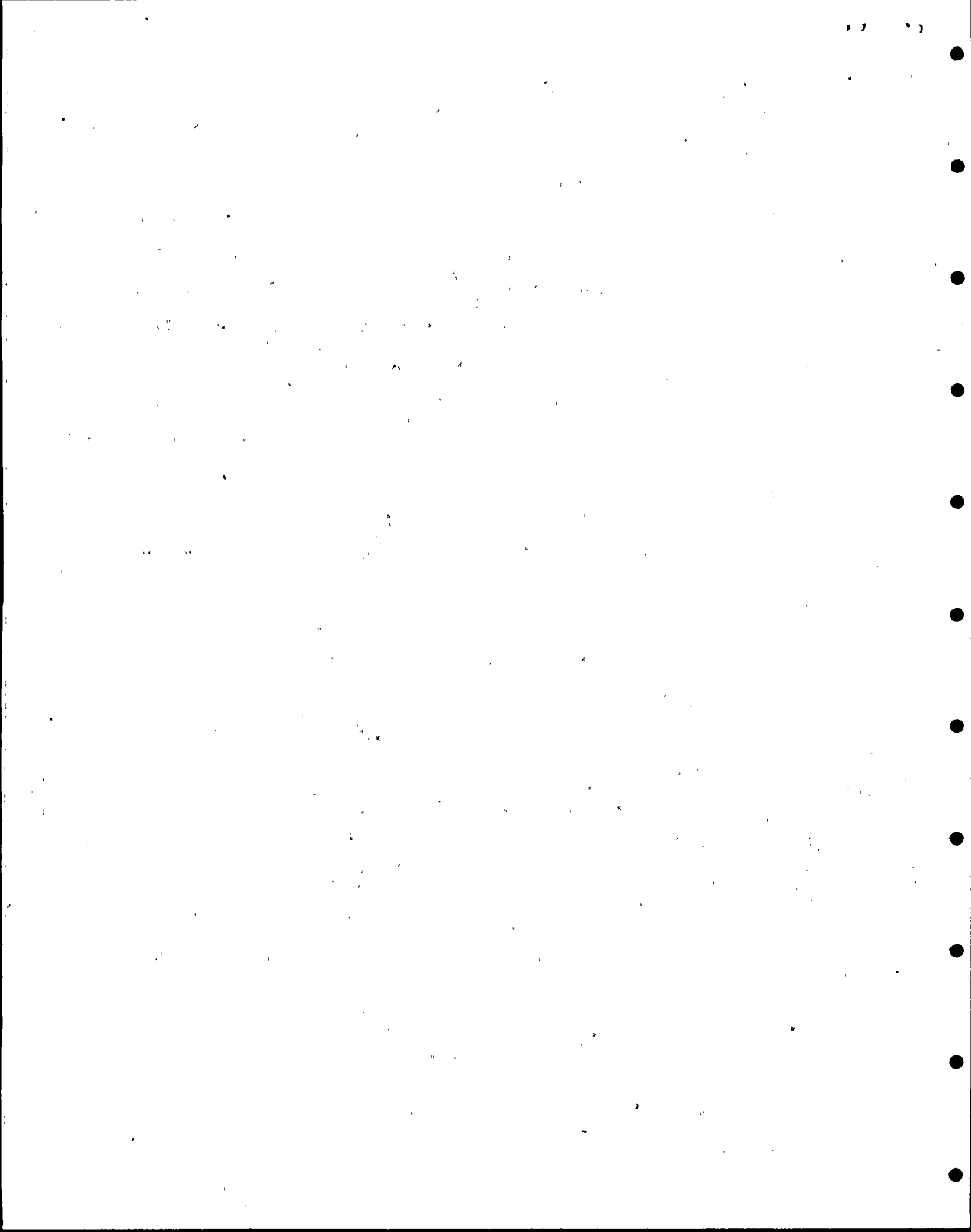
2 MR. STERLING: Let me just elaborate on what I am
3 saying. It is up to the licensee to assure himself that
4 what is being done is adequate. A lot of these reports that
5 the vendors put out are rather complicated, and to adequately
6 show to myself if I were reviewing whatever I put down, by
7 explaining a justification in my own words like they are
8 doing there, I have assured myself that I understand what
9 they are doing and that it is satisfactory to my way of think-
10 ing.

11 I had one other point. Since this was done before,
12 on Exhibit VI-1, you have your time requirement at zero minus
13 30.

14 MR. CARSON: No, that is zero to 30.

15 MR. STERLING: Zero to 30, I'm sorry. In the next
16 exhibit, you said that your radiation was under review. Your
17 time required is also under review I take it now as far as
18 margins. You have to add that hour margin in there.

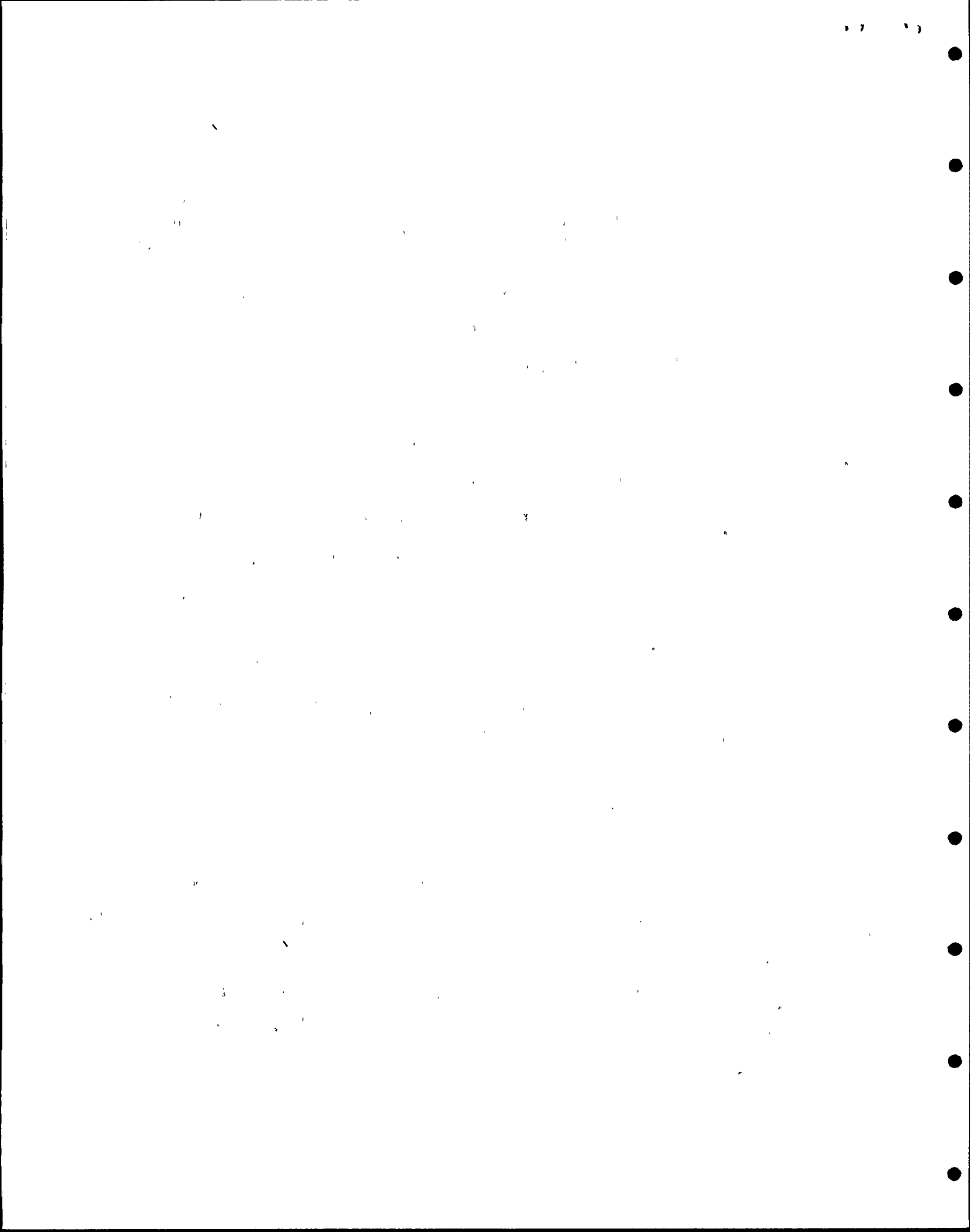
19 MR. CARSON: This is one of the problems that we had
20 with that specific requirement in 0588 where they mentioned
21 equipment to be operational for an hour, and that requirement
22 is specific for equipment inside the containment first of all
23 in 0588. One of our questions is how far into the DBA do we
24 look. It says seconds or minutes, and how many minutes is
25 minutes. Is that 1, 5, 10, or 250? Then do you add an hour



1 on top of that? So we do have some problem with that
2 particular requirement.

3 MR. STERLING: Is that the case? Is that one hour
4 only for inside the containment? Does somebody know?

5 MR. CARSON: Do we have a copy of 0588? I'm sorry,
6 that is under the section called margins in Category I of
7 0588 on Page 15, and it says some equipment may be required
8 by the design to only perform its safety function within a
9 short time period into the event, that is, within seconds or
10 minutes, and once its function is complete, subsequent
11 failures are shown not to be detrimental to plant safety.
12 It says equipment in these categories is required to remain
13 functional in the accident environment for a period of at
14 least one hour in excess of the time assumed in the
15 accident analysis. So it is not applicable only to the
16 in-containment equipment. This sequencer and safety actuation
17 system actually operates and performs its required function
18 in the range of 30 to 50 seconds because it sequences the
19 equipments that are added to the diesel to perform whatever
20 functions are necessary to mitigate the consequences of the
21 accident. So a 30-minute period in terms of margin as
22 applied in 323-74 where they ask for 10% on time margin is
23 several hundred percent, but in terms of 0588, if you add an
24 hour to that period, you would be talking of 60 minutes plus
25 30 or 40 seconds. We would see no problem in having this



1 equipment operate under those conditions, since it is in
2 continuous operation through the life of the plant.

3 MR. STERLING: Do you intend to upgrade that block to
4 show an hour and 50 seconds?

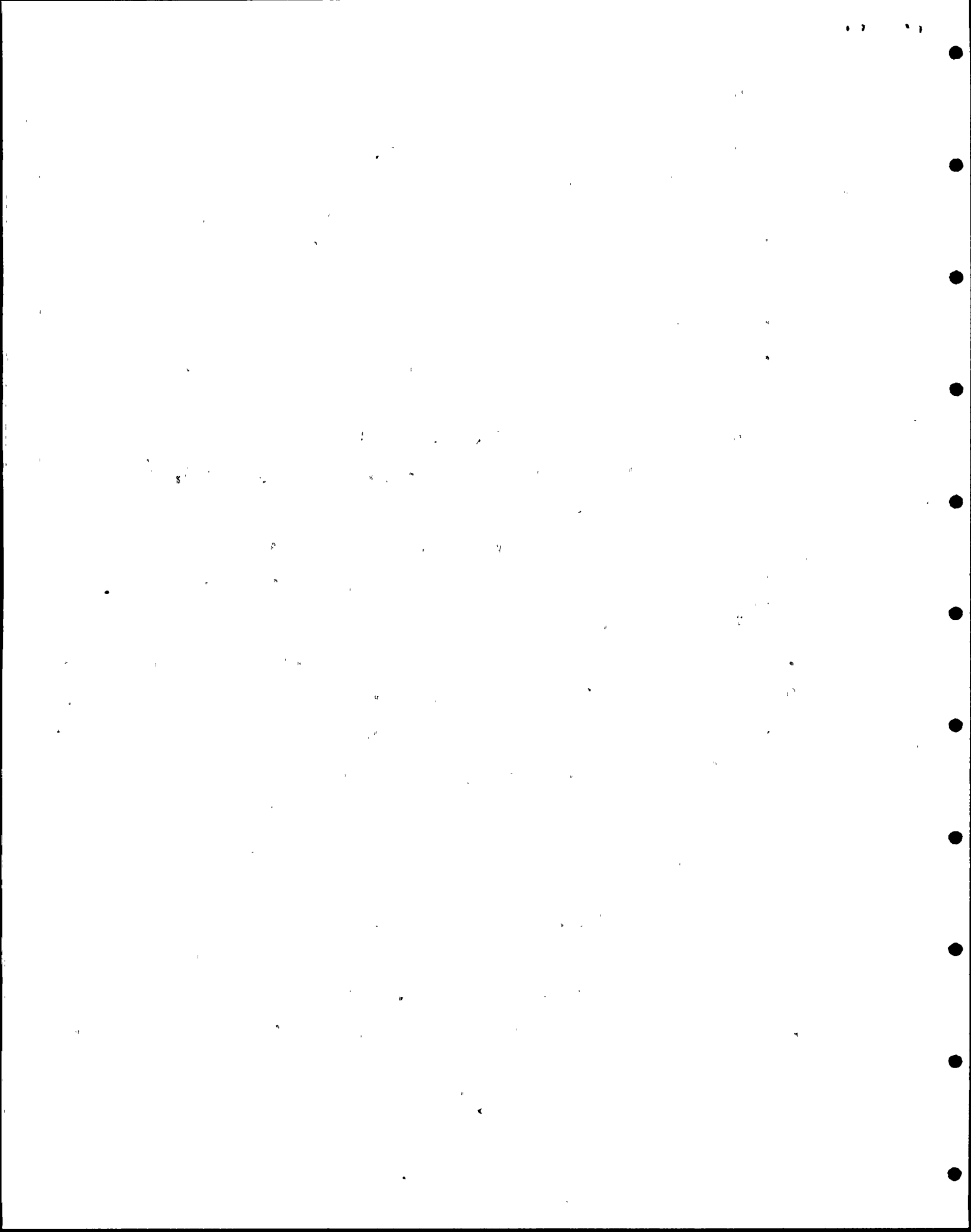
5 MR. CARSON: We would not anticipate that we would go
6 back and make additional testing, but we will justify the
7 fact that it could operate for an additional period of one
8 hour, since, as I mentioned, it operates continuously in any
9 case and is in this highly controlled area where none of the
10 effects of the accident really come into play with this
11 particular equipment.

12 MR. BARROW: It looks like John Allen is going to
13 make me ask the question. I will just make a statement.. A
14 lot of argument has been made about this where we have had
15 discussions about this one hour thing and there is a lot of
16 leeway. You could argue it never would have to operate after
17 the first five seconds or 20 seconds or whatever, but this
18 one is kind of unique in that if you had a LOCA and you were
19 operating sequenced and a half-hour later or an hour later,
20 if you got a loss of power, the sequencer would have to
21 operate again.

22 MR. CARSON: That's correct.

23 MR. BARROW: So this may be one of the cases where
24 that could conceivably be important.

25 MR. CARSON: In that regard, for the hour's operation,

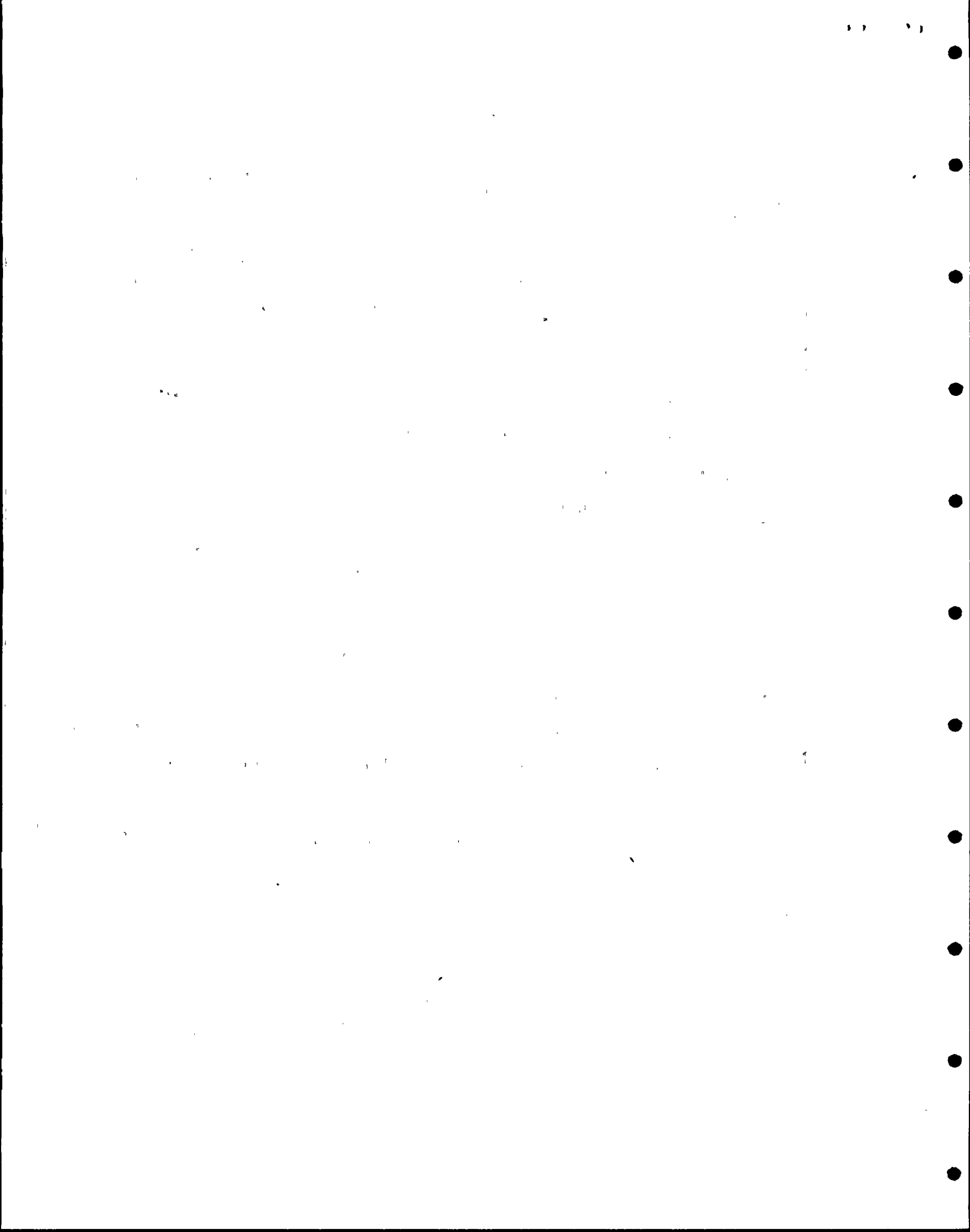


1 we would also point out that in 0588, the principal
2 discussion there is in regard to equipment in harsh environ-
3 ments to make sure that that equipment could operate in
4 the DBA environment, and there is no harsh environment here.
5 The equipment operates energized continuously. It has been
6 shown in the testing in the qualification that it will operate
7 numerous times during the period, and we therefore feel that
8 there is no specific requirement to again show that it might
9 operate at times zero and then again at time 30 minutes and
10 again at time 60 minutes.

11 MR. BINGHAM: I think, John, getting back to the basic
12 question at hand, that we said yesterday we would be
13 re-reviewing the documentation, and in this particular case,
14 it may be of advantage to clarify the form to indicate that
15 that issue had been dealt with and was deemed acceptable and
16 appropriate for this piece of equipment, since it is not in
17 a harsh environment, or any other piece of equipment that we
18 are looking at. I think our statement yesterday was that we
19 were not aware of equipment we were responsible for that was
20 in a harsh environment that we would have difficulty with
21 the one-hour requirement, but that we would have that under
22 review.

23 MR. ALLEN: Any further questions?

24 MR. NOONAN: Just one small one. Earlier, you used
25 the term "burn in" test. Do you require all your suppliers



1 to do a burn in on your equipment?

2 MR. CARSON: For equipment which contains this type
3 of components, electronic type components, the vendors will
4 normally do a burn in test and we would look at their
5 procedures and their test programs to see that they have in
6 fact operated the equipment for some long period of time prior
7 to the point where they would do their baseline testing. We
8 don't specifically require them in our specifications to do
9 that.

10 MR. BINGHAM: Just a minute. In some specifications,
11 we do require that. On some specifications, we do, and, John,
12 without looking at the details, I don't think we have the
13 people here that could tell us whether this particular one
14 required burn in. Generally, that is important to us.

15 MR. ALLEN: In any case, you get burn in by default
16 just by acceptance testing.

17 MR. BINGHAM: Yes.

18 MR. CARSON: But it would certainly be looked at in
19 the procedures.

20 MR. NOONAN: I guess the point I was trying to make
21 was that you do your burn in tests, and particularly if you
22 do a thermal cycle burn in test, it is a good method to find
23 manufacturing defects.

24 MR. BINGHAM: Yes.

25 MR. NOONAN: It increases reliability of the equipment

1 in the field.

2 MR. ALLEN: Vince, would you like that to be an open
3 item to determine our policy on burn ins?

4 MR. NOONAN: Yes, I think I would like for it to be
5 an open item. In fact, I encourage it to be an open item.

6 MR. ALLEN: Okay, we'll get that down as an open item
7 then.

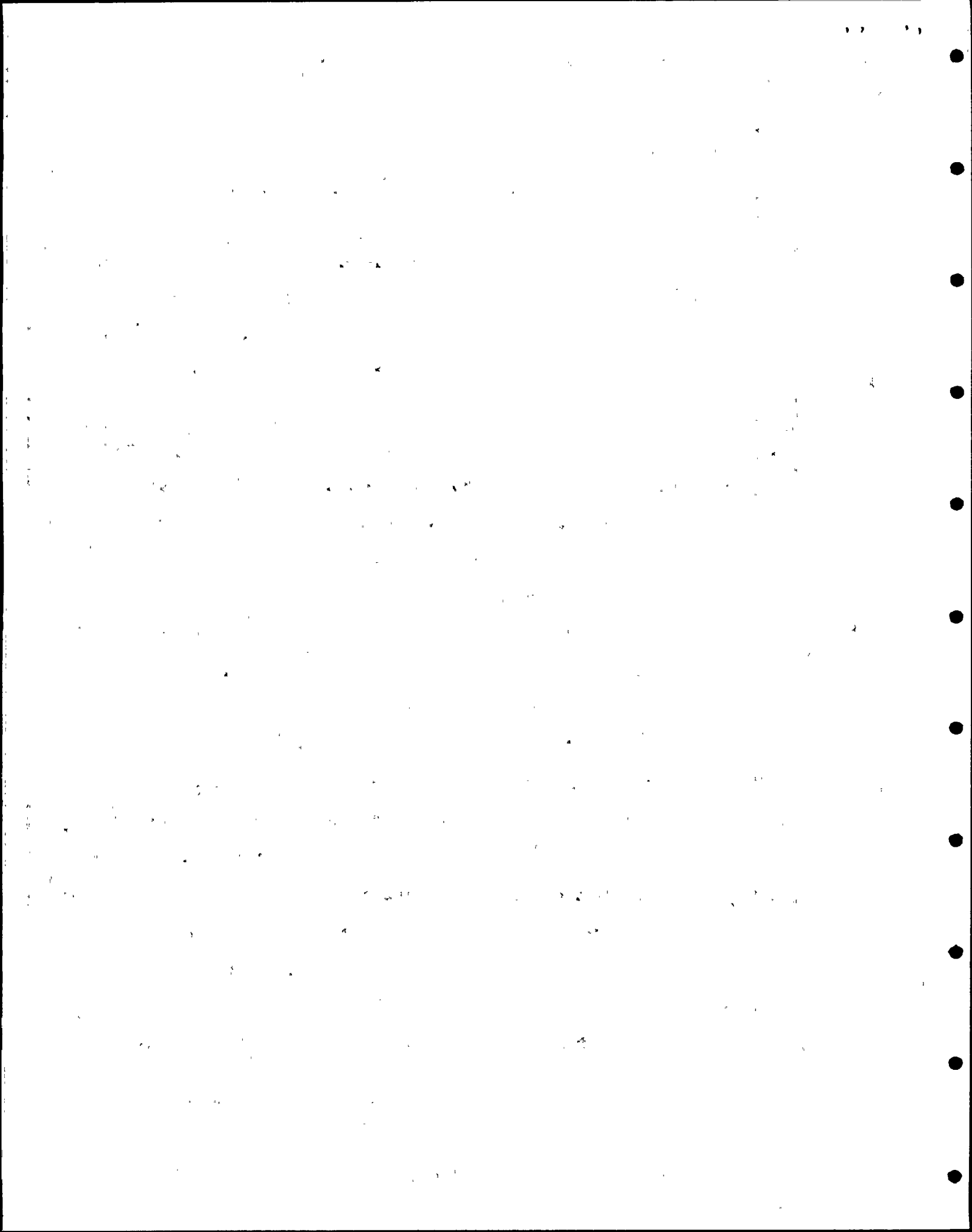
8 John Barrow.

9 MR. BARROW: I can clarify it a little bit. On our
10 specifications when vendors are using IEEE 650 to qualify
11 the equipment and 650 calls for burn in like battery chargers,
12 generator inverters, and radiation monitors, we have had burn
13 in done in those qualifications.

14 MR. CARSON: But, again, that is coming from the
15 suggested procedure for the qualification, that burn in.

16 MR. ALLEN: Additional questions?

17 DR. ROSZTOCZY: The piece of equipment that you
18 describe here is not a system in itself and, therefore, it
19 doesn't have a complete function. It was only a component of
20 a system. In order to accomplish the function, there are
21 other portions of the same system that must function. Other-
22 wise, you can't perform. The other parts include sensors,
23 amplifiers, cables, actuators, and so on. There has been
24 nothing on this sheet which would indicate what other pieces
25 have to perform their function and nothing that would pull

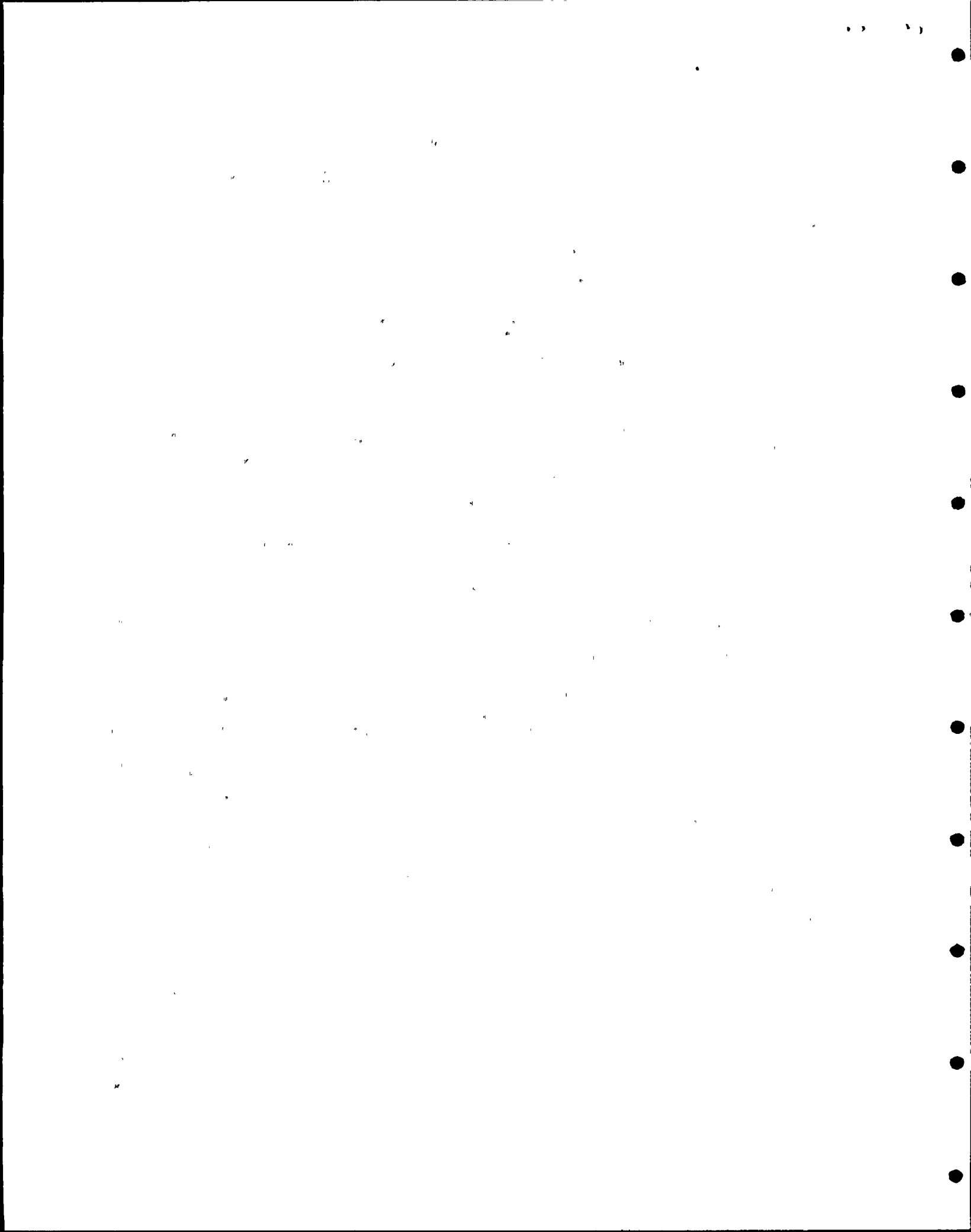


1 these pieces together and indicate that the overall system
2 is going to function. Is there a second level beyond these
3 sheets that you fill out for systems as opposed to components,
4 and then is there a certification, some signatures on that
5 other sheet indicating that somebody reviewed this system and
6 checked that each component sheet has been filled out like
7 this one and that the overall system is going to function.

8 MR. BINGHAM: No, there is not.

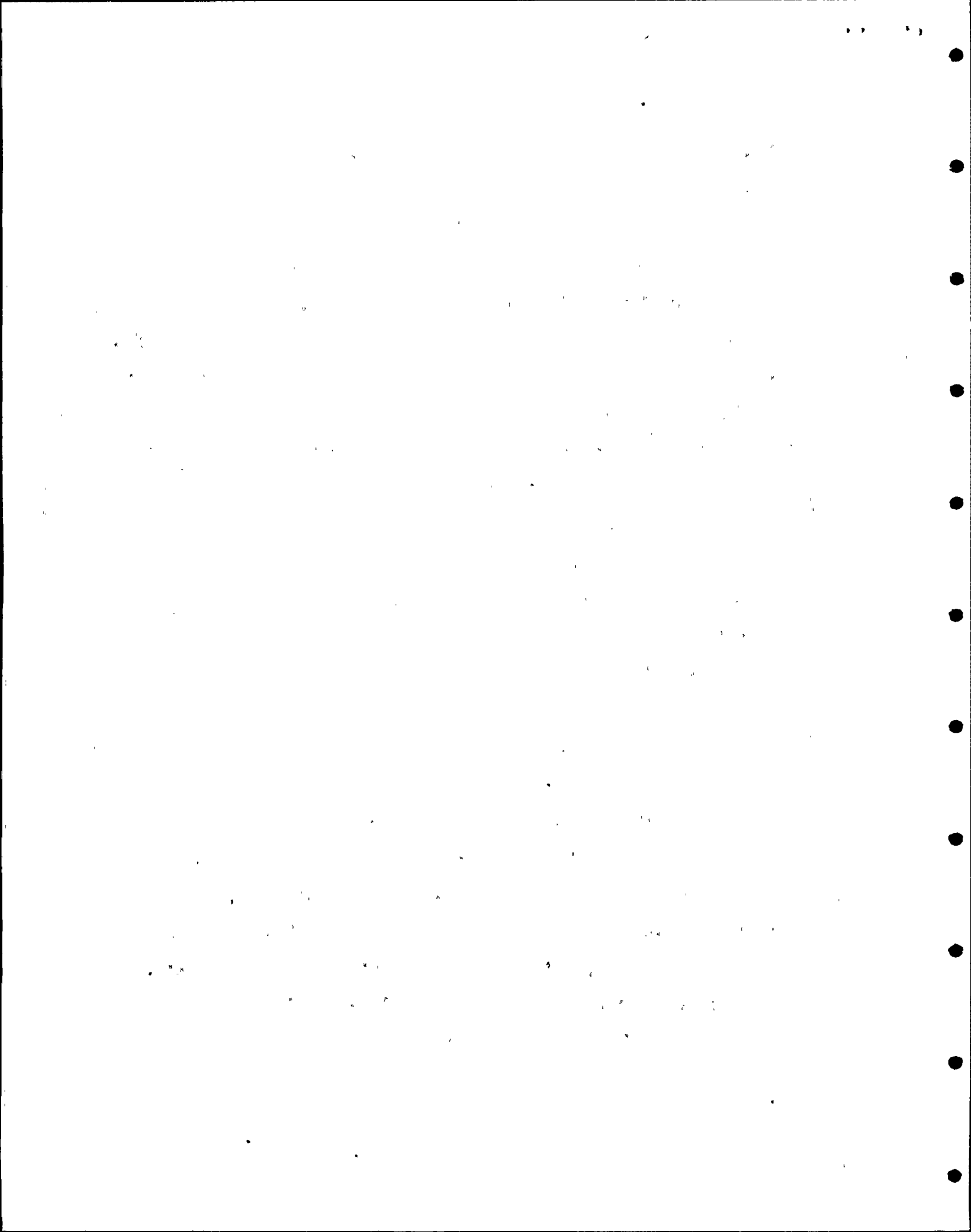
9 DR. ROSZTOCZY: How do you know then that the system
10 is going to function? Let me phrase the question to APS.
11 How will you know it, this just being an example? How will
12 you assure that this system is going to function?

13 MR. BINGHAM: I think the way that we would cover this
14 particular issue is through the way that we start the program
15 with a list that says these are all the items that have to be
16 qualified, and then in our specifications we assure that all
17 the inputs are handled and are tested. We talked yesterday
18 about any abnormalities that are noted in the tests would be
19 put back into the analysis of the particular component and
20 individuals would be notified to assure that those issues
21 were handled. Therefore, we have determined that the
22 interfaces are met. That means this component that we took
23 out of this system now does everything it is supposed to do
24 based upon our overall analysis of what it was supposed to do
25 in the complete system. So we believe that the way it has



1 been covered is that we started from the cradle to the grave,
2 so to speak, and we separated out pieces of equipment to test
3 because of certainly the impracticability of putting the
4 whole plant in a chamber of some kind and testing it, and we
5 believe that is how we take care of this particular issue.
6 My response to you that there wasn't a final check-off sheet
7 that says yes, indeed, we looked at this and again confirmed
8 that everything was in order was true. We do not have that
9 sheet. But we believe that we have safely covered the
10 application of qualifications.

11 DR. ROSZTOCZY: The approach as you are describing it
12 appears to me rather weak. The final requirement is that
13 the licensee or applicant has to certify that all the systems,
14 all this equipment, is going to perform the intended function
15 and they have to certify this under oath. As you submitted
16 it to us, it seems to me that there is no direct way to
17 establish that conclusion. You are saying that you started a
18 system or a program and you assumed that that system or
19 program worked correctly, and even if you do it that way,
20 no clear boundary is drawn here. I don't know where does this
21 system end and where does the next one start. There must be
22 some connection to this, and it is not clear where the
23 boundaries are, either. So I think it would be extremely
24 important that at the end you pull all of this together and
25 somebody takes a look at what has been done in terms of the

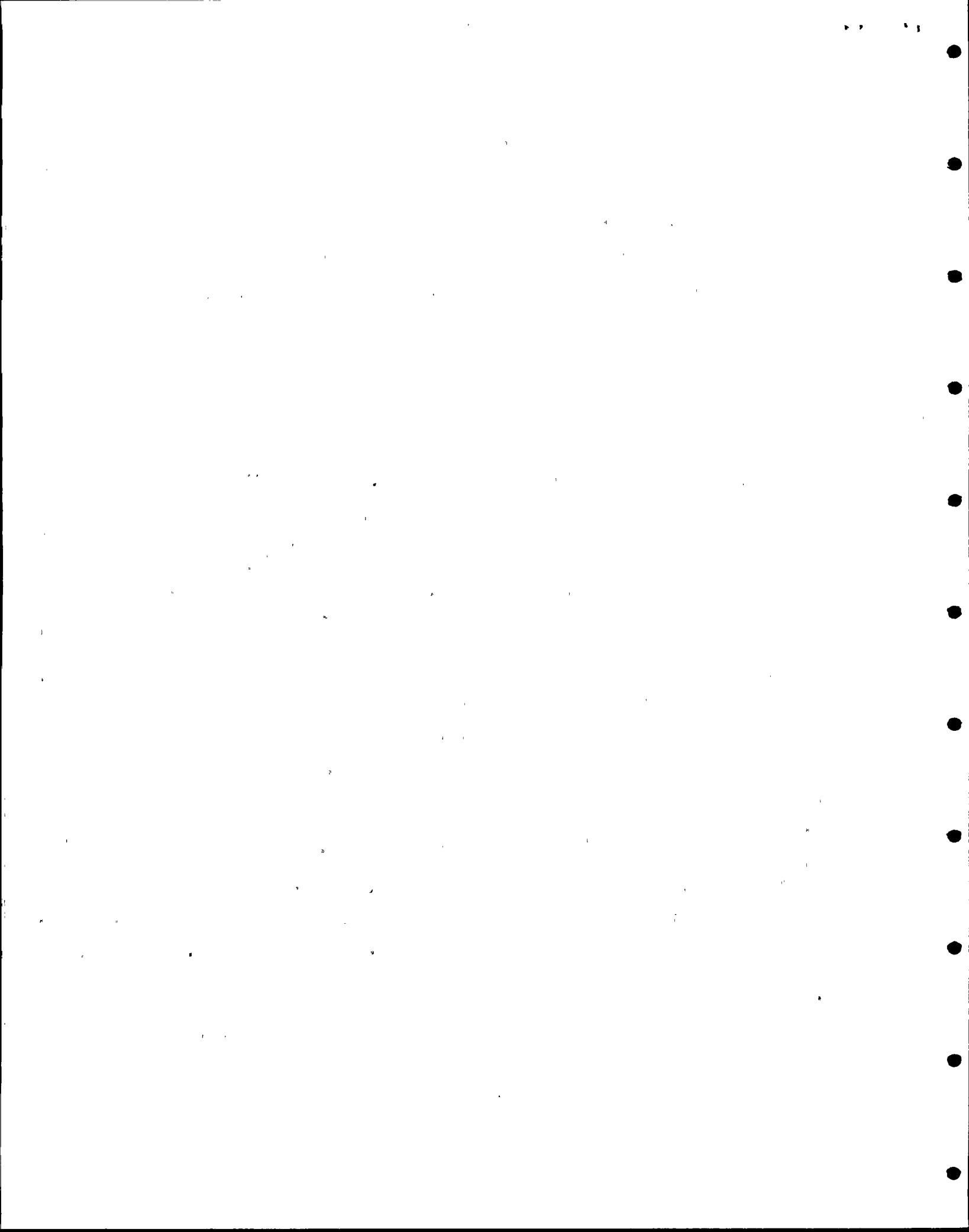


1 components, and when you add those together, does this
2 establish the qualification of the entire system. In this
3 case, I don't know how many components there are, but there
4 could be easily a dozen or more components, and if something
5 was left out, just one piece was left out somewhere, you
6 wasted your time.

7 MR. BINGHAM: That's true. I don't think we disagree
8 with that and, Ed, I am sure you want to make a comment, but
9 let me just add a few thoughts. What we are assuming in our
10 presentation today is that the board understands all of the
11 systems. I am sure that is not the way we should be going,
12 but the reviewer or responsible person that knows that system
13 knows the components, would have the list of the components
14 that have to be checked, would know the interface, and, by
15 review, could using their professional judgment assure
16 themselves that all of the interfaces were properly addressed.
17 Now, I guess John or Ed could --

18 MR. VAN BRUNT: Let John comment first and then I would
19 like to comment on it, too.

20 MR. ALLEN: A couple of things. The ultimate test of
21 the system, of course, is during preoperational testing where
22 you actually make sure that the motors start, or whatever,
23 that the control room isolates. That gives you a total test
24 from cradle to grave, I might say, and whether the system is
25 going to work. The way we qualify it is with each individual



1 system, we qualify this system and then, for example, we've
2 got a radiation monitoring system that feeds into this system,
3 it is qualified, and then we've got the actuation devices
4 on the other end, for example, maybe some switch gear, and
5 it is qualified all to each individual environmental qualifica-
6 tion, because some of it might be in different locations in
7 the plant. So what I guess you are saying is who goes and
8 looks at each one of these systems to make sure they qualify.

9 DR. ROSZTOCZY: Yes. I am not sure what is the case
10 here, but this might even be a good example that part of this
11 might be coming from a different vendor. Is there any
12 Combustion scope in this system?

13 MR. ALLEN: Input.

14 MR. CARSON: Just inputs, contact closures from remote
15 operators.

16 DR. ROSZTOCZY: How about the sensors? Containment
17 pressure has to be measured for this system.

18 MR. CARSON: That is a contact closure.

19 DR. ROSZTOCZY: Who is responsible for the instrument
20 that measures containment pressure?

21 MR. BINGHAM: That is balance of plant.

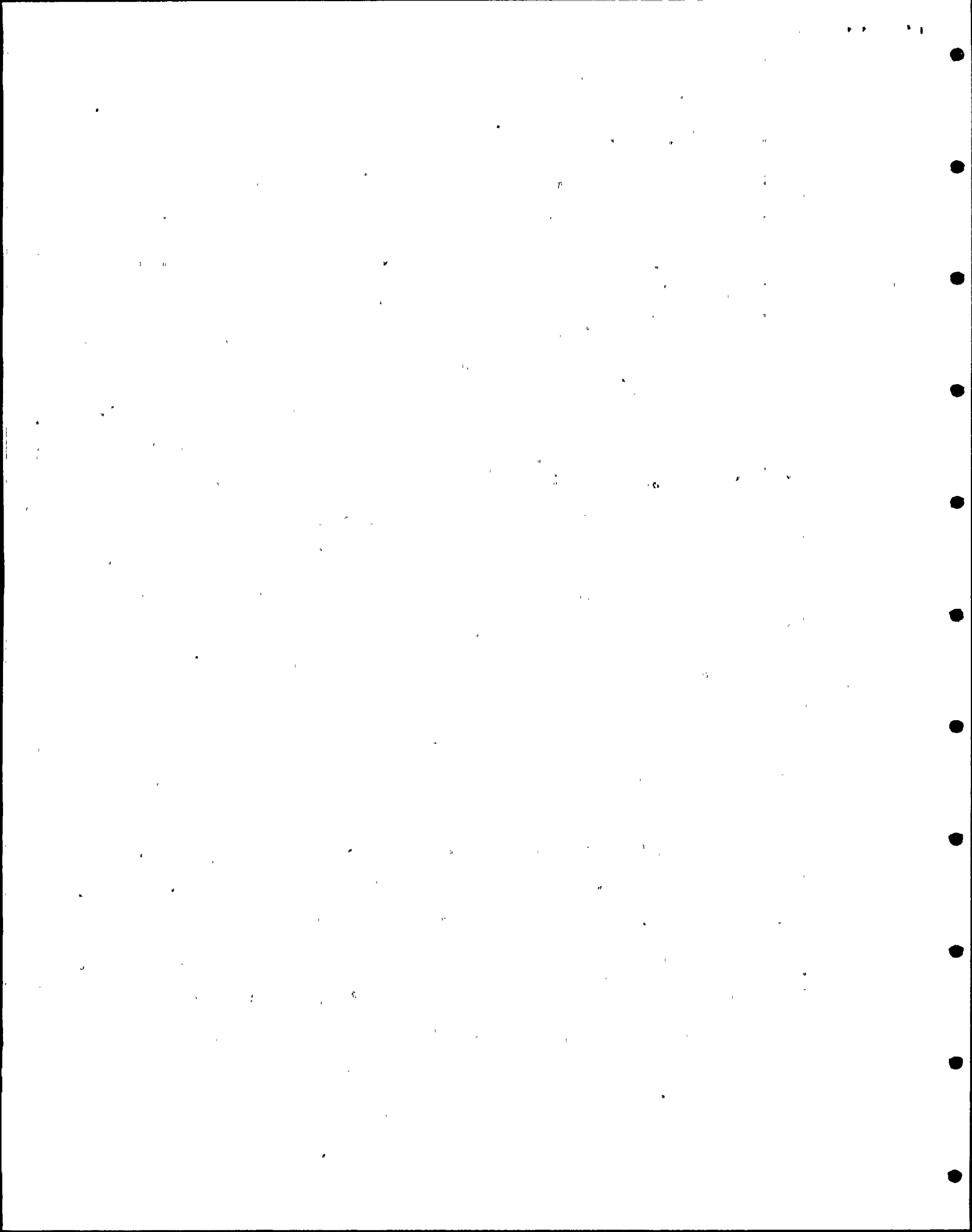
22 DR. ROSZTOCZY: The reactor coolant system pressure.
23 Here is a system which has components part of which is
24 balance of plant, part of which is in the CE scope, and there
25 isn't a single person who has looked at the entire system and

1 said that those components, some of them coming from one
2 source, some coming from another source, some might even be
3 coming from a third source, that all of those added together
4 establish the qualification of the system. That thing that
5 someone mentioned doesn't do this job. You can do all the
6 testing you wish and startup, that is not going to establish
7 qualification for an accident condition.

8 MR. ALLEN: No, it doesn't establish qualification.

9 DR. ROSZTOCZY: A large number of the components in
10 this system are in the harsh environment, one which was on
11 the board is not in the harsh environment, but a large number
12 of components of this system are in the harsh environment
13 and they have to be qualified for the harsh environment. I
14 think it would be important that at the end, somebody pulls
15 all of this together and I think it would be wise if he would
16 have to put his signature that he has done this, looked at
17 all these pieces, is certain nothing was left out, and
18 establishes the qualification of the overall system, the
19 overall function.

20 MR. VAN BRUNT: I understand what you are saying,
21 Doctor, because from my perspective, the whole is the sum of
22 the parts. We can start with the whole system with an overall
23 requirement for the system and then we specify all the parts
24 and we are going to verify that all the parts are right and
25 they go in to make up the whole. That would include CE stuff



1 as well. So I have a little bit of difficulty in understanding
2 if I go in and specify a whole system and specify all the
3 environmental requirements and that adequately gets put into
4 the equipment and the equipment is adequately tested and
5 demonstrated, each of the individual components, why it is
6 then necessary as long as we've got all the components in to
7 go back and just add all those up and be sure that we did them
8 all, because if we did our job right going in, we should have
9 them. However, I will commit that we will go back and take
10 a look at this and verify whether we believe there are any
11 loopholes in the program we have which would permit something
12 to slip by.

13 MR. ALLEN: Did you get that, Terry?

14 MR. QUAN: Yes.

15 DR. ROSZTOCZY: Now let me see Exhibit VI-1. Under
16 Design Basis Accident, this indicates loss of coolant
17 accident and main steam line break. What is the significance
18 of that? Is it an indication that this equipment has to
19 function only after those two incidents and there are no
20 other cases when this system has to function?

21 MR. CARSON: That's right. First of all, let me
22 clarify. In this system, the component is called the BOP
23 ESFAS, Engineered Safety Features Actuation System. This
24 particular item purchased under this purchase order JM-104
25 is not the entire Safety Features Actuation System. It is

1 only that portion of it which is located in the control room
2 which receives input from outlying sensors and sends
3 actuation signals to outlying equipment. It is primarily
4 a relay cabinet. That is the component, the black box, that
5 we are looking at here, and that relay system is a grouping
6 of relays which takes a contact closure from a loss of voltage
7 indication or from a high pressure or reactor coolant system
8 malfunction, takes that relay closure and converts it into
9 some intelligence and sends it to a motor and tells it to
10 operate. That has to operate when either of these accidents
11 occurs and that is its only function. It does not normally
12 do anything during normal operation of the plant except be
13 ready to perform its function in an accident.

14 MR. ALLEN: Bob, there is an additional design basis
15 accident, so I think that is what Zoltan is getting at, from
16 the loss of power.

17 MR. BINGHAM: It has come to our attention that this
18 form as it was filled out may be misleading, particularly
19 with the discussion that we have had, and probably for this
20 particular piece of equipment, since there is no harsh
21 environment, there probably should have been an N/A in this
22 column and this particular column should reflect the conditions
23 for which it has to operate. In this particular case, it
24 doesn't see any harsh environment. Dennis, what might be put
25 in that column?

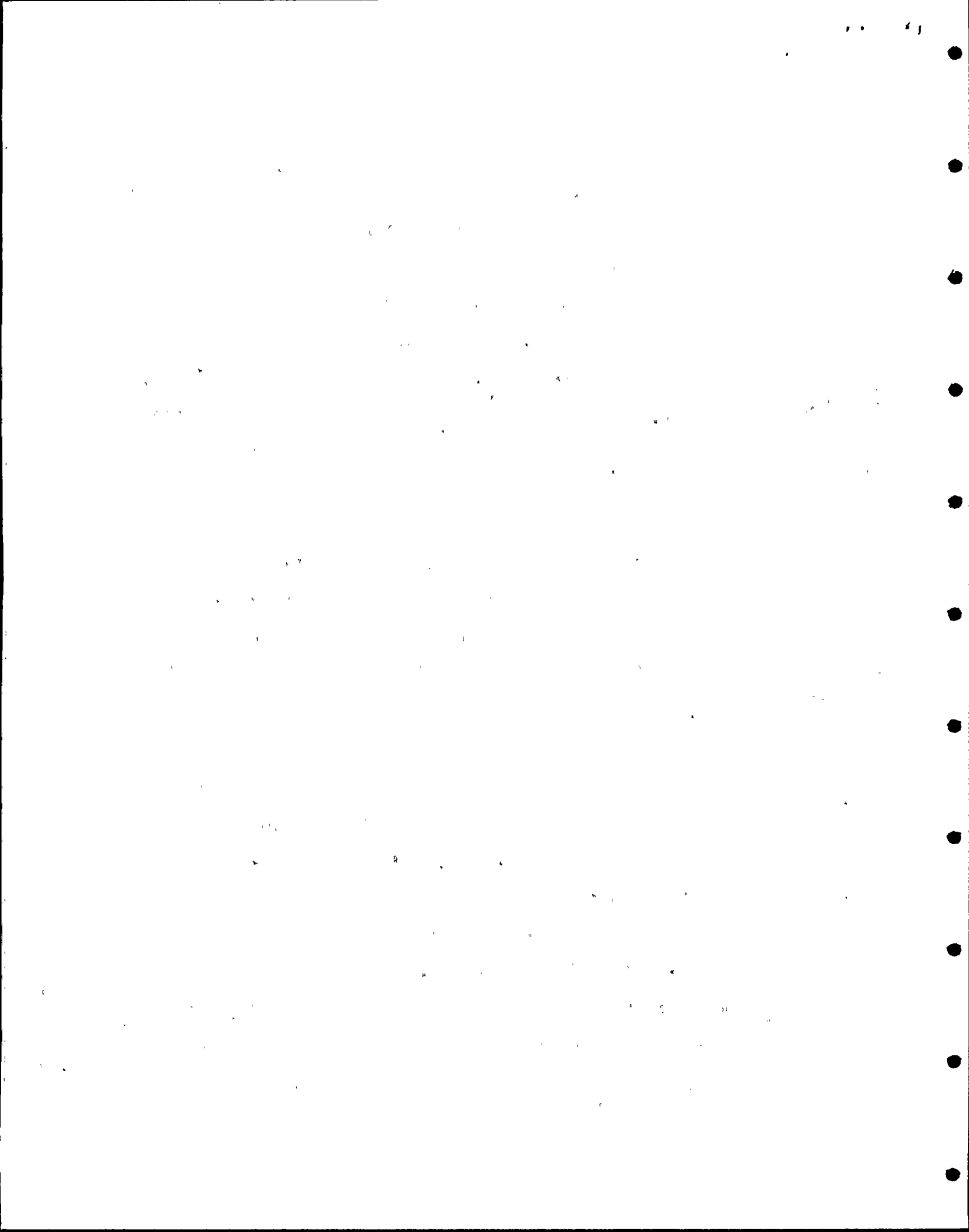
1 MR. KEITH: I think on that one, you would put an N/A
2 also for equipment that is in a nonharsh environment, because
3 that is for a qualification concern.

4 MR. BINGHAM: We will be reviewing that, John, and
5 this can continue as an open item to make sure that with our
6 re-review, we do pick up all these issues.

7 DR. ROSZTOCZY: I think there are two obvious problems,
8 one of them that was mentioned here that the identification of
9 the component is incorrect on this sheet because it doesn't
10 clearly and uniquely identify the component that we are talking
11 of. Instead, it has the name.

12 MR. BINGHAM: Well, this does right here (indicating),
13 you see. The tag number identifies the piece of equipment.
14 I realize for the board that it is difficult for you to
15 understand what J-SAB-CO2B is, but to somebody that means
16 something.

17 DR. ROSZTOCZY: Let me make a suggestion then. I think
18 it probably would be helpful for your work to specify the
19 component by its name, whatever name you give to it. For
20 example, if this is one ESFAS actuation relay or something,
21 then write that in. It would be beneficial to your work to
22 also identify the system. By doing so, it would be easy to
23 pull together all of those components that form one system,
24 and then whoever is doing the overall review could check if
25 everything has been properly qualified. So probably it would

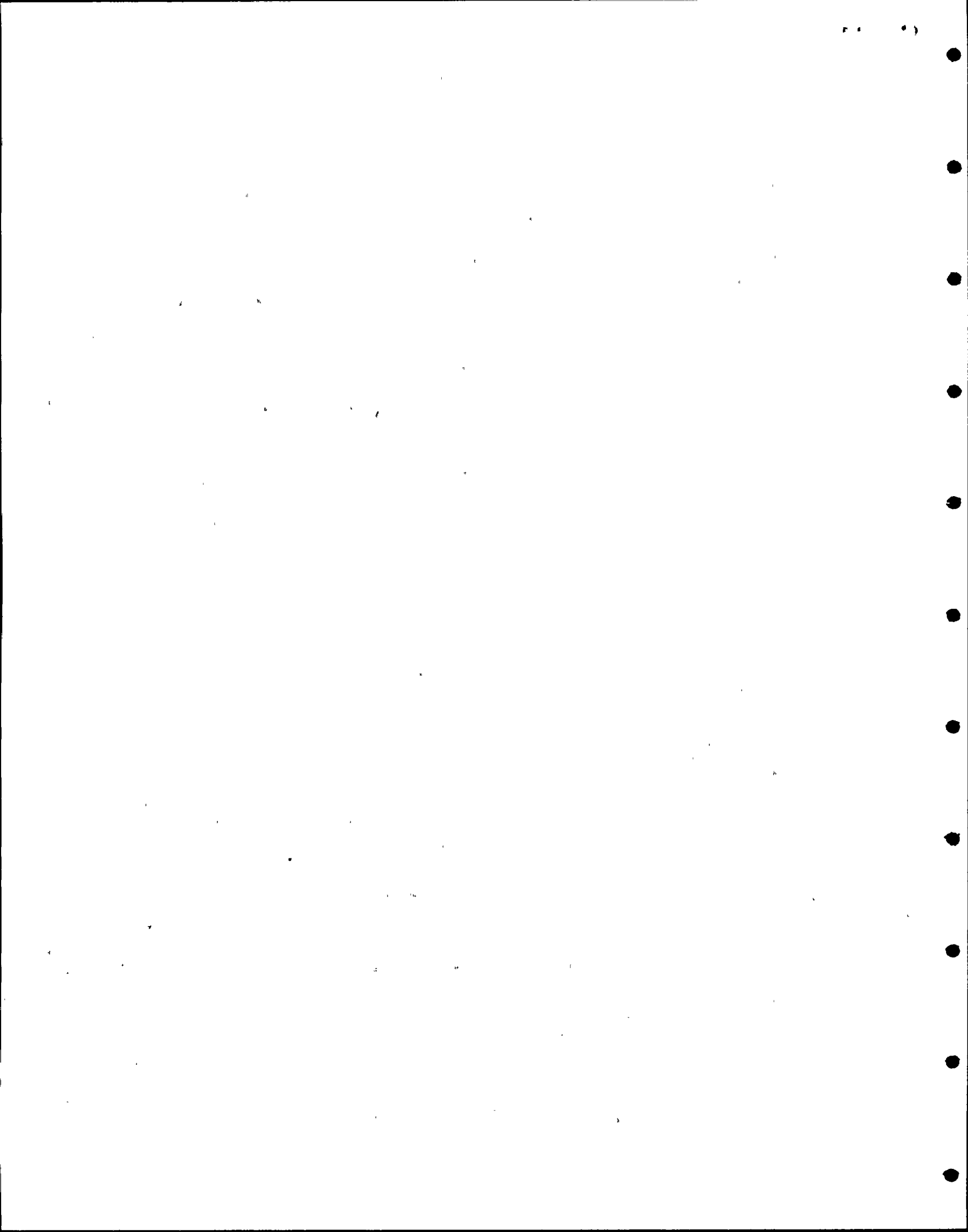


1 be appropriate to have both a system identification and a
2 component item identification on this sheet.

3 Going back to the design basis accident, one would
4 expect there to see every accident for which it has to
5 function and would possibly establish some conditions for
6 this, and I would expect to see exactly the same for every
7 component of this system there, because the system has a
8 function and, in order to perform the function, all components
9 have to work, so each of them should have the same there.
10 When I go to the next component of this system, which happens
11 to be in the harsh environment, those components become very
12 important, and by omitting something from there like loss of
13 power or steam generator tube rupture could result in inappro-
14 priate qualification of some of the components.

15 MR. BINGHAM: I think what we need is to have some
16 explanation of the shorthand that we use, because we are
17 very diligent in following systems throughout all of the
18 operations in design of the plant through these type numbers,
19 what safety train, what channel, what system they are in,
20 and they are followed all the way through all of the plant.
21 I think we understand your concern and perhaps when one is
22 aware of the nomenclature, they then can take this particular
23 tag number or identifier and can relate easily to the piece of
24 equipment.

25 DR. ROSZTOCZY: Is there any code number or letter in



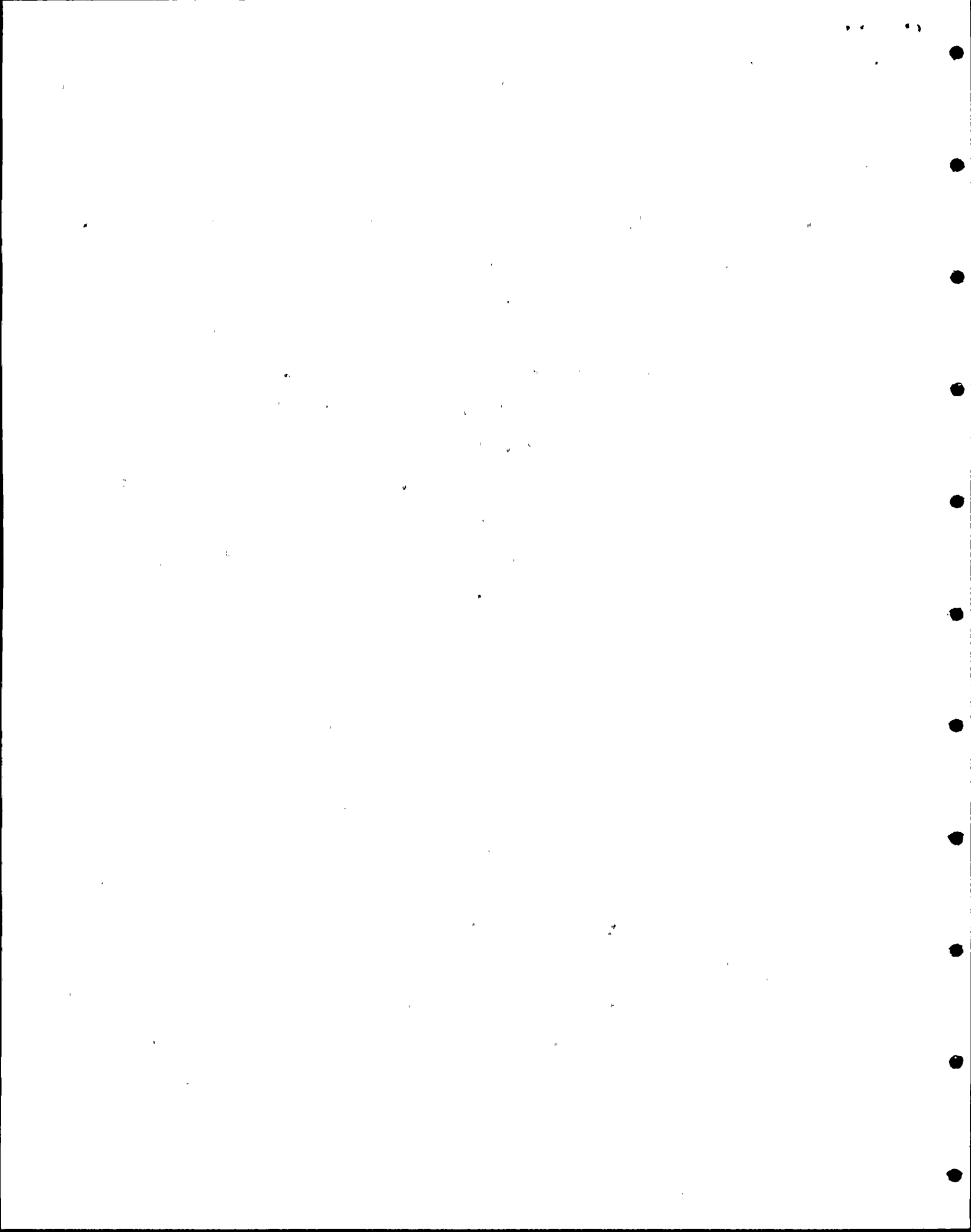
1 the number which would uniquely tie this component to a given
2 system?

3 (Thereupon a brief off-the-record discussion ensued,
4 after which proceedings were resumed as follows:)

5 MR. ALLEN: Okay, Bill.

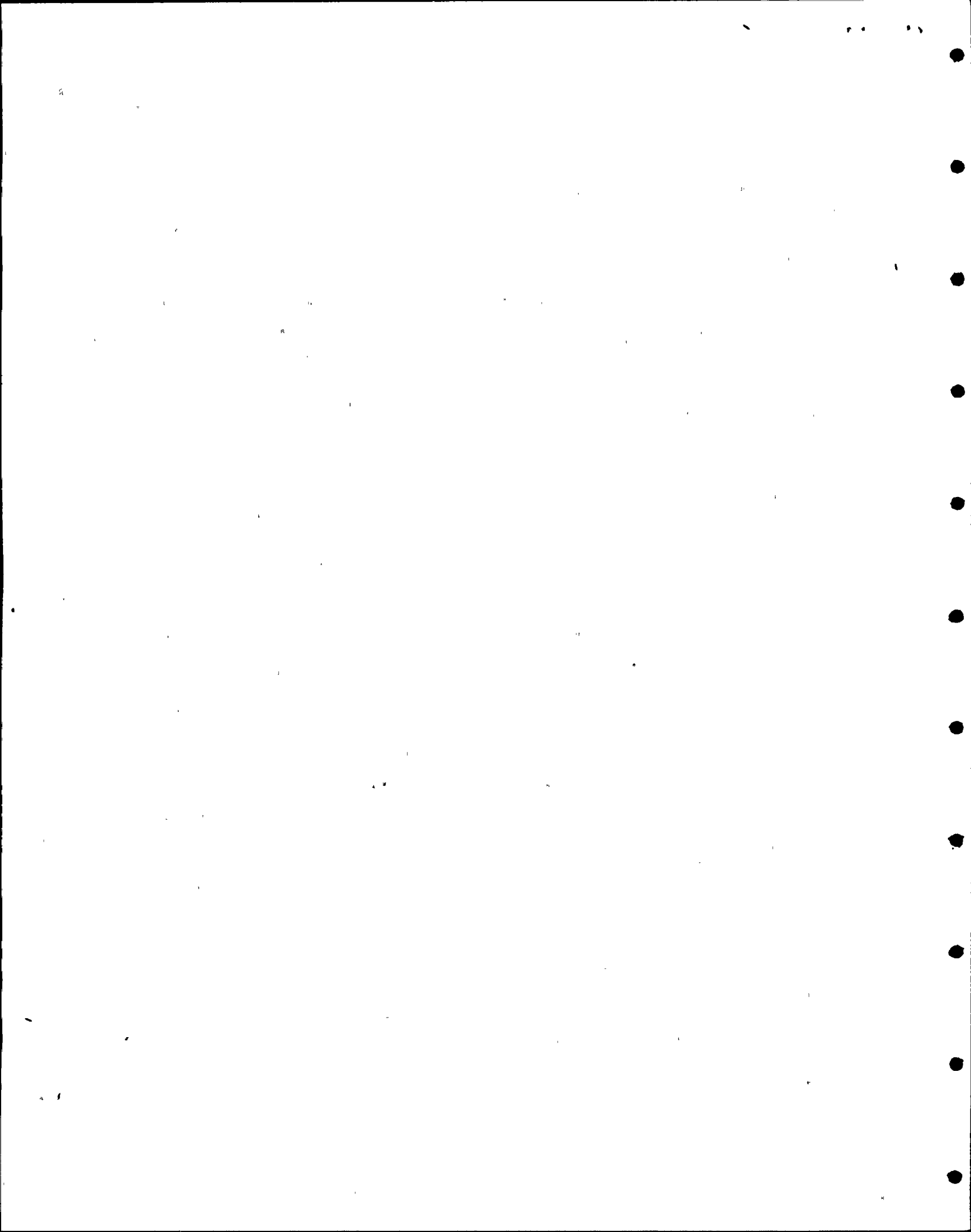
6 MR. BINGHAM: I think the way we would like to leave
7 this with the board is that we will review the concerns that
8 Dr. Rosztoczy has brought up, and I would just like to
9 indicate that my previous statement that we are very diligent
10 in being able to understand where this equipment is throughout
11 all of the plant by the designator does hold and there are
12 means to take that number and find out where that system is.
13 So let's leave it at that point.

14 MR. VAN BRUNT: Just as a follow-up on that, I wanted
15 to indicate to Dr. Rosztoczy that, speaking for the applicant,
16 we are very concerned about the same thing you are. We want
17 to be able to track back to ground zero, if you like, and I
18 would second what Bill said, that we have worked very hard
19 since the beginning of this job to assure that when given any
20 particular component or any tag number that we can go back
21 through. I think if you were a little more familiar with the
22 systems that we use that you probably could go from those
23 numbers right back through. I don't use them every day. I
24 can't either. But I know that the fellows that work with the
25 stuff every day can track it right back to the system and



1 everything else. I think what you are looking for is there,
2 but we will ensure ourselves that it is.

3 DR. ROSZTOCZY: If I look at the other column, the
4 time column what has been discussed earlier, then the answer
5 is that this certain component is in the control room and
6 that part is not important or not applicable, but you do have
7 another piece, for example, the pressure sensors in the
8 containment, in your scope for which you have already filled
9 out a sheet like this or are in the process of filling out a
10 sheet like this. It is likely that your engineer has the
11 same number that that column has, which is 30 minutes. That
12 will result in inappropriate testing and it certainly would
13 be unacceptable, so maybe you should go back and see for those
14 parts of the equipment which are exposed to the harsh environ-
15 ment what time periods did you use and let's discuss the
16 time a little bit more. The extra hour has been discussed,
17 the one-hour environment. There have been also statements
18 made that it performs its function in a very short time like
19 30 seconds or so. That is not so. This equipment will have
20 to perform a function and you don't know when that function
21 will come after the beginning of the accident. For example,
22 if you look at the spectrum of small breaks, then you will
23 find that, depending on the break size, actuation might
24 happen shortly after the accident or it might happen quite a
25 bit later. There are even break sizes in the small break



1 spectrum which won't even depressurize to this level where
2 this would be actuated. They are, however, actuated on high
3 containment pressure, but with a small break, it could take
4 very long to reach that value. So I don't know where the
5 30 minutes came from. It certainly is not the time that
6 should be on the appropriate sheets for that part of the
7 system that is exposed to harsh environment. That should be
8 looked at very carefully. There are all spectrums of breaks
9 and they don't proceed with the same speed.

10 The other point I think has been very well stated,
11 that even after it performs its LOCA-related first function,
12 this piece of equipment might be asked to perform at a later
13 time again, and that should not be forgotten. Those also
14 should be qualified for a rather long time.

15 MR. ALLEN: Did you have a comment, Carter?

16 MR. ROGERS: Bill, I wonder if you might explain the
17 shorthand of the tag number. Do we have someone here that
18 can do that?

19 MR. KEITH: We have Ed Sterling.

20 MR. STERLING: The J portion is instrumentation.
21 Anybody who can do it better correct me if I am wrong. The
22 S portion of that tag number is the system number, system
23 designator, and A and B are the channel. The CO2 A and B on
24 those two is the cabinet number.

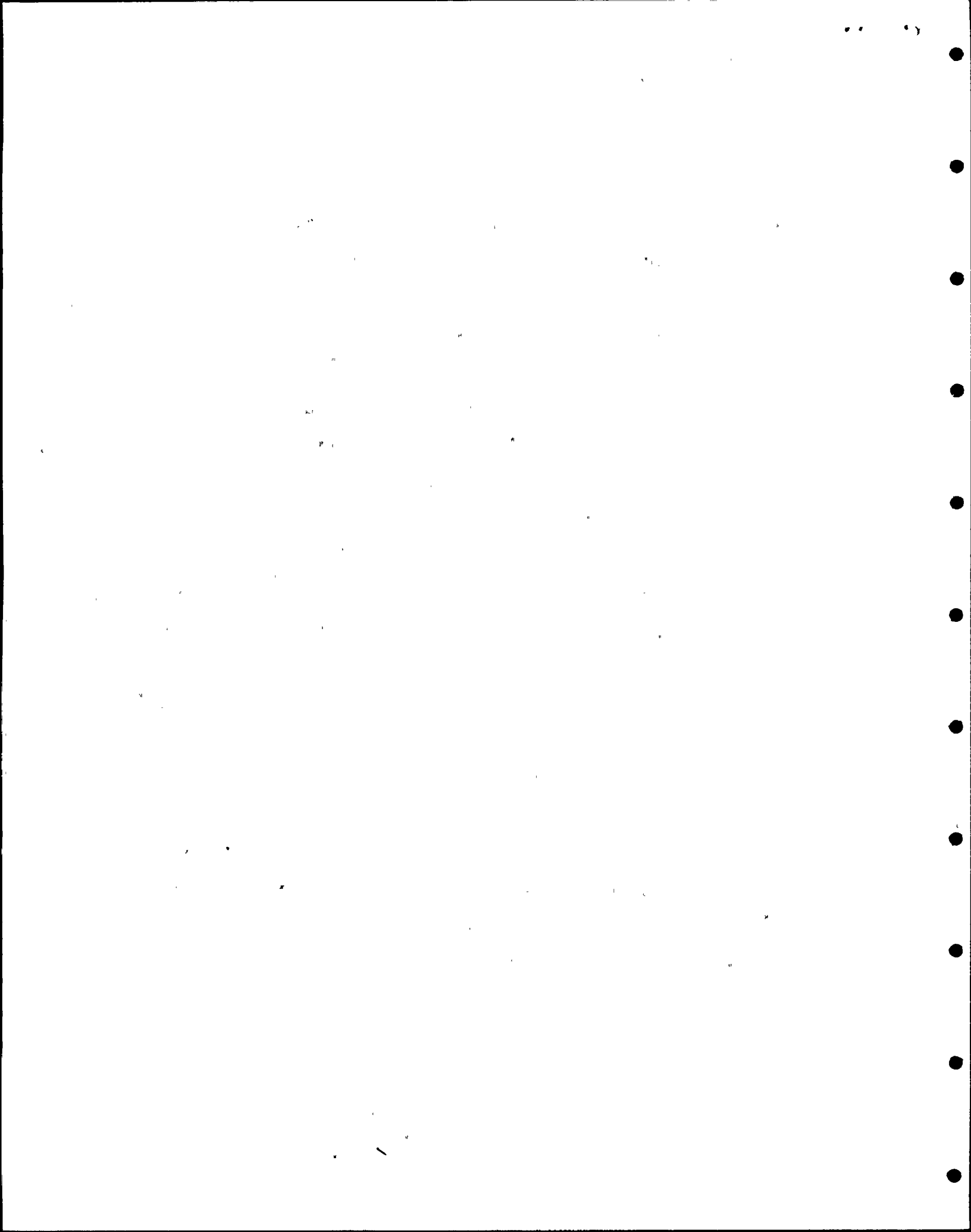
25 MR. CARSON: That is a specific relay cabinet located

1 in Channel A and located in Channel B. There are two items,
2 so there are two of these in each unit in the control room,
3 and it takes inputs from various points and it sends out
4 signals to various points.

5 DR. ROSZTOCZY: Could we have Exhibit VI-6, please?
6 On this exhibit, we see the signatures of two individuals who
7 have reviewed this and signed it. It is not clear what are
8 they signing for. What does the signature indicate here?
9 There is no statement on there of what they are signing, so
10 it leaves that a little bit vague. Is it the purpose of the
11 signature to say that these individuals are certifying that
12 this component has been properly qualified?

13 MR. BINGHAM: Let me give you a little background,
14 Dr. Rosztoczy. First, we have many documents that we review
15 and sign off that we have reviewed them and they meet our
16 criteria from the vendors. We have a form that is stamped
17 on or attached to all the various documents. That also has
18 a signature and has all the legal words on exactly what we
19 have done as far as our review and does release the manufacturer
20 to proceed with the work. In other words, it is our release
21 that really constitutes the document review like a test
22 report, a vendor drawing, whatever other document it is that
23 we have asked to approve before manufacturing proceeds. These
24 sheets are supplemental sheets to assure that we have flagged
25 for the responsible engineer all those items that are

1 important that they specifically review. It is like a
2 checklist that the pilot uses before he takes the airplane
3 off to make sure all the switches are thrown, and so forth.
4 It is our way when we have a very large number of people
5 doing work of assuring, one, consistency amongst the groups,
6 two, that individuals do not forget to check a very important
7 point, and, three, it enhances our training of these
8 individuals as some leave the company and others come on the
9 project. So it really is a supplemental form and the
10 signature here is required so that we can have traceability
11 to the reviewer that they have looked at those checkpoints.
12 They are essentially saying I have looked at them, I have
13 assured myself in my evaluation that what I have put down
14 there represents good professional practice, and that what
15 the vendor has done meets the established criteria. Further,
16 as I indicated to you, it gives us a way to assure ourselves
17 that we flag deficiencies and that we have a manner in which
18 to track those deficiencies and assure ourselves that they
19 are reviewed by the proper people. So when you see the
20 signatures here, they are saying yes, I have reviewed it, it
21 is satisfactory, or here are the deficiencies. Second, from
22 the project management standpoint, we can go to those
23 individuals if we find through our audit of these forms that
24 they have not interpreted something in the proper manner and
25 correct their misunderstanding as to how this form works.



1 DR. ROSZTOCZY: I am not sure that I understand the
2 answer to the question. Are you saying that these individuals
3 here are certifying that this piece of equipment has been
4 qualified to the appropriate requirement?

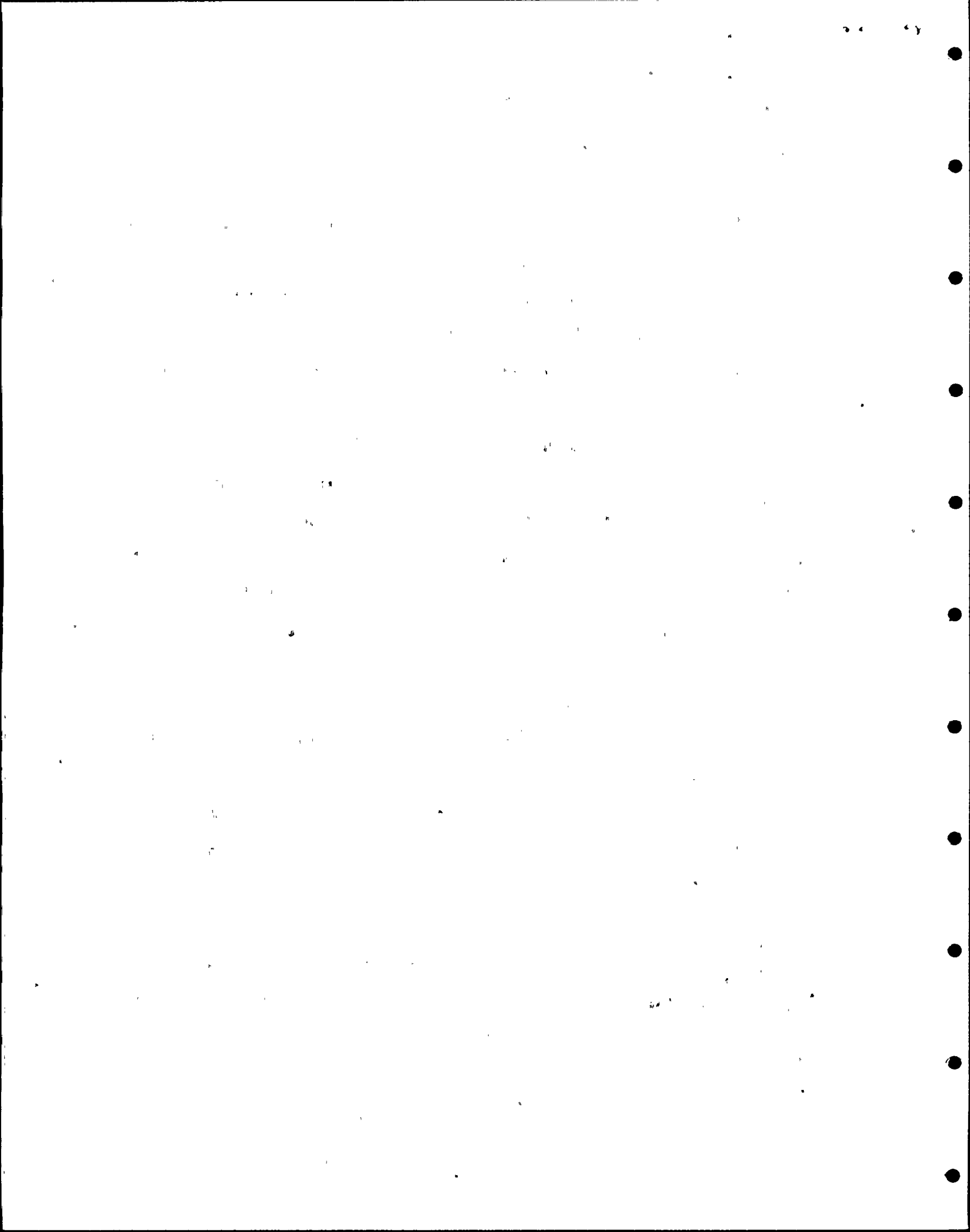
5 MR. BINGHAM: No. The vendor certifies that the
6 equipment has been qualified. We are in a reviewing position
7 to assure that the vendor has done what they are supposed to
8 do.

9 DR. ROSZTOCZY: I understand that. With that under-
10 standing that the licensee in a sense has responsibility to
11 review all of the equipment what he receives from the vendors
12 and is certain that he has done it in that process, what I
13 could call the licensing process, these individuals are
14 certifying that they have checked on this and the qualifica-
15 tion that has been performed is appropriate.

16 MR. BINGHAM: It meets the established criteria.

17 DR. ROSZTOCZY: It meets the requirements. How do
18 you know from here whether they found it acceptable or they
19 found it deficient? You said in either case, they would sign.
20 How do you know if these individuals, the two shown there,
21 if they signed because they thought it was acceptable or the
22 signatures indicate that they are deficient?

23 MR. BINGHAM: If there were deficiencies, the procedure
24 that goes with this check-off form indicates that they are to
25 fill it out. I may not have made that point clear, but there



1 is a procedure that tells the individual how to use the
2 check-off form, and in there it says, "If there are deficiencies,
3 fill this out."

4 DR. ROSZTOCZY: But that is a different form. That is
5 not this form. It is some other form attached to it.

6 MR. BINGHAM: Indicate the deficiencies. Indicate
7 them right here on whatever it is, No. VIII -- I'm sorry,
8 we've got to be careful, because we have come to grips with
9 this particular issue. If you look at Exhibit VI-11, VIII,
10 Qualification Deficiencies, it says, "The following is a list
11 of qualification deficiencies requiring work orders." Those
12 would be listed.

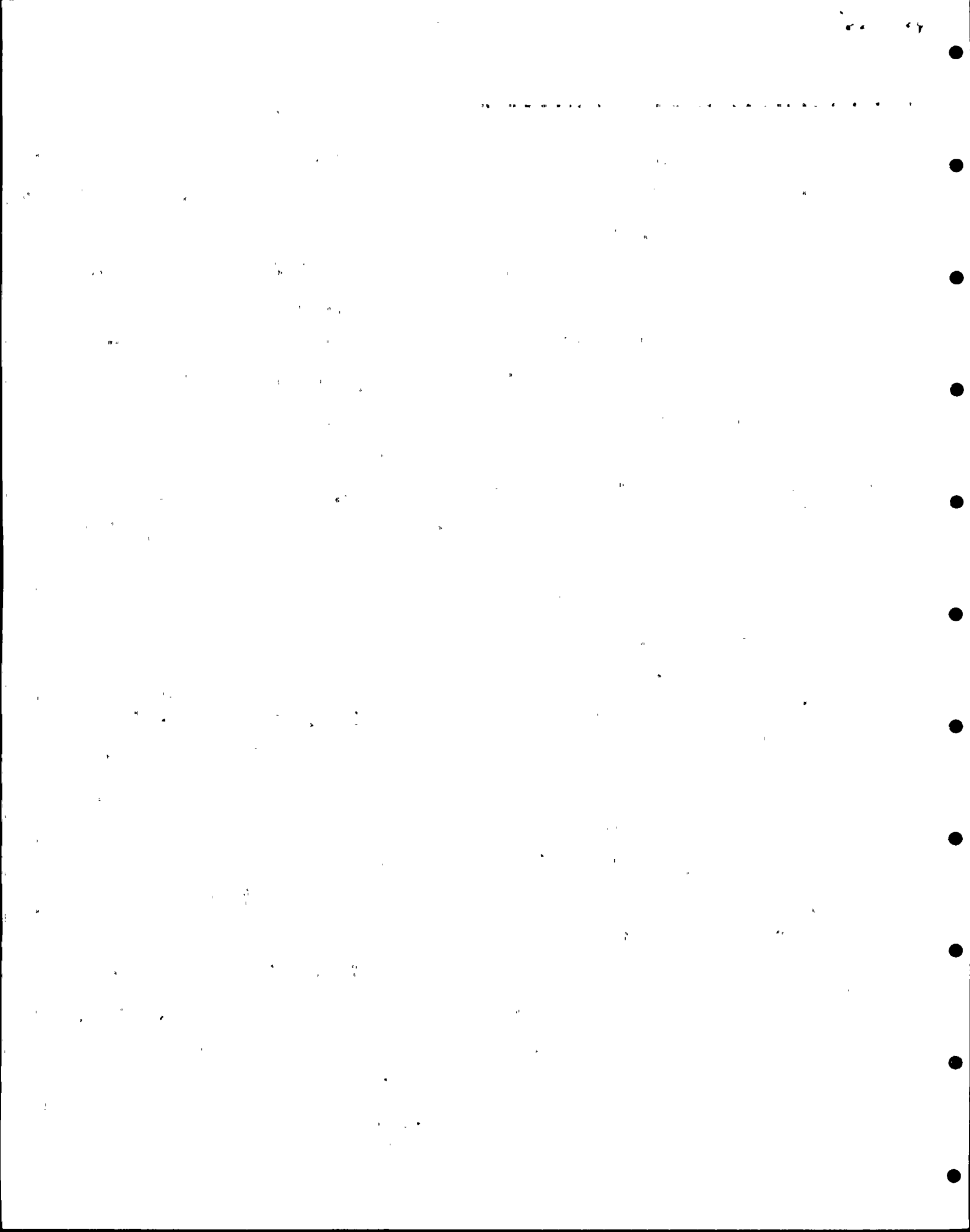
13 DR. ROSZTOCZY: This appears on this form which was
14 used apparently for one sample, but it does not appear on the
15 other form, the one which was your example.

16 MR. BINGHAM: It doesn't appear on the old form.
17 If we go through some of the other exhibits -- For example,
18 that is Exhibit C of the procedure, which is an updated form.

19 We will add that form to the record, John.

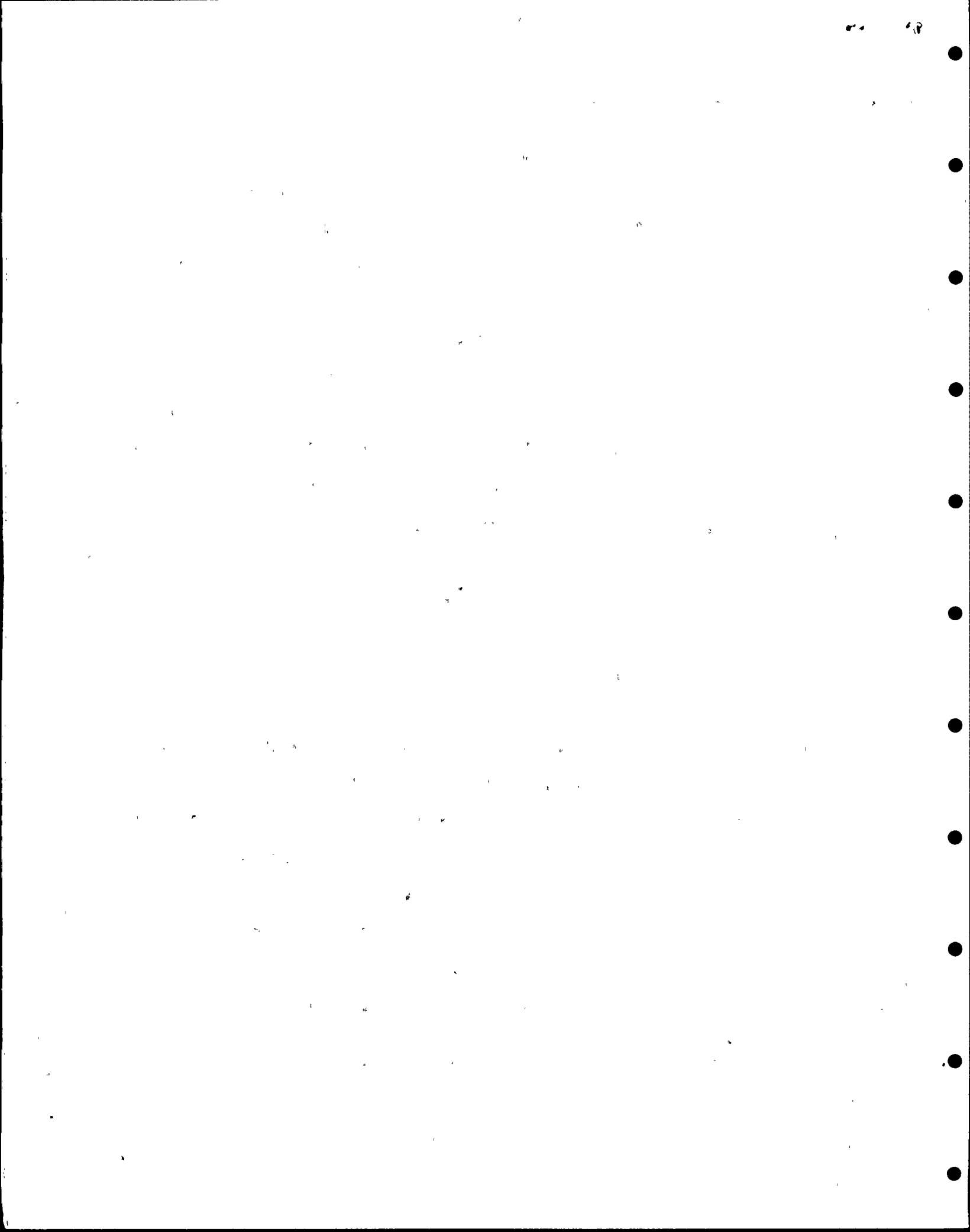
20 DR. ROSZTOCZY: I think it would useful to have a
21 statement above the signature which would indicate what are
22 they signing for.

23 Now let me go back to Exhibit VI-4. If you go to
24 Item 3) there, which is "Test temperatures were measured by,"
25 then they checked under "Other" and they said "Under Review,"



1 so obviously they haven't completed their work. They don't
2 know yet whether this has been properly done, but they signed
3 at the end of the sheet. What does that mean?

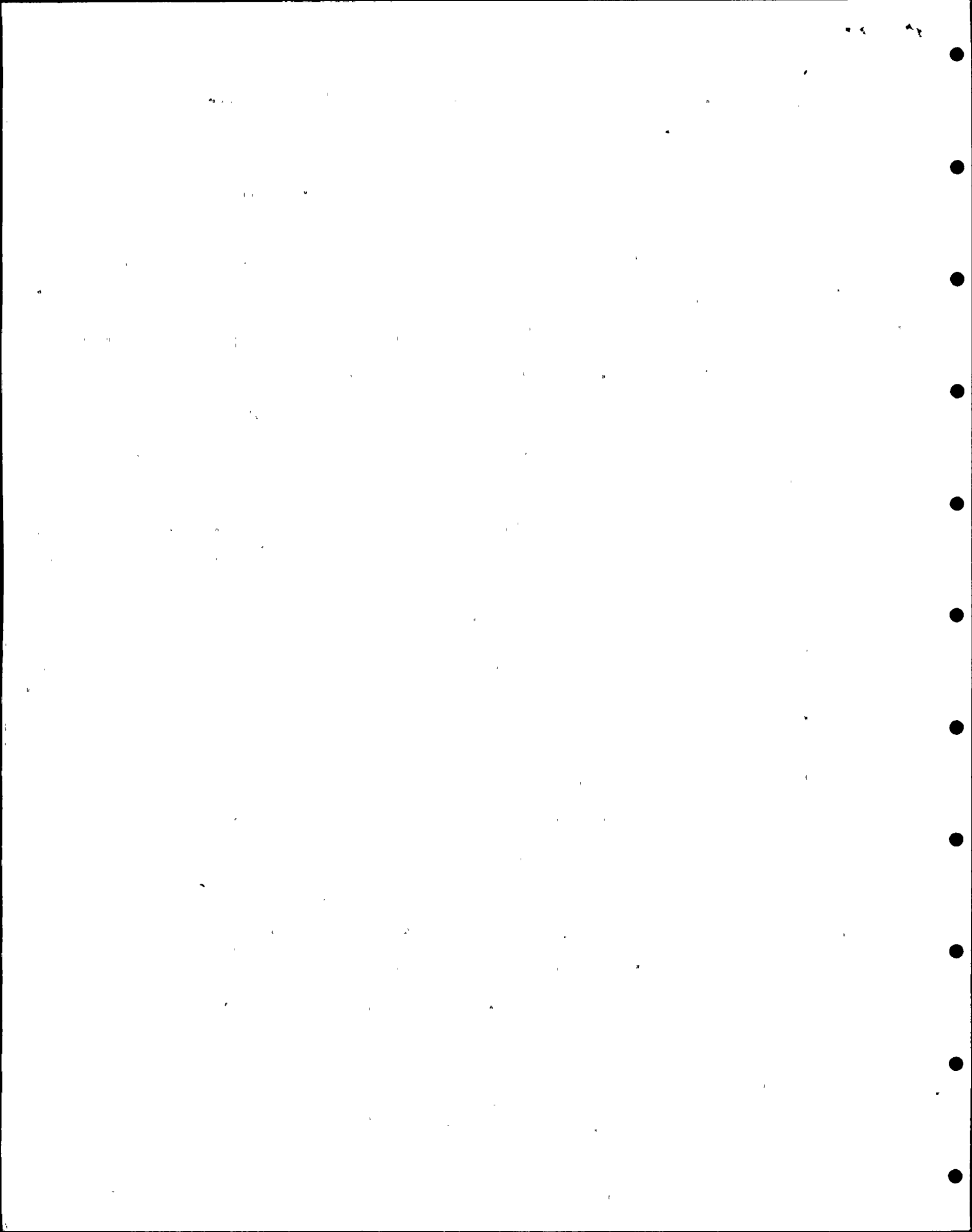
4 MR. BINGHAM: You are absolutely right. I was trying
5 to indicate that we are trying to have a better control to
6 complete this review and explain what it is, and
7 consequently the new form that I showed you attempts to do
8 that. I did indicate in earlier discussion that the document
9 that goes back to the vendor has the signature on it of the
10 individual and will indicate that there are comments that
11 must be resolved or that we have reviewed and find the
12 document acceptable and manufacturing or testing or whatever
13 may proceed. So there are two documents and let me try again
14 to explain. The basic document that comes in would be a test
15 plan or a test report. Let's take the test report. The test
16 report comes in, it is logged in through our document control
17 system, it goes to all of the involved parties, including the
18 customer. They all use their check-off sheet to go through
19 the various elements and compile comments. Those comments
20 come back to the reviewer -- I think there is a form in there --
21 go through the reviewer and then will be statused and sent to
22 the vendor. Let's assume that there is a lot of comments.
23 Those comments go to the vendor and say, "Please resolve these
24 comments before work proceeds," or "Work may proceed, you can
25 resolve these comments later." The vendor then takes this,



1 and let's assume he has to resolve the comments before work
2 proceeds. He resolves them and resubmits the document back
3 to Bechtel. Bechtel then takes the new version of the
4 document, sends it out to all individuals involved, and let's
5 assume that the first round is enough, reviews and determines
6 that all the comments are resolved. The responsible engineer
7 will then sign off on that document that work may proceed,
8 but we have not relieved the manufacturer of any of the
9 requirements to assure that he has qualified and justified
10 the qualification of that equipment. That is the major
11 document side and that is where the signature really means
12 something. On this form, it is an internal control form as
13 well as a way to provide information that is readily accessible
14 for this particular concern and we want the sign off so that
15 we can have traceability.

16 DR. ROSZTOCZY: If you rely on the second form in
17 addition to this for the documentation that this component
18 has been properly qualified, then I think you should have
19 presented here both forms and you certainly should include
20 both forms in your file.

21 MR. BINGHAM: Well, I indicated earlier that we would
22 include both forms in the file. If this form disappeared
23 forever, there wouldn't be anything more than just an inconven-
24 ience as far as the documentation of the qualification in our
25 opinion.



1 DR. ROSZTOCZY: Then maybe there was no need to
2 present this one. You should have presented the one that you
3 depend on.

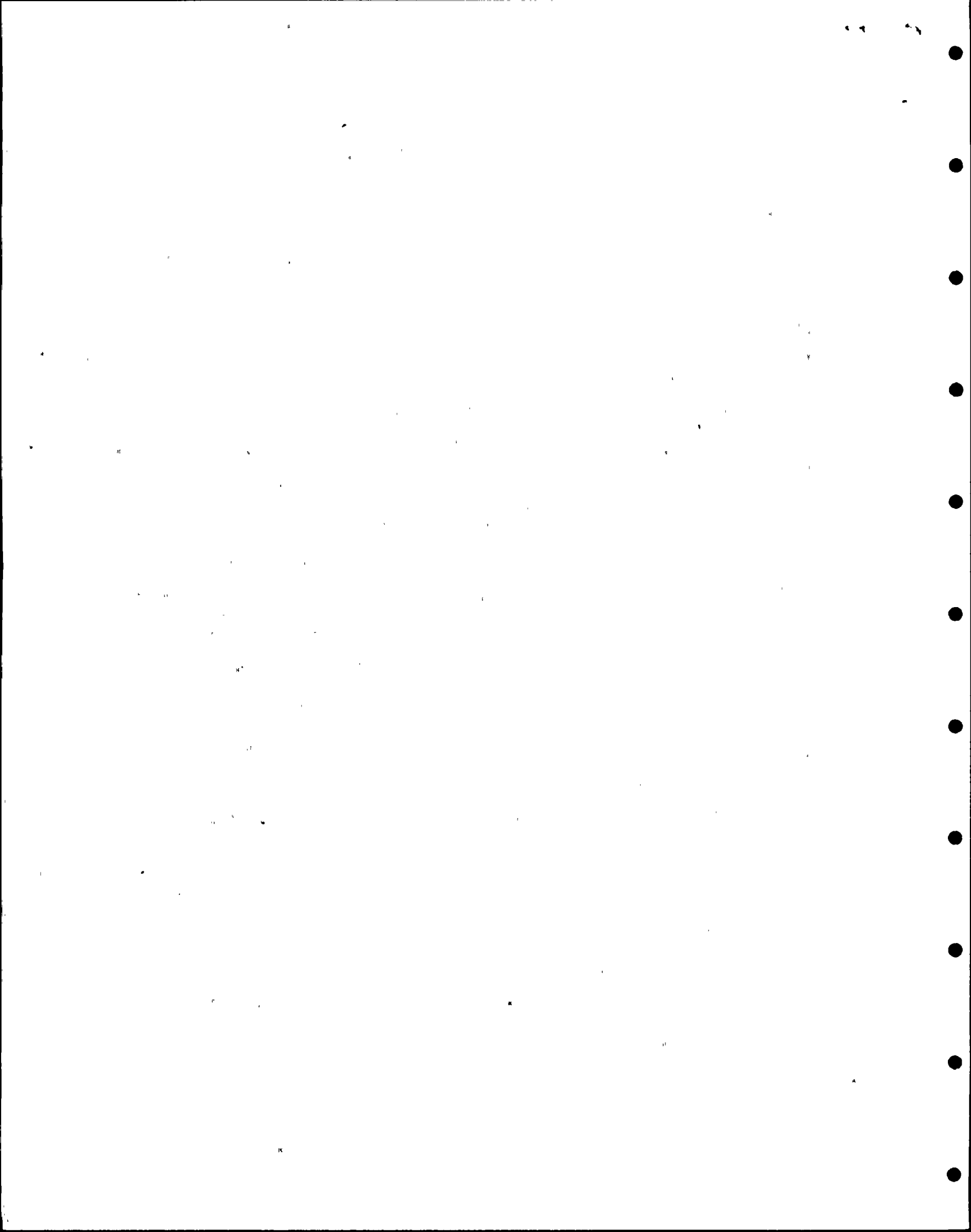
4 MR. ALLEN: Bill, Art has a comment he would like to
5 make.

6 MR. GEHR: I think the point has been well taken.
7 Right above the signature, you have a phrase "Evaluation
8 Approval:" And that is too broad for what you intend that
9 signature to mean. It's just plain and simple that way,
10 Bill. You will find it in the records and it will look like
11 those two people approved the evaluation when in fact the
12 form itself as filled out shows they have not. The suggestion
13 is if you are going to have this as a permanent record that
14 you put in a statement that "The material shown on this form
15 is true and correct to the best of my knowledge." Then that
16 would be a meaningful signature. But when you put on that
17 form "Evaluation Approval," sign it, that indicates that those
18 people are signing more than they intended and you ought to
19 get rid of that and put in a proper designation for whatever
20 anyone signs.

21 MR. BINGHAM: Well, let's take that under advisement,
22 John.

23 MR. ALLEN: We will keep that as an open item.

24 I think the time is telling us that we should break
25 for lunch.



1 DR. ROSZTOCZY: One final question. It is a short one.
2 In this case, the aging test on this specific equipment was
3 an actual aging test for the type of performance that you
4 expect from the equipment. By putting a piece of equipment
5 through this test, you establish that it is qualified for the
6 type of performance. What assurance do you have that the
7 piece that was tested has been discarded or somehow eliminated
8 and will not be placed in any plant?

9 MR. BINGHAM: We require in the specification that
10 we have the equipment either refurbished or replaced and the
11 vendor must document that that has been accomplished. We do
12 audit and perhaps would look at that particular issue on a
13 case-by-case basis.

14 DR. ROSZTOCZY: What would refurbish mean in a case
15 like this?

16 MR. BINGHAM: Well, the heat might damage the paint
17 or the surface of the component, or maybe they might get
18 some of the wiring dirty in the tests, or if they are shaking
19 it, there may be some minor structural local anomalies that
20 you would want to fix up to make it look like a new product,
21 those kinds of things.

22 DR. ROSZTOCZY: But that would be grossly inappropriate.
23 This has been aged now to a point beyond which its operability
24 is not guaranteed at all, so this piece of equipment under no
25 circumstances should be placed in that plant, and to refurbish

1 it like repaint it a little bit and put it into the plant
2 would be a gross mistake.

3 MR. BINGHAM: I understand your point. I think we have
4 a response, John, but why don't we leave this open for now
5 and I will come back.

6 MR. QUAN: Could I have that question stated again?

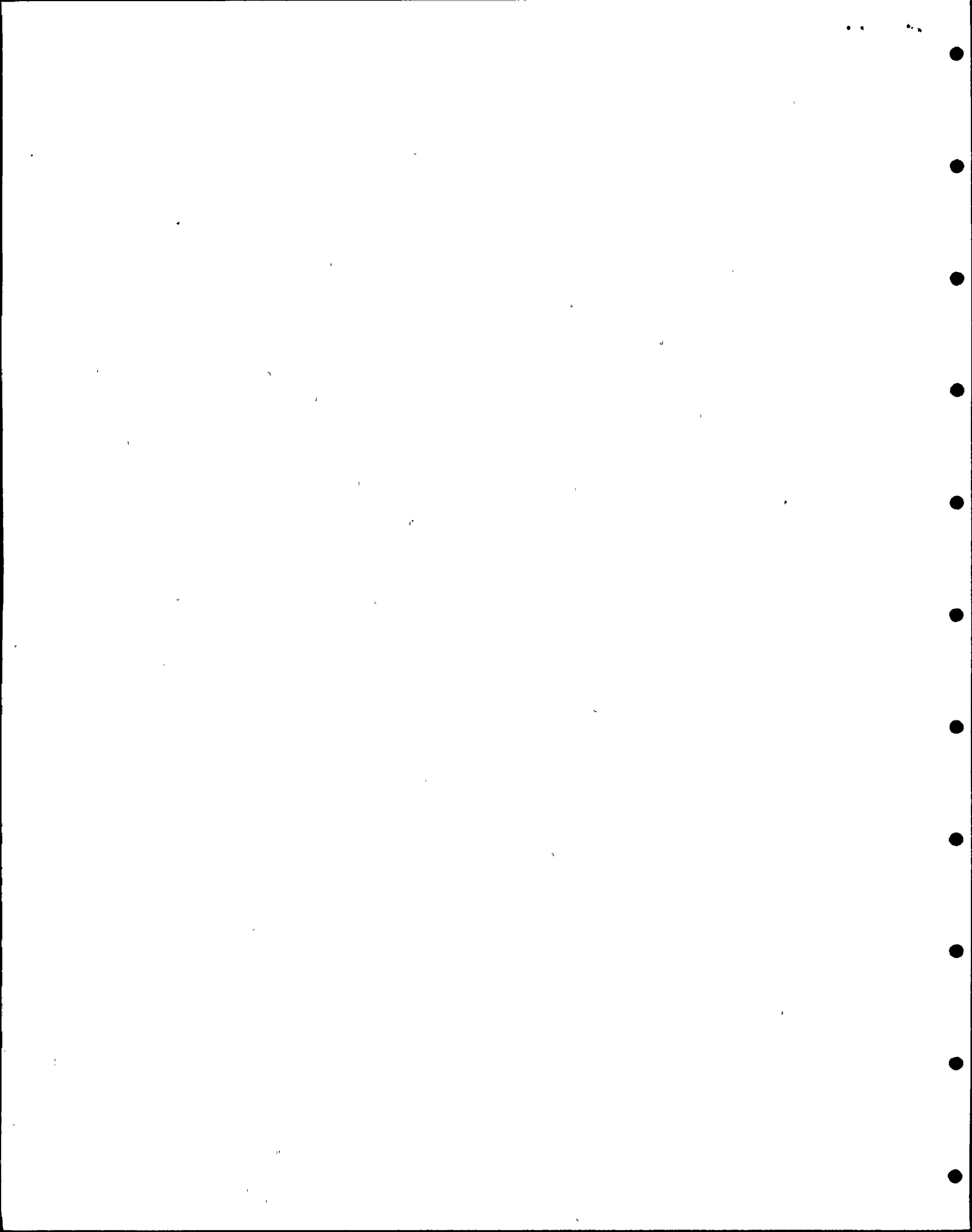
7 DR. ROSZTOCZY: The equipment that actually was tested
8 has been aged to the limit required for the performance.
9 There is no guarantee that it will perform beyond this limit,
10 so this would have to be discarded and should never be placed
11 in the plant. What assurance has been made that that step
12 was done?

13 MR. ALLEN: Really, can you say it is aged to the
14 limit?

15 DR. ROSZTOCZY: The limit that you qualified it for,
16 so it's performance beyond its limit is uncertain and,
17 therefore, it should be discarded.

18 MR. ALLEN: Let's break for lunch. Why don't we try
19 for as fast as you can eat and get back.

20 (Thereupon the meeting was at recess.)
21
22
23
24
25



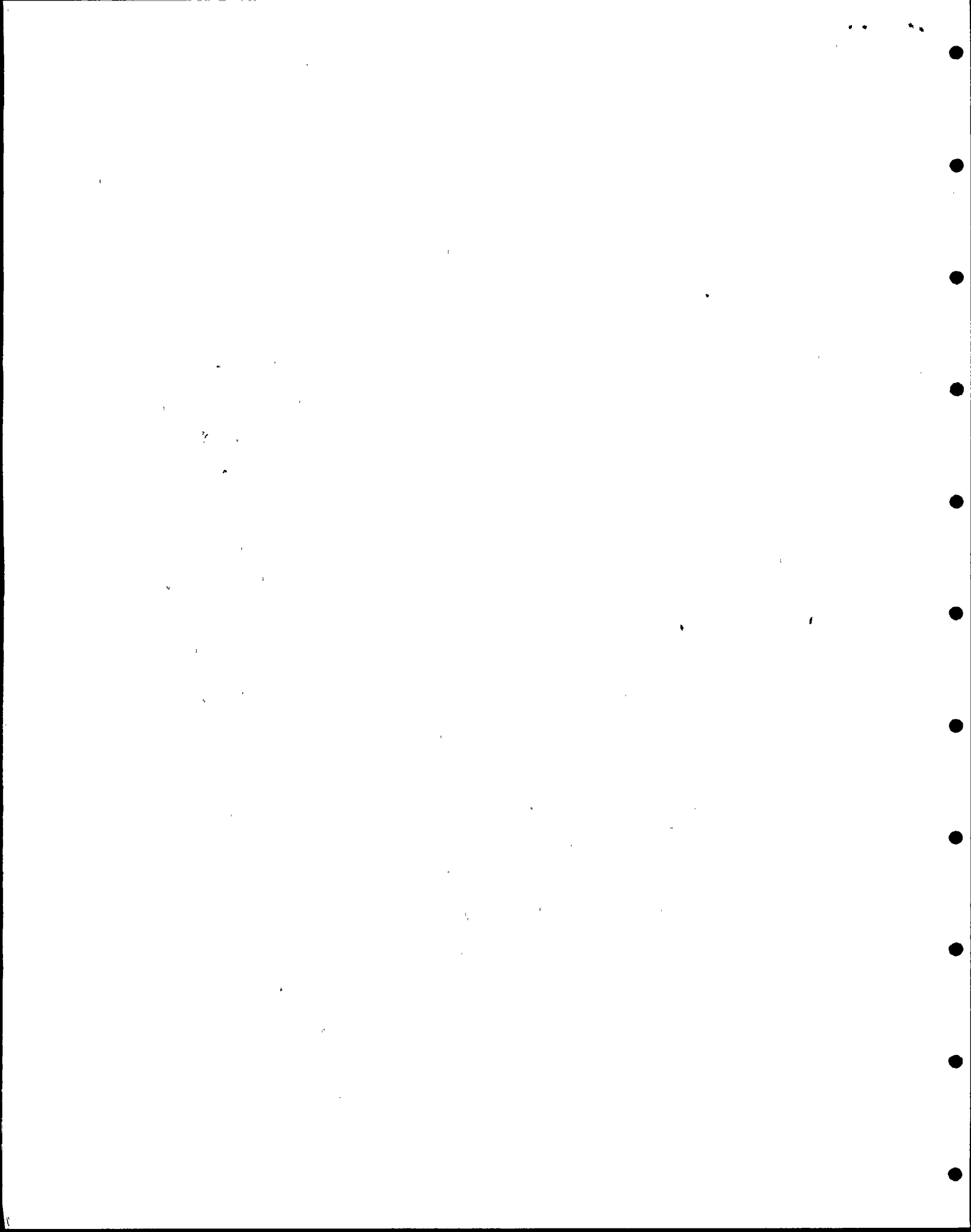
September 26, 1980
1:45 p.m.

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2
3 MR. BINGHAM: I would like to ask Ken Schechter to go
4 through the seismic equipment qualification for the same
5 piece of equipment.

6 MR. SCHECHTER: Thank you. I would like to discuss
7 the qualification checklist for the same piece of equipment
8 that Mr. Carson discussed earlier, the Balance of Plant
9 Engineered Safety Features Actuation System, Exhibit VI-8.
10 It is in the scope of balance of plant. The supplier is
11 General Atomic Company, Electronics Systems Division. It is
12 a control board assembly that houses various devices, 90 inches
13 high, 64 inches wide, 36 inches deep, weighing 3,400 pounds.
14 It is located in the control building at Elevation 140. It is
15 mounted in the field by welding, total weld length of 52 inches.
16 Natural frequencies in each direction were not measured. It
17 was qualified by testing. The functional description is
18 Balance of Plant ESFAS. The equipment is required for both
19 hot standby and cold shutdown.

20 Exhibit VI-9. The equipment is available for
21 inspection in the plant, and it was qualified by means of
22 testing by Wyle Laboratories, and the report number was 58343.
23 The only load that was considered during this test was seismic.
24 The required response spectra was attached.

25 Let me just switch for a second and I will show the



1 required response spectrum for SSE. This is Exhibit VI-12.
2 Let me just point out the zero period acceleration of 1.6g.

3 Let's go back to the other one, please. (Exhibit
4 VI-9) The required zero period acceleration in each direction
5 for the SSE for all three directions is 1.6g as specified on
6 the required response spectra. For the OBE, it is 1.0g.

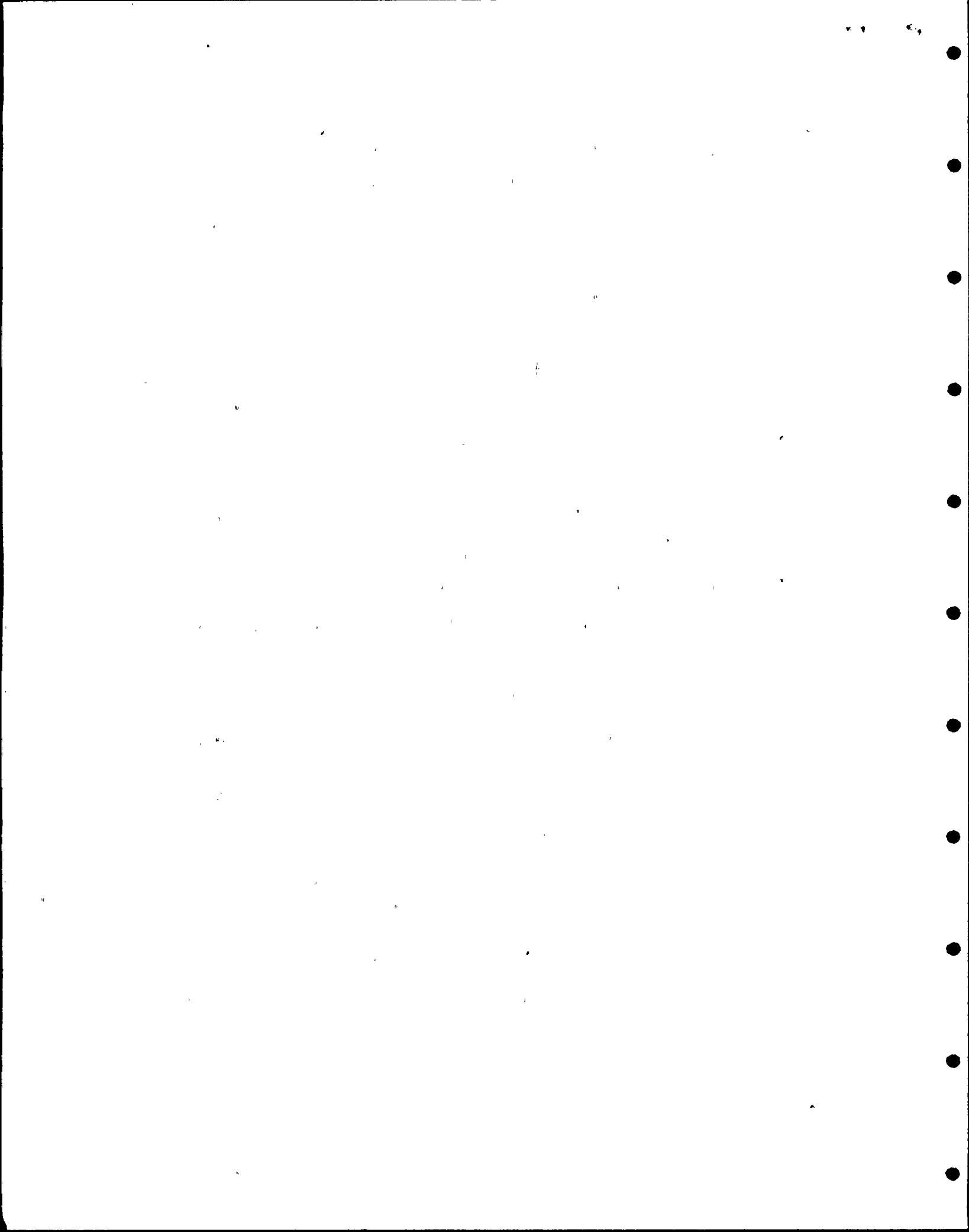
7 Section VI deals with if the equipment was qualified
8 by test. In this case, it was, so it is filled out. The input
9 was multi-frequency random input motion. It was a multi-
10 directional test. The total number of qualification tests
11 were 13 for OBE and 7 for the SSE, the frequency range from
12 1.25 hertz to 33 hertz, and the test response spectra did
13 envelope the required response spectra.

14 Exhibit VI-10. The input zero period acceleration
15 levels were 2.0g for the OBE for all three directions and
16 3.4g for the SSE, which is quite a bit higher than the required
17 zero period accelerations. The laboratory mounting was by
18 means of welding, total length 52 inches. The functional
19 operability of the equipment was verified and there were no
20 modifications needed as a result of the test.

21 Section VII is not filled out, since the piece of
22 equipment was qualified by testing. If it was qualified by
23 analysis or a combination, it would have been filled out.

24 MR. LaGOW: Was the equipment operated during test?

25 MR. SCHECHTER: Yes, it was.



1 Exhibit VI-11. Again, this is part of the section
2 and if it was qualified by analysis, we complete this.

3 Section VIII talks about deficiencies in the
4 qualification of the equipment, and in this particular case,
5 there were none.

6 Then this form was signed off.

7 MR. BINGHAM: Are there any questions?

8 DR. ROSZTOCZY: No question, just a comment. Many of
9 the same things which we critiqued on the other sheet need
10 to be corrected on this such as the signature and it should
11 be reviewed for misleading type of statements. Can you do
12 that as an open item?

13 MR. BINGHAM: We agree.

14 MR. NOONAN: I guess I have a couple comments. On the
15 sheet, one additional comment was operation. There is no
16 place on the sheet that would show that this thing was
17 functional.

18 MR. CARSON: Yes, that was indicated.

19 MR. NOONAN: You say it was functionally checked, but
20 does that mean before or after or during the operation? I
21 think you should be specific in whether you check during the
22 operation.

23 MR. BINGHAM: Let's make a note of that.

24 MR. NOONAN: It should say it is tested before or after
25 or during. The status function during the test should be so

1 stated. I don't see that on here.

2 The other thing is you showed the required response
3 spectra, but you didn't show the test response spectra. You
4 wouldn't have a copy of that, would you, by any chance?

5 MR. LINDERMAN: We have a copy here, but it is in the
6 document.

7 MR. NOONAN: Would that be normally attached to this?

8 MR. LINDERMAN: It would normally be attached, yes.

9 MR. NOONAN: Is it something I could just take a quick
10 glance at?

11 (Thereupon a brief off-the-record discussion ensued,
12 after which proceedings were resumed as follows:)

13 MR. NOONAN: The only other comment I would make is
14 in the process of trying to establish a curve, it looks like
15 you pretty much enveloped the whole area. As a result of
16 trying to do so, you tend to bring up the zero period
17 acceleration quite a bit.

18 MR. LINDERMAN: That's right.

19 MR. NOONAN: That's why I think -- well, I know 344
20 doesn't have any tolerances given to the spectra. It seems
21 reasonable that there should be some tolerances, and that's
22 why I made the statement before there ought to be at least
23 10% or 12% in some cases where you might boost it up high to
24 try to get it above the required level, which you are also
25 bringing up your zero period acceleration. I would see no

1 problem if you could show a spectrum that had a few dips
2 below the required spectrum of, say, 10 to 12%. I am not
3 saying the whole thing should be 10 or 12% below, but I am
4 saying a few points. I would see no problem in doing that
5 if that creates a problem in your testing where you are
6 starting to bring up the rigid body part of the specs.

7 MR. LINDERMAN: I know in the past it has always been
8 they want them completely enveloped and never have had any
9 allowance for slight dips.

10 MR. NOONAN: But the people that wrote the document I
11 don't think had much experience on the actual testing areas
12 and I think it is realistic to realize that you can't all the
13 time envelope that spectrum fully. I would have no problem
14 if certifications had small deviations, as I say, of 10% or
15 so. I always used 1.5 dB, which was my criterion based on
16 acceleration, and 3 dB on power.

17 MR. BINGHAM: Other questions, John?

18 MR. BARROW: I just have a suggestion. We found this
19 real helpful when we fill out the NS 15 form and send a copy
20 to Bechtel for them to incorporate our comments. They
21 suggested this, so I am going to return the favor and suggest
22 it. When you fill out your form, it would be helpful if
23 anywhere that it was not applicable or there was no comment,
24 fill in "None" or "N/A" on the section. That way, if somebody
25 goes back later, they will just know by looking at it that

1 the person didn't forget to fill out that part of it.

2 MR. BINGHAM: We'll do that.

3 MR. ALLEN: Any further comments?

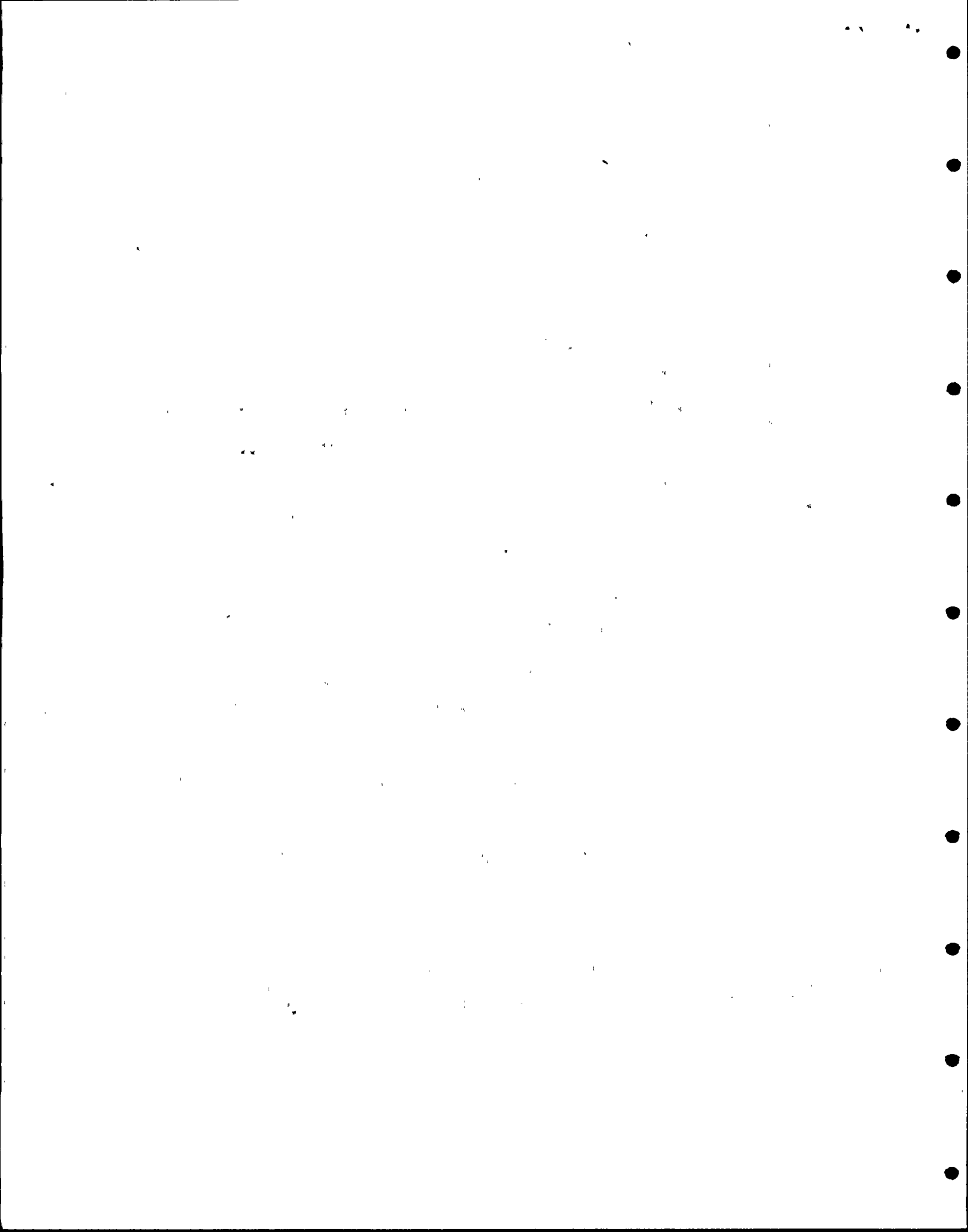
4 Shall we proceed to the next section, then?

5 MR. LaGOW: I did have one other comment. On the
6 previous form that you had up before we went to lunch, the
7 qualification form, I think that you ought to expand that
8 to show how the equipment was operated and, if it has inputs
9 and outputs such as this equipment did, to show that you
10 monitored the sensitivity of the input and the current
11 capacity of the output and things like that.

12 MR. BINGHAM: I believe that is part of our open item,
13 is it not, to review those issues?

14 That gets us to our last section, Section VII,
15 Qualification Problem Areas, and we will cover both environ-
16 mental and seismic. We will take environmental first, and
17 Bob Carson will present that.

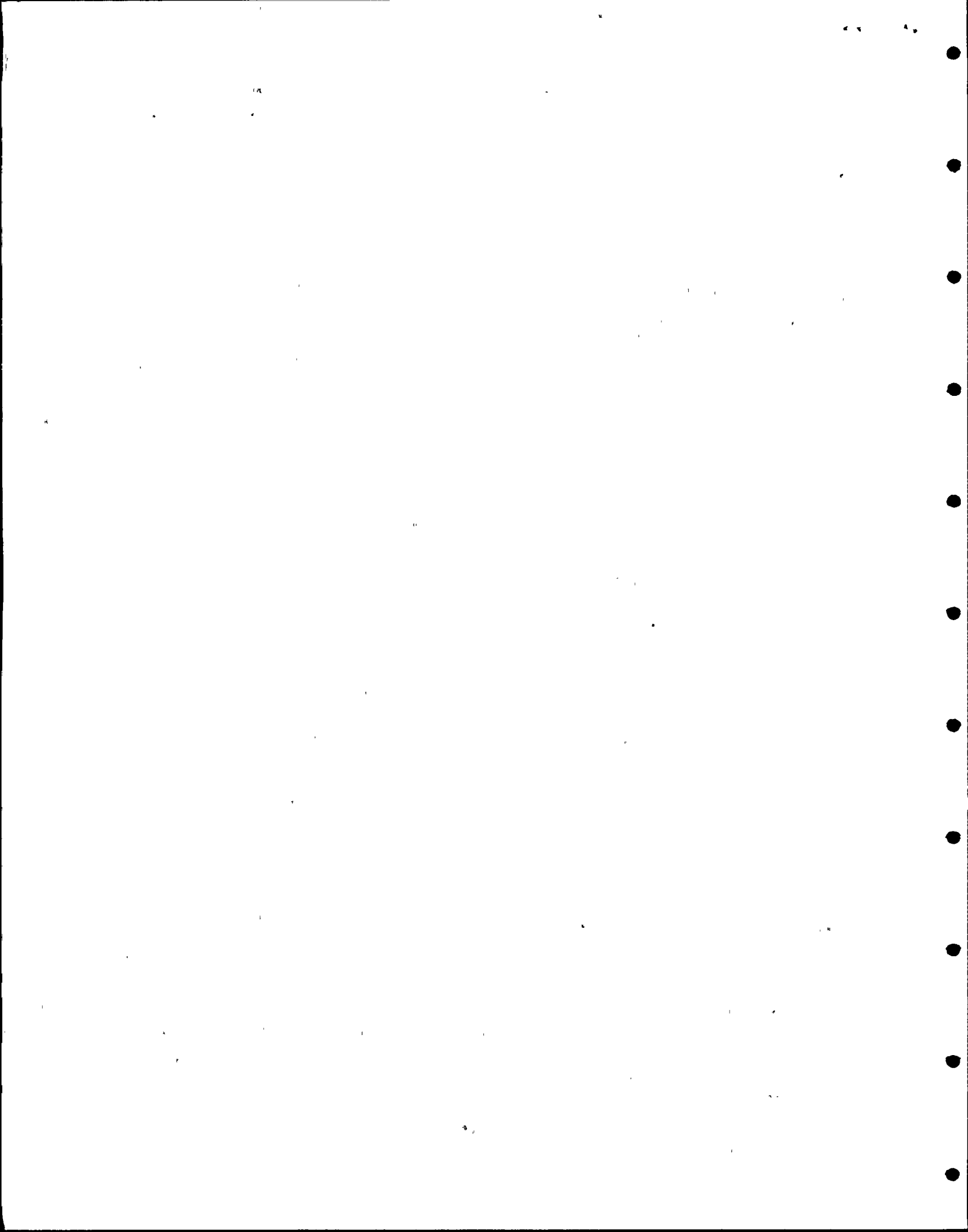
18 MR. CARSON: Exhibit VII-1 is a listing of the
19 major problems that we are having at the present time, by no
20 means a complete listing of all of the problems that we are
21 having, in the area of qualification, and you can see that we
22 are talking here about battery chargers, the supplier Power
23 Conversion Products of San Diego, and a very short summary
24 of the problem that we are having, safety-related design
25 problems with the battery chargers. In this case, this vendor



1 is having problems with qualification of circuit breakers
2 and some other portions of the equipment that go into this
3 battery charger and that is preventing him from shipping this
4 equipment, so it is holding up installation. We have been in
5 contact with him and are working with him for these particular
6 areas.

7 JM-108, one of the control system specifications
8 having to do with the Safety Equipment Status System made by
9 Beta. Their test plan was considered deficient when it was
10 submitted. We have made numerous comments on their plan.
11 It has been the subject of considerable discussion and meetings
12 and phone calls with them and we were anticipating them to
13 have resubmitted that by August. It has not yet been received.
14 The supplier is not responsive to our requests for additional
15 information and for rework on his plan and we are having to
16 try to expedite him, and if we don't get resolution soon, we
17 will have to take some further action up to and including
18 possibly initiating some program of qualification ourselves
19 rather than relying on the vendor to do that.

20 Here is another control system equipment order having to do
21 with valves by Control Components, of Irvine, California.
22 They are having great problems in getting their testing program
23 under way. Their original program having to do with valves
24 for the Palo Verde project was going to be one of qualifying
25 by similarity and relying on testing and analysis and testing



1 for valves that were going to be produced for another client.
2 That nuclear plant has since been delayed. They never build
3 the valves upon which they were going to base their qualifica-
4 tion for Palo Verde valves, so they are now having to
5 construct some additional equipment and there have been some
6 commercial problems involved in addition to the lack of getting
7 the plan put together. Their qualification plan has also had
8 some deficiencies in it and we are working with them on that.

9 Another valve problem. We are talking about Exhibit
10 VII-2 here. Fischer Controls. In terms of valves, they are
11 having problems with the valve actuators and Fischer them-
12 selves are not too anxious to talk to us about getting those
13 problems resolved. One item that is not listed here, because
14 this is only a representative sample of some of the problems,
15 is a vendor, Harlo, which is providing us with some electrical
16 relay cabinets, who has completely abandoned the qualification
17 program, has said that they aren't going to be involved with
18 it, they will not qualify the equipment, and in this regard,
19 the qualification program has been taken over by APS with
20 Bechtel acting as the agent and we are working with the test-
21 ing laboratories, Wyle, to provide the qualification for that
22 equipment.

23 The diesel generator sets being provided by Cooper
24 Energy, this is a very, very complicated and large-scale
25 program. It involves the engine, the generator, the control

1 cabinets, all of the items that were shown in the dotted
2 block when we talked about IEEE 387 for the diesel generator
3 equipment. We have asked them some time ago to look at their
4 total scope of supply in relation to IEEE 627; that is, to
5 talk to the problem of safety-related equipment, safety-
6 related components in the entire scope of supply, and not only
7 look at the strictly electrical items. This is generating an
8 extremely large program which they are having great
9 difficulty putting together. We have been in contact with
10 them continuously and are hopeful that within the next couple
11 of months, we will have some information. We are following
12 those on a day-to-day basis.

13 Bingham-Willamette, who is providing the auxiliary
14 feedwater pumps, has also been contacted to look at their
15 total scope of supply in regard to IEEE 627, to look at all
16 of the safety-related items, all safety-related components,
17 and there are commercial implications in that program.

18 Another valve problem from Dresser with Rotork
19 actuators. The aging tests on the Rotork actuators were due
20 to start in August of this year. They have been delayed.
21 A test plan for the entire valve equipment has not yet been
22 formally submitted. We are expediting that. In this regard,
23 we have received communications from Dresser that they are
24 leaving the nuclear service valve industry, they will accept
25 no further orders for valves for nuclear power stations, and

1 are not at all anxious to continue with programs that they
2 have in house. They have indicated that, in answer to our
3 requests to provide information on materials which form
4 gaskets and packing and such, they will ask their sub-vendors
5 for such information and they will pass on whatever they get
6 for us in regard to those requests. They will take no action
7 to perform any other qualification testing on the equipment.
8 This is a severe problem and may very well be a program which
9 will have to be taken over by APS with Bechtel acting as their
10 agent.

11 This is just an indication of some of the problems
12 that we are having, major ones. In addition, we are in
13 contact with all of our vendors, as I indicated yesterday, to
14 clear up any minor problems which are involved, some
15 deficiencies in documentation, some clarification on items
16 that were in either programs or procedures or reports. Those
17 are being handled by TWX, by mail, by telephone calls, by
18 meetings with the individual vendors in an attempt to get all
19 of this documentation in our files.

20 MR. BINGHAM: Are there any questions?

21 MR. ALLEN: Ed Sterling.

22 MR. STERLING: On Exhibit VII-1, if we can start there,
23 you have indicated you have problems with test plans, and so
24 forth, but you haven't really indicated what type of problems.
25 Are they problems in how they are determining what they are

1 going to age or not age or how they intend to age things, or
2 what type of problems?

3 MR. CARSON: The problems range the entire gamut.
4 All of the things that you mentioned are problems that we
5 have seen on test plans -- how to age something, where can
6 they get information about aging, what laboratories they might
7 use, things of that sort, how should testing for operability
8 be accomplished. Essentially anything that has to do with a
9 testing plan has at one time or another been a problem or
10 has called for comment back to the vendors. Some are respon-
11 sive in getting the answers back to us and modifying the
12 programs, if necessary. Some have been very, very unresponsive
13 in getting back to us and it has caused considerable delays
14 in many of these programs.

15 MR. STERLING: For example, a vendor might be stumbling
16 over a particular type of material in that he can't find a
17 way of aging and yet you know of another way. Have you been
18 passing along this type of information?

19 MR. CARSON: We have passed along as much information
20 as we can. We have pointed them in directions where they can
21 obtain information. We have made suggestions to them as to
22 modifications for their programs. We have not undertaken to
23 dictate to them specific things except if they suggest that
24 they are going to say "We have been building this sort of
25 equipment for 25 years and it works just great and, therefore,

1 that's fine and that is what we are telling you and that
2 what we will sign to." We tell them that that is not
3 acceptable, they have to give us a definite program, a
4 definite plan, they have to provide satisfactory documenta-
5 tion for a qualification effort.

6 MR. STERLING: Have you found any of the mechanisms
7 that they have been using for aging or whatever to be
8 proprietary to one type of vendor and he won't release that
9 type of information that you can use to age that same material
10 on another vendor?

11 MR. CARSON: No, we have not found that they have any
12 proprietary aging mechanisms. We have found that a vendor
13 has said, "We have paid to have this particular program
14 implemented," or "We have paid to have this material aged and,
15 therefore, that information is proprietary and we won't give
16 it to you. We will provide you with the end result, but we
17 won't give you the information. You can come and look at it."
18 We have gone and audited material, and in those cases, as
19 indicated yesterday, we have required that such information
20 be specifically identified and its location be specifically
21 identified so that anyone who needs to audit that information
22 will know what to look for and where to go to see it. We are
23 now also instituting requests to make sure that all such
24 information that is retained by the vendors will be available
25 for the life of the plant either in the vendor's facility or

1 in some storage facility or that APS would have the opportunity
2 to obtain such information for maintenance and storage for
3 the life of the plant.

4 MR. BINGHAM: Are there questions, John?

5 MR. ALLEN: Any questions?

6 MR. CLARK: I have one. Harlo Company is one of the
7 bigger board manufacturers in the country and didn't they
8 manufacture the board or control panels or relay panels?

9 MR. CARSON: Harlo is the manufacturer of the relay
10 panels, yes.

11 MR. CLARK: They are one of the bigger vendors in
12 the country I would assume. Are they dropping out of the
13 nuclear business now or is it just for this particular panel?

14 MR. CARSON: They have not specifically indicated that
15 they are dropping out of the industry, but they are saying,
16 in effect, "We will build a panel. If you wish to use this
17 panel in your nuclear plant, you may do so. If you don't
18 wish to use this panel in your plant, use something else."

19 MR. LaGOW: Would you clarify which problem you are
20 talking about there? That is not one that is specifically
21 listed on this tabulation.

22 MR. CARSON: That attitude we are finding is becoming
23 more prevalent, that people are saying, "The nuclear industry
24 is too much of a headache for the amount of material that we
25 are building and we really don't want to talk to you."

1 MR. BINGHAM: Other questions, John?

2 MR. ALLEN: I think Vince had a question.

3 MR. NOONAN: Maybe you already answered it. I guess
4 the bottom line is that they don't see any commercial gain
5 in doing the qualification tests.

6 MR. CARSON: That's right.

7 MR. NOONAN: They will provide the product and it is
8 up to you to take on the qualification of the item, is that
9 correct?

10 MR. CARSON: That is what is happening, yes, sir.

11 MR. NOONAN: I suspect it is probably the bottom line
12 on all these negative responses you have been getting.

13 MR. CARSON: Right, and we are working with them to
14 hopefully change their attitudes, and if we can change those
15 attitudes, we are working with them to get the required
16 documentation and do the required qualification programs.

17 MR. NOONAN: On the relay panel board, was it Harlo,
18 is there sufficient competition in that field that you can go
19 to other competitors to get it or are you pretty much limited?

20 MR. CARSON: At this point in time, there is no time
21 to go out and do a complete new procurement, so we have under-
22 taken to qualify the equipment ourselves and that is in
23 process right now.

24 MR. NOONAN: Given, say, for future plants, are there
25 other options?

1 MR. CARSON: There are not too many other options.
2 There are people who will build equipment like that, but they
3 are becoming few and far between.

4 MR. ALLEN: Herman, did you have a question?

5 MR. LaGOW: Is it primarily aging or is it the seismic
6 testing, or which is the problem?

7 MR. CARSON: The entire operation of providing
8 qualification. It is a great effort on the part of a vendor,
9 particularly a reasonably small vendor or a small vendor, to
10 undertake such a program. It ties up great amounts of his
11 time and effort which he feels can be more profitably used
12 building things for the commercial market.

13 MR. ALLEN: John.

14 MR. BARROW: I have just one thing to add. To give you
15 an example, when Solid State Controls was talking about
16 dropping out of the nuclear industry, one of their vice-
17 presidents told me their documentation on nuclear orders
18 constituted 80% of their paper work, but the nuclear orders
19 were only 20% of their business, so that was the main reason
20 they were thinking about getting out.

21 MR. ALLEN: Any further questions?

22 DR. ROSZTOCZY: The examples which have been shown on
23 this slide are basically schedule type of problems, in some
24 cases maybe contractual problems to make a contractor do the
25 job with one exception, the very first one. The very first

1 one refers to safety-related design problems. Have there
2 been some actual tests done on that equipment and was the
3 result negative; in other words, some components in that
4 system didn't pass the test?

5 MR. CARSON: There have been extensive tests done on
6 the battery chargers and, in fact, they perform very
7 satisfactorily. The problem is in getting the proper docu-
8 mentation for the circuit breakers, one of two circuit
9 breakers in that equipment which are being obtained from
10 General Electric Company and from Westinghouse. Our vendor,
11 Power Conversion Products, is having difficulty getting
12 qualification information on breakers that he is buying from
13 a subsupplier.

14 DR. ROSZTOCZY: You are saying then that that first
15 problem is not really a safety problem, it is more of a
16 documentation problem?

17 MR. CARSON: That's right, yes. We don't allow any
18 qualification programs that indicate safety problems. We are
19 working to get the programs successfully completed and we work
20 to get the proper documentation, and an awful lot of our
21 problem is getting the proper documentation.

22 DR. ROSZTOCZY: I understand that. I am going in the
23 direction that are you aware of any equipment that actually
24 failed under the testing that it was tested for so some design
25 changes were needed to correct this, for example, that could

1 put you back on your schedule or could cause you some
2 difficulties if a given component undergoes the specified
3 test but it doesn't pass the test, you have to go back, you
4 have to make changes.

5 MR. CARSON: There have been areas.

6 DR. ROSZTOCZY: Could you give me examples or could
7 you give me the cases when the actual test wasn't passed and
8 some design change was needed?

9 MR. BINGHAM: There have been areas, I think COMSIP
10 was one of them, where tests were made by the particular
11 vendor, they filed a Part 21, of course, because they had
12 already shipped some of the equipment, and in our normal
13 course of work, we also file our 50.55(e)'s and these are
14 all on record. there is probably a handful or so that I
15 know of where that has occurred.

16 DR. ROSZTOCZY: The ones in operating plants would go
17 on record. How about the ones which are just for a CP.

18 MR. BINGHAM: The same.

19 DR. ROSZTOCZY: The same thing? You file the same way
20 for a CP control system?

21 MR. BINGHAM: The vendor will file a Part 21 if it is a
22 generic problem and they have shipped equipment to be installed.
23 In other words, it has gone through their program as being
24 acceptable and now they find out it is not and they want
25 a test, and we have a few occasions on this plant where that

1 has been the case, yes.

2 DR. ROSZTOCZY: But this first case is a case when
3 they already shipped something out, so they shipped just like
4 it would have been all right and they found out later there
5 was a problem. How about cases when you just gave them a
6 specification, they take your specification, they develop a
7 test program, and they take their equipment and it doesn't
8 pass? I assume that one would not be reportable, because
9 they haven't shipped it yet.

10 MR. BINGHAM: If they have not shipped it, it is still
11 in the formative stages of design. I would guess that they
12 would make modifications to provide the proper piece of
13 equipment for the intended service.

14 DR. ROSZTOCZY: The question was, I believe, have there
15 been any cases on Palo Verde.

16 MR. CARSON: Those sorts of cases get corrected before
17 they leave the vendor's factory.

18 MR. BINGHAM: That isn't the question. His question
19 is have there been any that we know of.

20 MR. CARSON: We had some problem with Rockbestos cables
21 that had been shipped.

22 MR. BINGHAM: There have been some.

23 MR. VAN BRUNT: Some had and some had not.

24 MR. BINGHAM: Some had not been shipped.

25 MR. VAN BRUNT: In the case of Rockbestos, we filed a

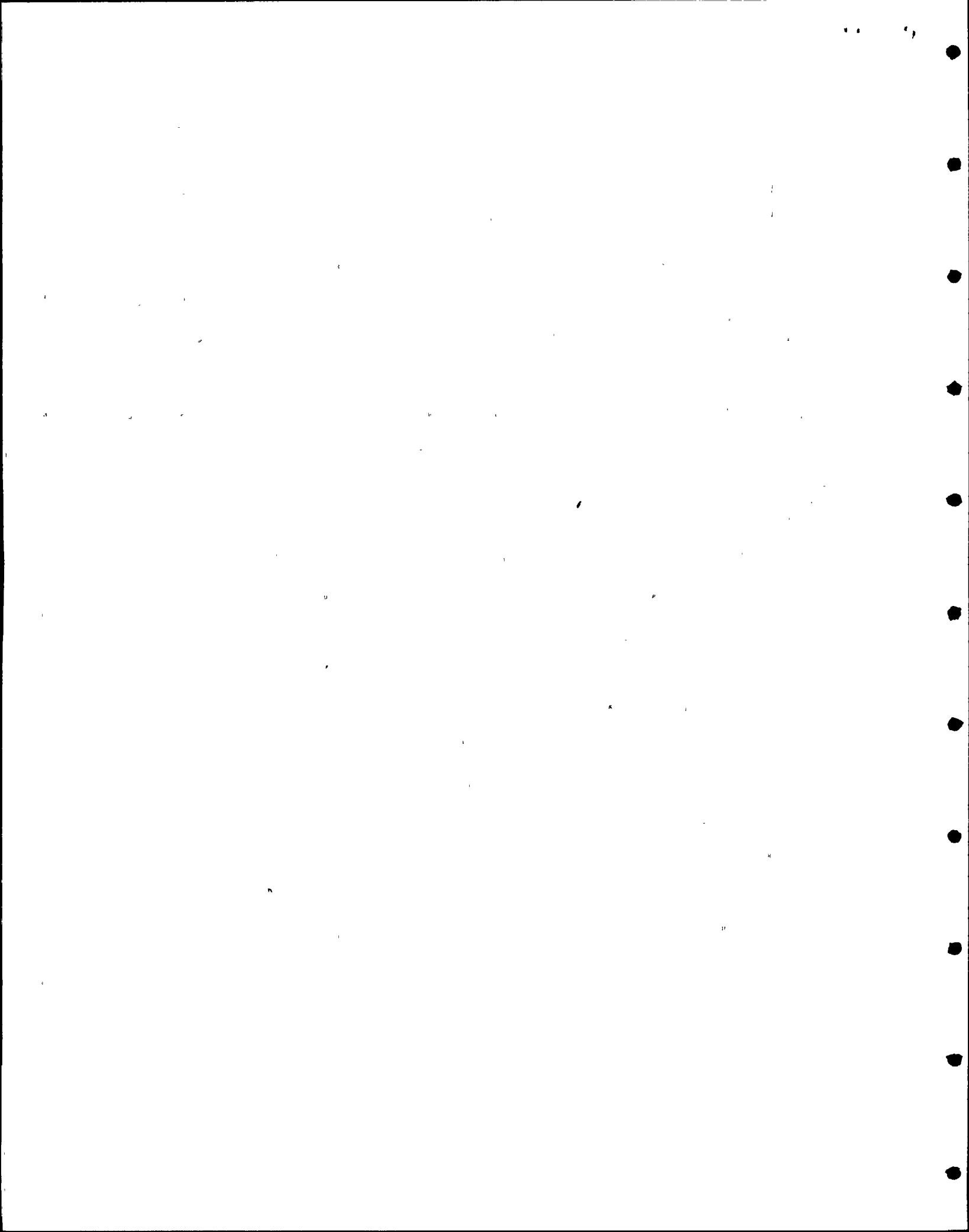
1 50.55(e) on that particular situation.

2 DR. ROSZTOCZY: Some of these cases when they do
3 perform the tests and they don't pass are still valuable.
4 information. The valuable information is sent and they tell
5 us how close we are to some failure threshold.. When you have
6 just passed that test, you don't know if you barely made it
7 or if you were very far removed, but when you do fail some
8 test and you start to get some ideas as to which equipment or
9 what component in given equipment is the limiting one that is
10 closest to the threshold --

11 MR. BINGHAM: I can think of one example, and that is
12 in-containment transmitters that both Westinghouse and Barton
13 have been having difficulty qualifying as well as Foxboro,
14 and I am sure that the Commission is aware of those.

15 MR. NOONAN: To follow the same line, if there have
16 been failures during a test program which you would normally
17 maybe expect to happen, it would not be uncommon to happen,
18 in your final test report, do they document the progressive
19 nature of these failures, what they were, and then final
20 resolutions of the failures?

21 MR. CARSON: All anomalies are indicated and the
22 resolution of the anomalies is indicated, either something
23 that is of no consequence or something that requires redesign
24 or some other corrective action, but, as I indicated, the
25 end result is before a plan is approved and certainly before



1 the report is approved, the equipment must be put in such
2 shape that it is qualified and it does do its job.

3 MR. NOONAN: I understand that. I just wondered if
4 there was a trail that could be tracked to look at.

5 MR. CARSON: Oh, yes. The reports indicate anomalies
6 and anomalies are analyzed and, if they require corrective
7 action, that is done and the test or the analysis and test
8 is restarted at that point and continued to a successful
9 completion.

10 MR. ALLEN: Further questions?

11 Does that conclude your presentation, Bill?

12 MR. BINGHAM: No, we have one other subject. We have
13 seismic on the agenda. Really, we don't have any particular
14 problems with specific vendors as we indicated in environmental.
15 Of course, we do have the open issues we discussed earlier
16 upon our re-review that may come up and present us some
17 problems. I think we should leave it at that point for the
18 board.

19 That would conclude our presentation, John.

20 MR. NOONAN: I wonder if I could just bring up briefly
21 about the relay problems, type testing of relays. Do you
22 have such a program in place? I am talking about type testing
23 of relays. Do you have such a program in place where you
24 would take, say, a sample of relays, put them on a table,
25 shake them, look for contact chatter problems or even maybe

1 relay failures?

2 MR. CARSON: Bechtel as such does not have a program
3 to test relays or any other specific component. There are
4 programs by General Electric, by Westinghouse, by Gould-Brown-
5 Boveri and other people who manufacture relays. We know of
6 programs that are going on with these manufacturers who are
7 doing these things and we are certainly anxious and we constantly
8 ask them for information about what the status is of relay
9 testing programs. We do take account in any of our programs
10 of relay chatter as Bruce Linderman indicated earlier. If
11 during a seismic examination, for instance, we notice chatter,
12 that is measured, and if it is less than 2 milliseconds, we
13 assume that it is no problem unless an analysis of the circuit
14 indicates that the 2 millisecond bounce would be a problem.
15 We are guided there by IEEE Standard 501, which allows a
16 2 millisecond bounce.

17 MR. NOONAN: I guess you have nothing in that system
18 that would integrate those bounces and give you a false
19 signal?

20 MR. CARSON: That's right. We have those circuits
21 re-examined to see if that would cause a problem.

22 MR. NOONAN: One of the NSSS vendors that you mentioned,
23 we went through a lot of their equipment, particularly in the
24 control room. We did type testing or required them to do
25 type testing and we found a lot of problems in relays.

1 MR. CARSON: Yes, we know of problems in relays.

2 MR. NOONAN: They produce a tremendous amount of
3 relays.

4 MR. CARSON: We know GE, for instance, has discontinued
5 use of certain relays which just a few years ago were
6 indicated as being successful, and they are replacing them
7 with their new Century series on one of our projects.
8 The Vogtle project is in a hassle right now with them about
9 changing relays.

10 MR. NOONAN: That's fine.

11 MR. ALLEN: The next item I had that you had asked
12 for some indication on what we are going to do is the documen-
13 tation as far as equipment qualification. I touched on it
14 briefly yesterday, but our intent right now is that APS will
15 have full documentation for both the BOP qualification program
16 and the NSSS program. These will be filed by purchase order
17 or by equipment type like relay panels, ESFAS cabinet, 5 KV
18 cable, and it will include all documentation in one single
19 package. For example, the spec will be there, the PO and the
20 qualification plan, the test result, all the information and
21 all the sheets like we have been seeing here. Once those
22 are assembled, they will be kept both in a hard file and they
23 will be microfilmed and kept on a computer based system at
24 both Palo Verde and our engineering offices in Phoenix. So
25 we will have them in both places for audit and use by

1 Engineering and Operations.

2 DR. ROSZTOCZY: For example, if somebody would come
3 out here and want to follow the qualification of a given
4 system, then what he would have to know, he would have to
5 know the component list for that system.

6 MR. ALLEN: Not necessarily the component list. He
7 would have to know the system. For example, he would want to
8 know switch gear so we could go to EMO, whatever it is, some
9 number, and look that up through the spec number, purchase
10 order number, and then that total package would be ready for
11 his audit.

12 DR. ROSZTOCZY: Once again it was mentioned here
13 earlier as an example the safety injection actuation system.
14 If I look at the whole system, it has a number of components.
15 Would those components be filed one following the other or
16 do you have to find the identification number for each of
17 those components and then go to the appropriate component?
18 Then I have to have somewhere a component list for the system.
19 Once I am in possession of that, then I could go and look at
20 the list. Then you are saying once I went to the file of a
21 given component, then everything would be together in that
22 one file.

23 MR. ALLEN: Right. In some cases like instrumentation,
24 you would have to go to the instrumentation index, which
25 would reflect the purchase order number. Then you would take

1 the purchase order number and that is where everything would
2 be filed. You would have to go to electrical elementaries.
3 You would see what switch gear, motor control centers, or
4 whatever was involved. You would determine its purchase order.
5 Then you would go to that and that file would be there with
6 the corresponding qualification information.

7 DR. ROSZTOCZY: And it would include the qualification
8 information independent of who generated it, whether it was
9 generated by Bechtel or whether it was generated by a
10 manufacturer who had, in turn, turned it over to Bechtel and
11 you got it through them?

12 MR. ALLEN: Right.

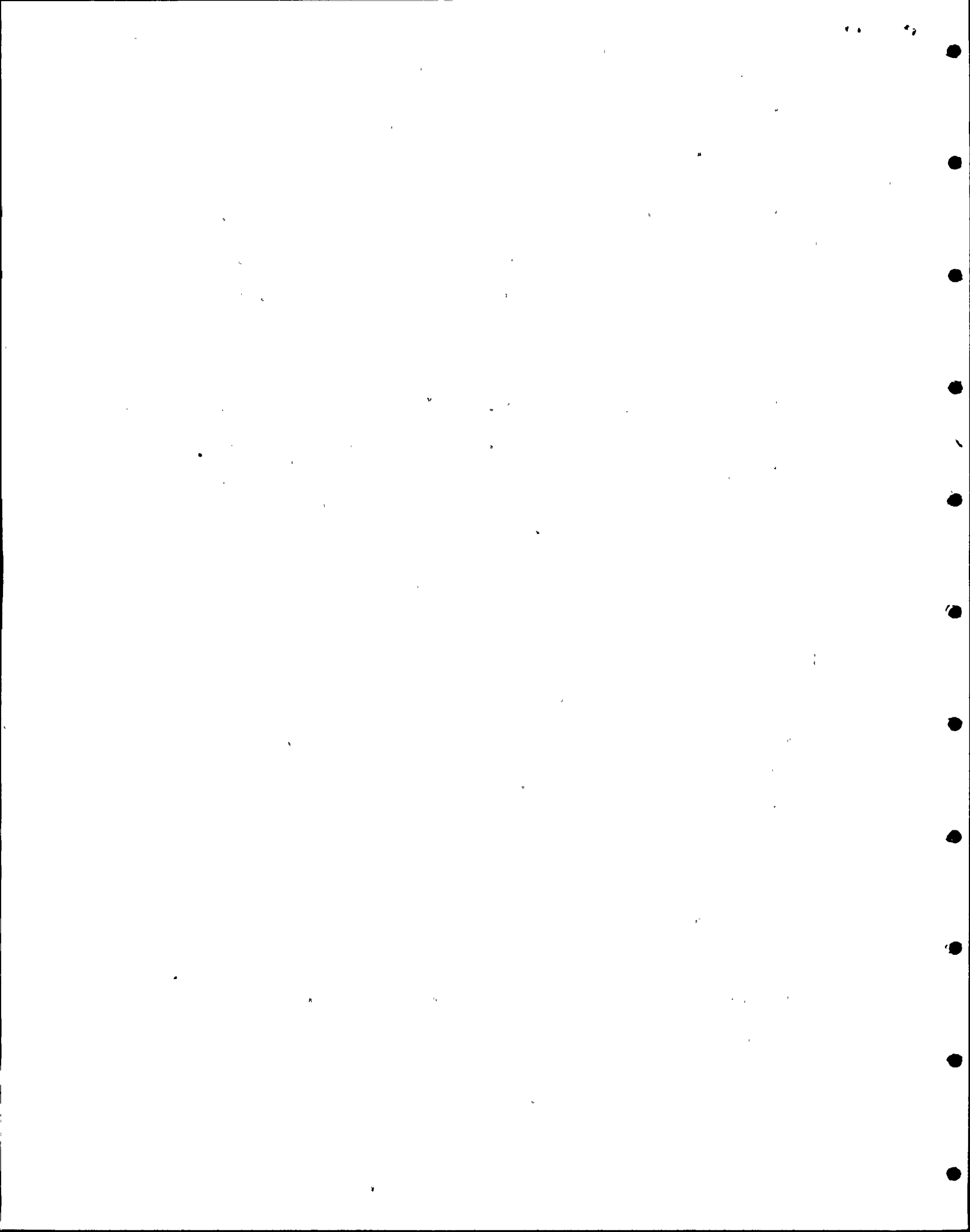
13 DR. ROSZTOCZY: What is your time schedule for establish-
14 ing this file? From our viewpoint, especially I am interested
15 in a date when you say this is all complete so one can come
16 out here and look at it.

17 MR. VAN BRUNT: For one component or for all components?

18 DR. ROSZTOCZY: Well, not specifically which component.

19 MR. VAN BRUNT: Seriously.

20 DR. ROSZTOCZY: I think I am looking for all components,
21 or maybe almost all. For example, you were talking yesterday
22 in terms of preparing a submission at the time when you are
23 something like 70 or 75% complete. The question would be then
24 when is the file complete for all of those items which are
25 in your submission?



1 MR. ALLEN: At the present time, we've got a great
2 deal of that information filed, already compiled into the
3 purchase order filing system. Cable, for example, I believe
4 that would be probably complete.

5 MR. BARROW: That would be complete.

6 MR. ALLEN: Bill, what was our date for submission
7 of the first --

8 MR. BINGHAM: November, '81.

9 MR. ALLEN: November, '81, that would be 70%, and
10 then six months later the rest of it.

11 DR. ROSZTOCZY: Does this mean that at this time when
12 you submit to us the summary type of information, at that
13 same time the file is complete for all of that equipment?

14 MR. ALLEN: I don't think you could say it would be
15 100% complete, because, as Bill indicated, we've got some
16 problem vendors, and that is not going to be 100% complete.
17 Probably, what would you say, Bill, 10%?

18 MR. BINGHAM: I don't know. The intent would be to
19 have the information available that was prepared for the
20 summary sheets, so you might have 100% of the 70% in form
21 that could be auditable. I don't know whether you could have
22 it all in your records management system.

23 MR. ALLEN: No, it will be in hard copy.

24 MR. BINGHAM: There could be hard copy available to
25 review.

1 MR. ALLEN: So as far as an audit team coming in and
2 looking at it, we would have a hard copy available.

3 DR. ROSZTOCZY: So any time you get it to a submission,
4 then following the date, we could audit components which are
5 in the submission?

6 MR. ALLEN: Yes. The microfilmed stuff wouldn't be
7 going on until later. You would probably rather audit the
8 hard copy anyway.

9 DR. ROSZTOCZY: That's right.

10 MR. SLITER: If I understand from the previous conver-
11 sation, there is a target date for submittal of 0588 summary
12 data.

13 MR. BINGHAM: Yes. If you look at that schedule,
14 Figure 2, I believe it is, in the handout.--

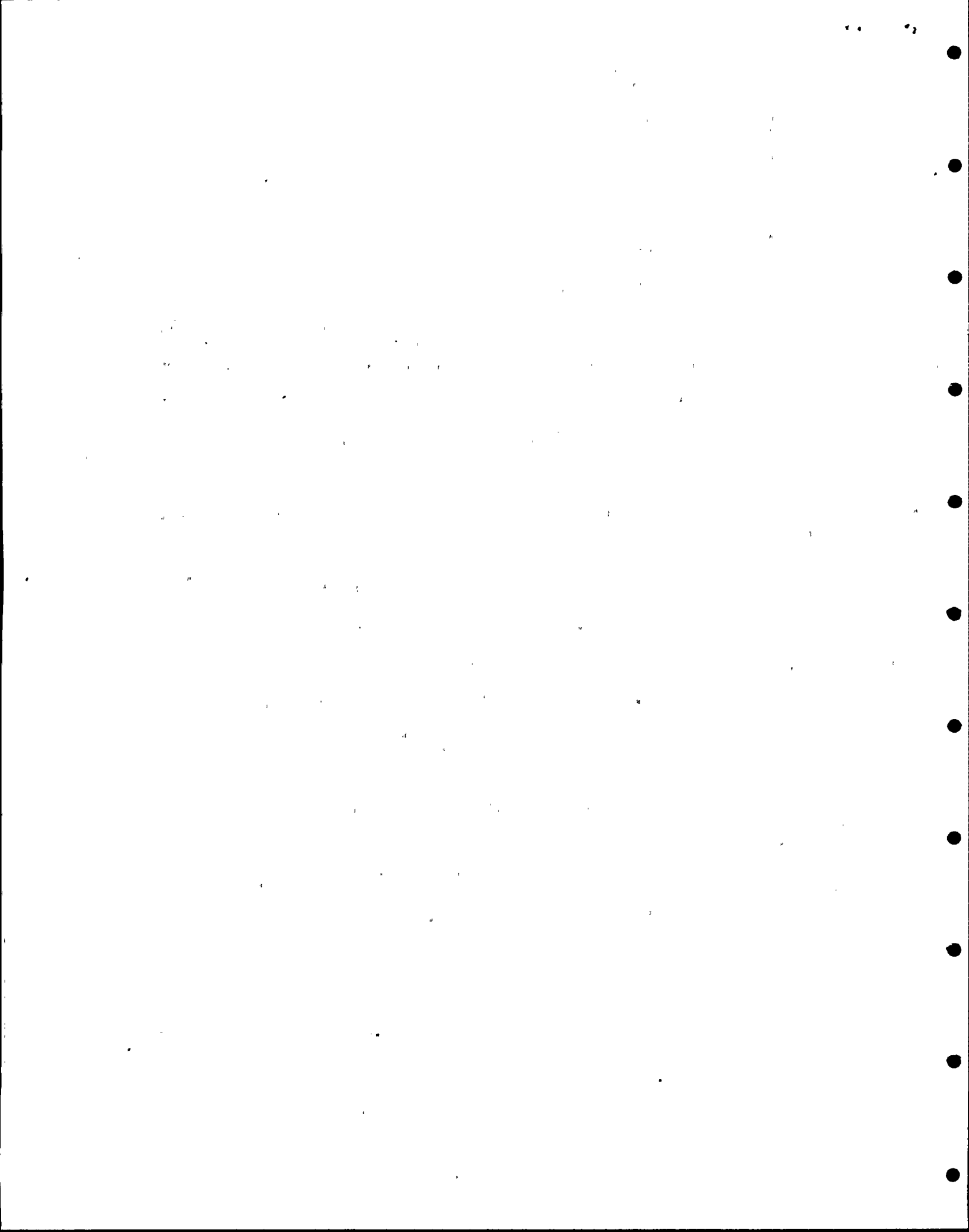
15 MR. ROGERS: Figure 8.

16 MR. BINGHAM: I'm sorry, Figure 8, you will see the
17 November date. Look under Bechtel Power Corporation. It
18 says summary submittal documentation of licensing and then
19 the site records available as well.

20 MR. SLITER: Thank you.

21 MR. ALLEN: Norm, do you have a comment?

22 MR. HOEFERT: I just wanted to add at this time, the
23 file you were talking about is being completed at Deer Valley
24 and the plant files are not completed. They are not in
25 condition I don't believe to be audited at this time.



1 MR. VAN BRUNT: I think that it would be fair to say
2 that at that point in time, there would be one complete file.
3 Whether we would have the multiplicity of files established
4 and the multiplicity of microfilm established would be
5 another matter, but there would be a complete file which
6 would be auditable, and most likely that would be the hard
7 copy file in the engineering offices.

8 MR. ALLEN: Are there any more comments on that item?

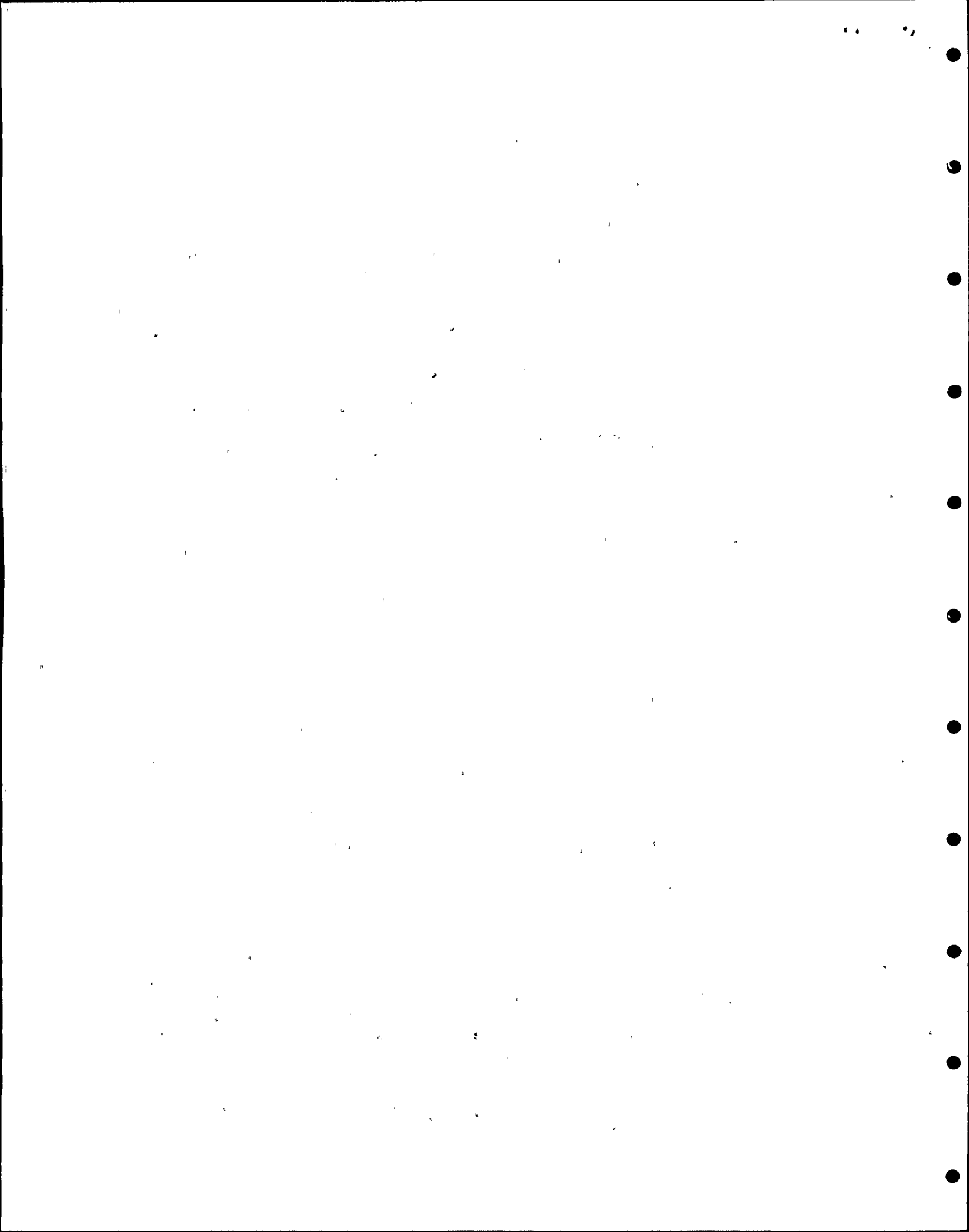
9 DR. ROSZTOCZY: Since we brought up this schedule,
10 maybe this is an appropriate time to bring up some comments
11 in connection with the schedule. The schedule also shows some
12 NRC actions which are not correct. I don't expect to act on
13 this schedule that is on here.

14 MR. VAN BRUNT: You are going to do it faster; right?
15 That's what Harold told me.

16 DR. ROSZTOCZY: This one shows the issuance of the NRC
17 SER at the same time as you are submitting to us, and we
18 normally require 10 months to do that work and not zero time.

19 MR. VAN BRUNT: Let me say that I discussed that with
20 Harold this morning somewhat and there are some difficulties
21 with that, I understand.

22 DR. ROSZTOCZY: This shows there are two submittal
23 dates and one of them is November, so that comes the end of
24 '81, and then it says the final equipment qualification
25 summary submittal is the end of March, and exactly the same

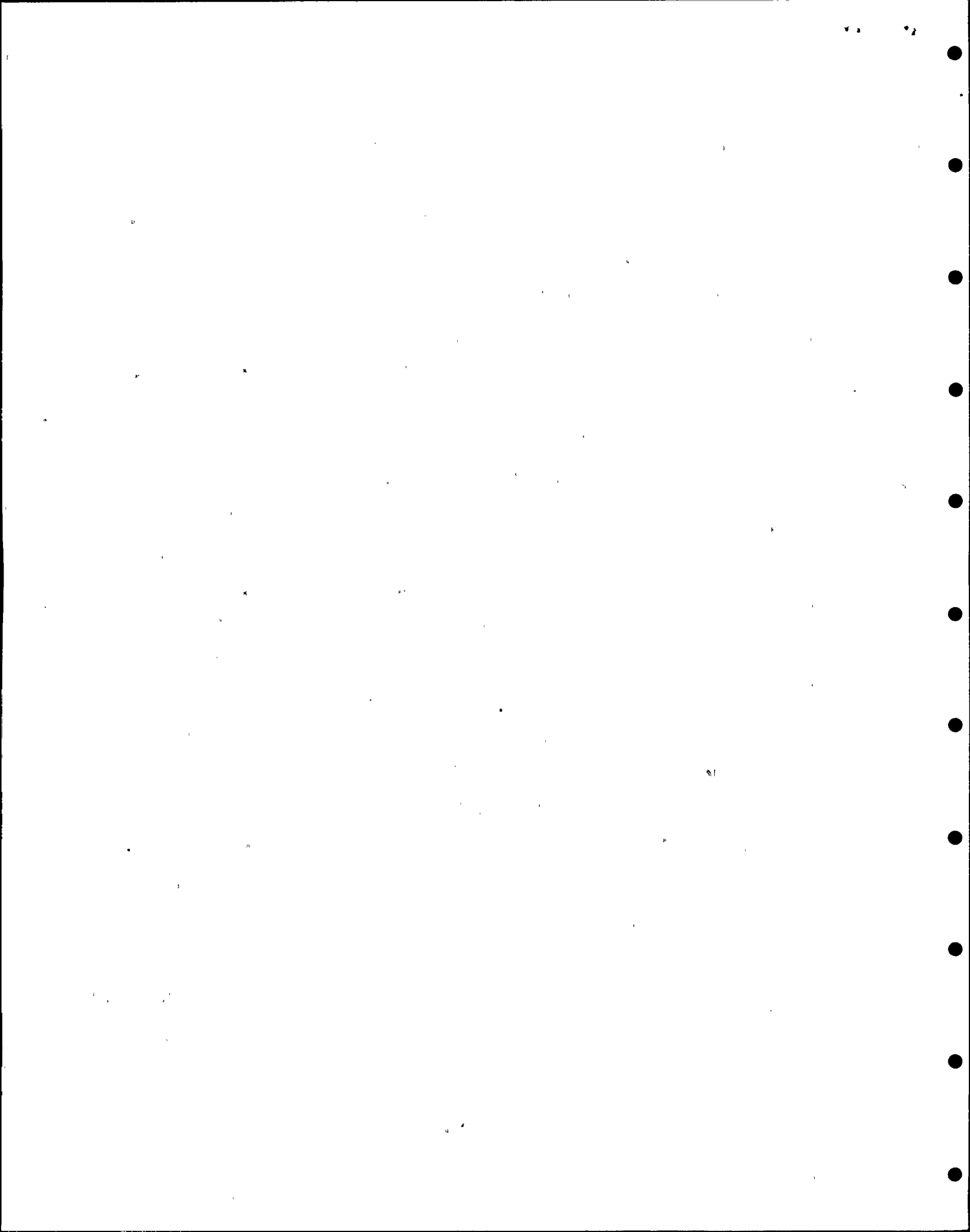


1 time it shows an SER from NRC. That is just not possible.

2 MR. VAN BRUNT: Well, as I indicated to you, I spoke
3 with Harold Denton this morning some about that and had some
4 conversations about it and I guess the question is partly a
5 legal question as to whether the Commission could issue an
6 SER.

7 DR. ROSZTOCZY: It includes lots of practical questions,
8 too, and one of them is whether we would even start to audit
9 it without having it be completed. It depends on the
10 availability of people, and it is a great inconvenience to
11 come out here for two audits as opposed to one audit and we
12 might not do the actual audit until it is completed. We would
13 study the first submittal, we would select from there certain
14 things we wanted to audit, then we would wait for the comple-
15 tion of the submittal study, select some more for audit, and
16 then come out and have one audit which covers both the first
17 and the second submittal. So I think that a realistic date
18 looking at this would be the end of '82.

19 MR. VAN BRUNT: Well, my comment to that would be that
20 that is unacceptable to us and we are certainly going to have
21 some conversations with the Commission about the schedule for
22 the project. This is one issue in that whole situation.
23 So we are going to be looking at what we can do and I believe
24 that the staff will be looking at some things that they can do
25 so we can get to some common ground that will meet at least



1 our objectives if we hold up our end of the bargain for fuel
2 load in '82.

3 DR. ROSZTOCZY: Right. I think it just points out the
4 need to correct that scheduled time of submittals.

5 MR. VAN BRUNT: You have to understand that we can't
6 speak for the staff. We can only write down what we would
7 like to pursue.

8 DR. ROSZTOCZY: Right. Somewhat interrelated with
9 this, also, the form what you are submitting here, I was
10 under the impression from the presentation that these dates
11 here were -- I have to be careful here -- the submittal that
12 is shown here, the November date and the March date, do those
13 represent all equipment qualification independently whether
14 balance of plant or the CE plant system.

15 MR. VAN BRUNT: Bill, can you answer the intent on that?
16 I am not sure.

17 MR. BINGHAM: Yes, that is the intent.

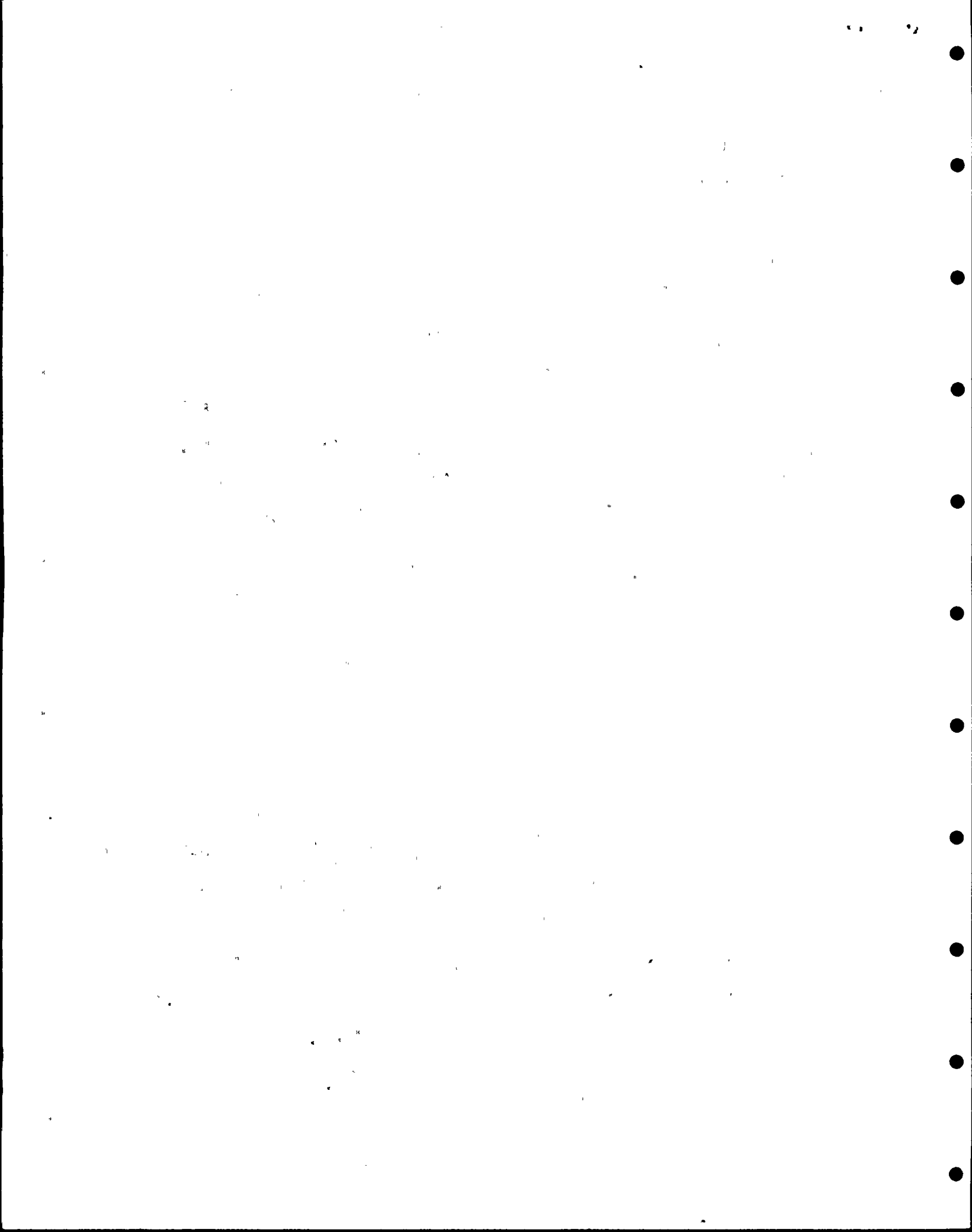
18 DR. ROSZTOCZY: So when the final part comes in, that
19 would mean it is complete for the entire plant.

20 MR. VAN BRUNT: Yes, I agree. That was the intent.

21 MR. KEITH: The CE schedule is shown on there.

22 DR. ROSZTOCZY: Yes, I think it is shown.

23 MR. VAN BRUNT: That is assuming that we don't have
24 some insolvable problems with, as Bill calls them, recalcitrant
25 vendors, which is the real world, I may say.



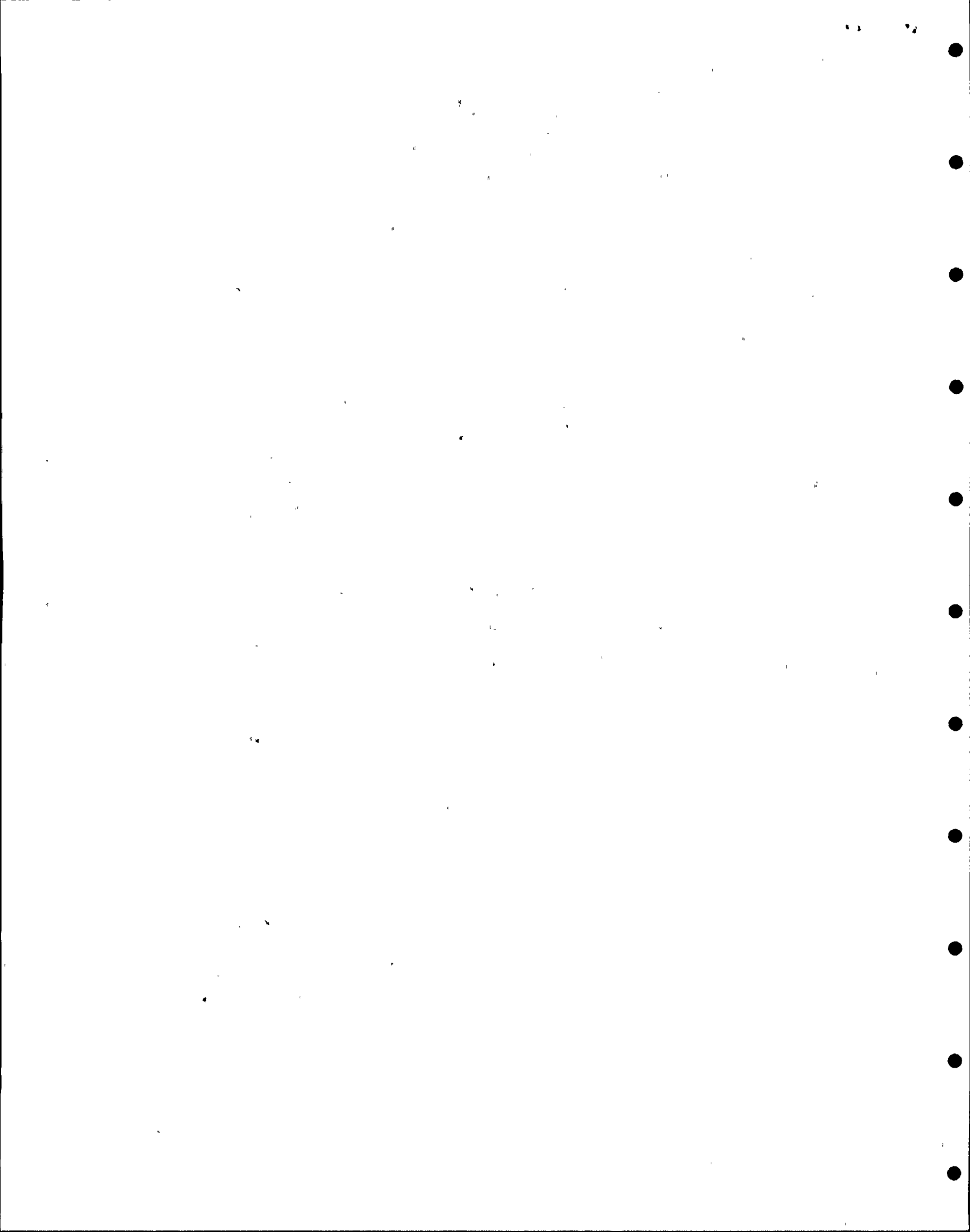
1 MR. ALLEN: Any further questions?

2 MR. NOONAN: I would just like to make one comment on
3 the basic concept of this meeting. I think the meeting has
4 been worthwhile. It has shown us what you have been doing
5 and I think you have seen some of the NRC requirements.

6 A couple things I would like to repeat from yester-
7 day. I said that the Commission is now on its hydrogen burn
8 problem. They are looking at it. While it doesn't affect
9 your plant as much, it might affect other plants. I think
10 you ought to follow what is going on there to see what is
11 coming out of that, because they have asked us to look at
12 equipment under a hydrogen burn type of environment. It is
13 not a requirement yet, but clearly they are thinking that way,
14 or at least they are asking us to look at it.

15 The purpose of this meeting is when you come in
16 with your submittal to have the best submittal that you can
17 possibly have so it cuts down on the staff review. Hopefully,
18 we could eliminate any questions and completely cut that
19 period out so we don't have this question and answer going
20 back and forth. We get the submittal, we look at it, and
21 then it is in good shape, we select out those items we want to
22 audit, we come out and audit them, and then we come out and
23 render the SER.

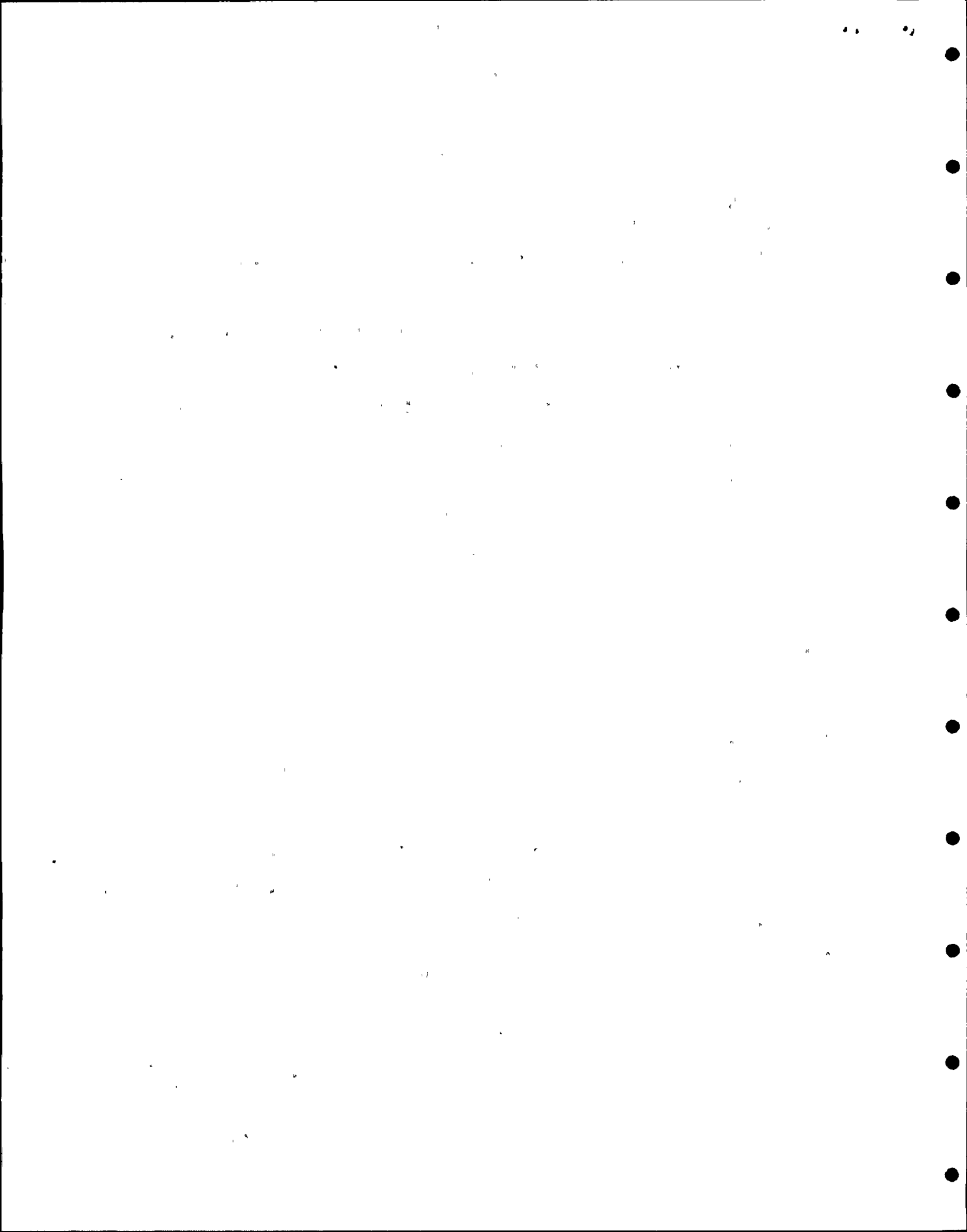
24 MR. VAN BRUNT: I think from my opening remarks, that
25 is our intention as well.



1 MR. NOONAN: Clearly, there are some schedule problems
2 that we have to work on. I think we ought to do that as soon
3 as possible to know what your requirements are so we can take
4 a look at our manpower and work out a schedule that is
5 compatible to both people, and you know from discussions with
6 Harold that he wants to shorten down this whole proceeding
7 and not lengthen it by any means.

8 MR. VAN BRUNT: While I wasn't here the full meeting,
9 just based on the conversations that I have had with people
10 and the part of the meeting I have been here, I think that
11 from our perspective, the meeting is being very helpful to us,
12 because, as we discussed this morning, while there are various
13 standards and things that cover this area, there is a vast
14 interpretive area that is not written down, and I think we
15 have gone a long way in the interchange of information here
16 to understand the interpretations that you folks are putting
17 on this and it will certainly help us in at least where we
18 can be as responsive as we can. So I think it has been helpful
19 to us.

20 MR. NOONAN: I think the basic concept is to gain
21 confidence that the utility itself has a handle on all the
22 problems and is really involved in all the work and has not
23 just left its contractors dictate action and say we can work
24 it out with the NRC. We would like to eliminate that part of
25 it. We would like to see it more basically between the



1 licensee and the NRC.

2 MR. VAN BRUNT: The licensee is the responsible party.

3 MR. NOONAN: That's right. That is one of our main
4 concerns and that was one of the things we addressed yesterday
5 about the NSSS vendors. I understand there are some problems
6 there. But in this particular field, he feels that the NSSS
7 should also come under the same kind of a type of action,
8 and you probably have talked to him about that. So that is
9 that problem.

10 I think in general the meeting is worthwhile. It
11 gives us an idea of what you are doing and how well you are
12 doing it. I guess I don't have any further comments.

13 Do you have anything further?

14 DR. ROSZTOCZY: I have some comments, but I still have
15 questions in two areas. One of them is the failure of the
16 nonsafety equipment. It has been brought up yesterday and
17 there was some discussion on it. My understanding was that
18 you have a design criterion that nonsafety equipment indepen-
19 dently how does it fail, in which mode does it fail, cannot
20 degrade the operation of safety-related equipment. This is
21 a rather strong criterion to have such a design criterion,
22 and if you are executing it across the board everywhere for
23 your system, I think that is a positive item. I am not sure
24 how easy it is to accomplish this. Is this design criterion
25 clearly spelled out in your FSAR?

1 MR. KEITH: I don't believe it is in the FSAR. Let
2 me describe for you just briefly what we do do. We do a
3 hazards review, a separation review throughout the plant, and
4 there we look at all kinds of failures in each area. We go
5 compartment by compartment throughout the plant, so we look
6 at failures in each area. Specifically in the seismic area,
7 we look at all the non-Category I equipment which is located
8 near Category I equipment to determine whether there is a
9 potential for this failing during a seismic event and damaging
10 Seismic Category I equipment. If we determine that there is
11 that possibility, then we classify it as Seismic Category IX,
12 which means that it is supported to Seismic Category I
13 requirements. It doesn't have to function for anything
14 following the SSE, but we then support it to assure that it
15 will not fault and damage any Seismic Category I equipment.

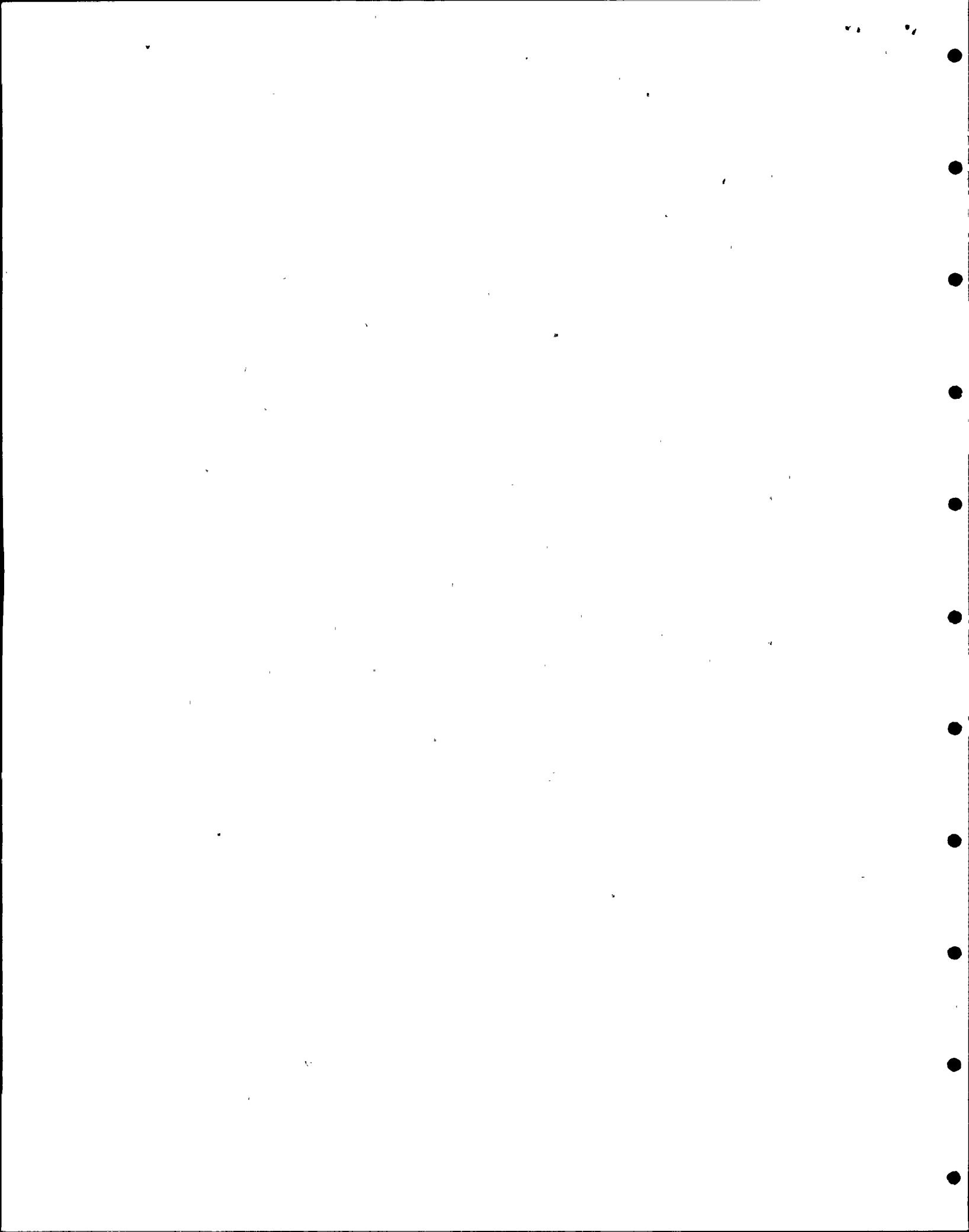
16 MR. VAN BRUNT: That is specifically stated.

17 MR. ROGERS: In the FSAR.

18 DR. ROSZTOCZY: But is that a more general criterion
19 in the FSAR across the board, not only for seismic, but for
20 other possible mode of failure areas?

21 MR. KEITH: Could you give me some examples of the
22 modes of failure you are thinking about? Maybe I can be more
23 specific.

24 DR. ROSZTOCZY: This is a very difficult problem in
25 that it is a negative statement, not a positive statement.

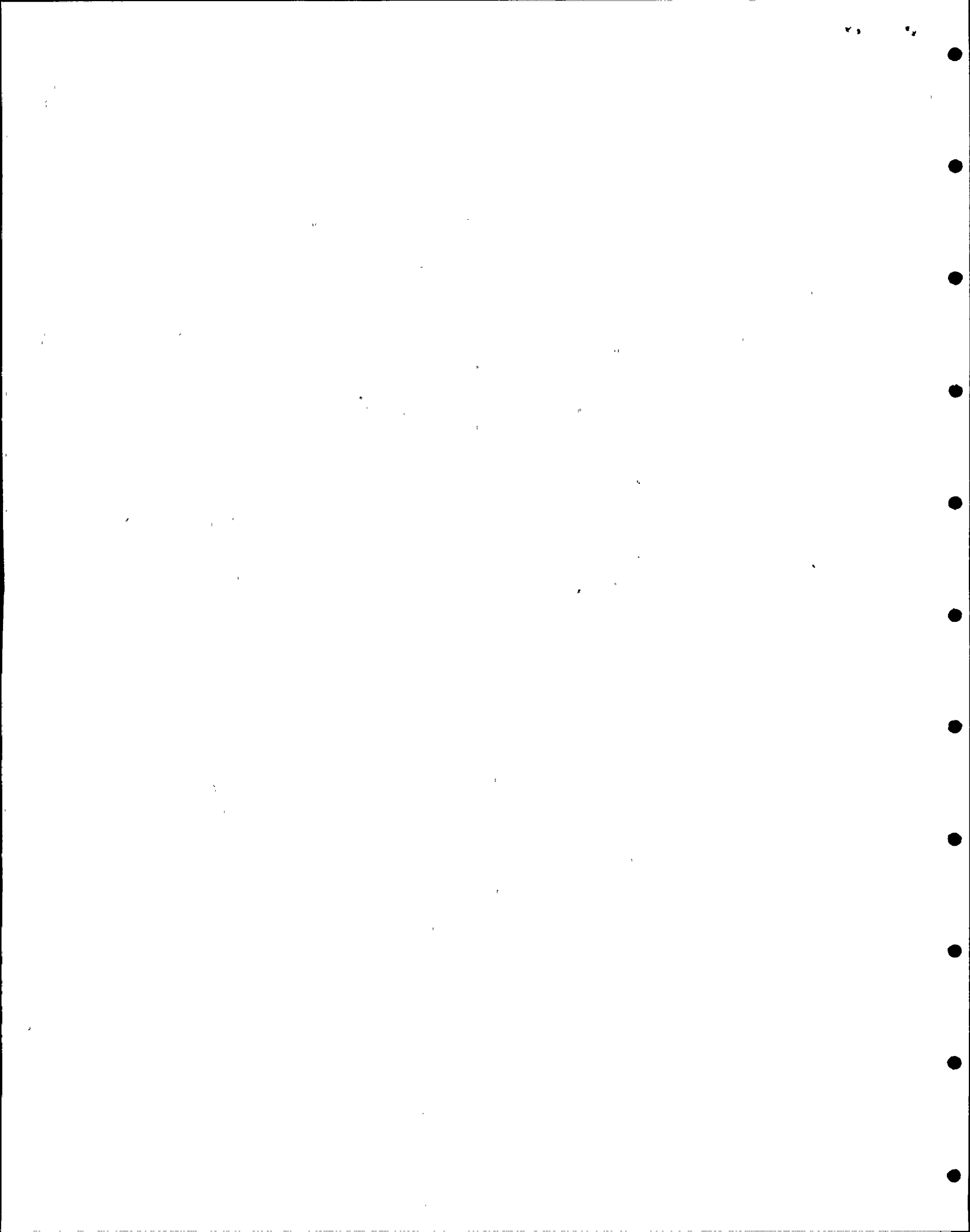


1 For example, if you manufacture a truck, then it is relatively
2 easy to test whether it does the purpose what it is manufactured
3 for, but it is very difficult to test whether it has any other
4 kind of side effects, and our biggest concern is that there
5 are only certain equipment that qualify for the environment.
6 There are many other equipment there which is not qualified.
7 The reason for not being qualified is that you don't depend
8 on it. You are not planning to call on this piece of equip-
9 ment, but do you know the failure of those is not going to
10 cause some problem for you or for the operators of the plant
11 who are seeing some of those other instruments also which are
12 not qualified.

13 MR. BINGHAM: I think probably, Dennis, it would be
14 best to review the question and then we can respond back to
15 the particular issue.

16 MR. VAN BRUNT:: Bill, I think I agree with you. It is
17 a broad question and I think we would have to think about it.
18 The seismic area is one that we can deal with because it is
19 the specific one that we have considered. I think we would
20 have to think about the other one as to whether it falls in
21 the same category or not.

22 DR. ROSZTOCZY: I think it is very broad and, because
23 of that, it is very difficult, so I would like you to take a
24 look at this and tell us what are you doing to assure yourself
25 that you won't be surprised later.

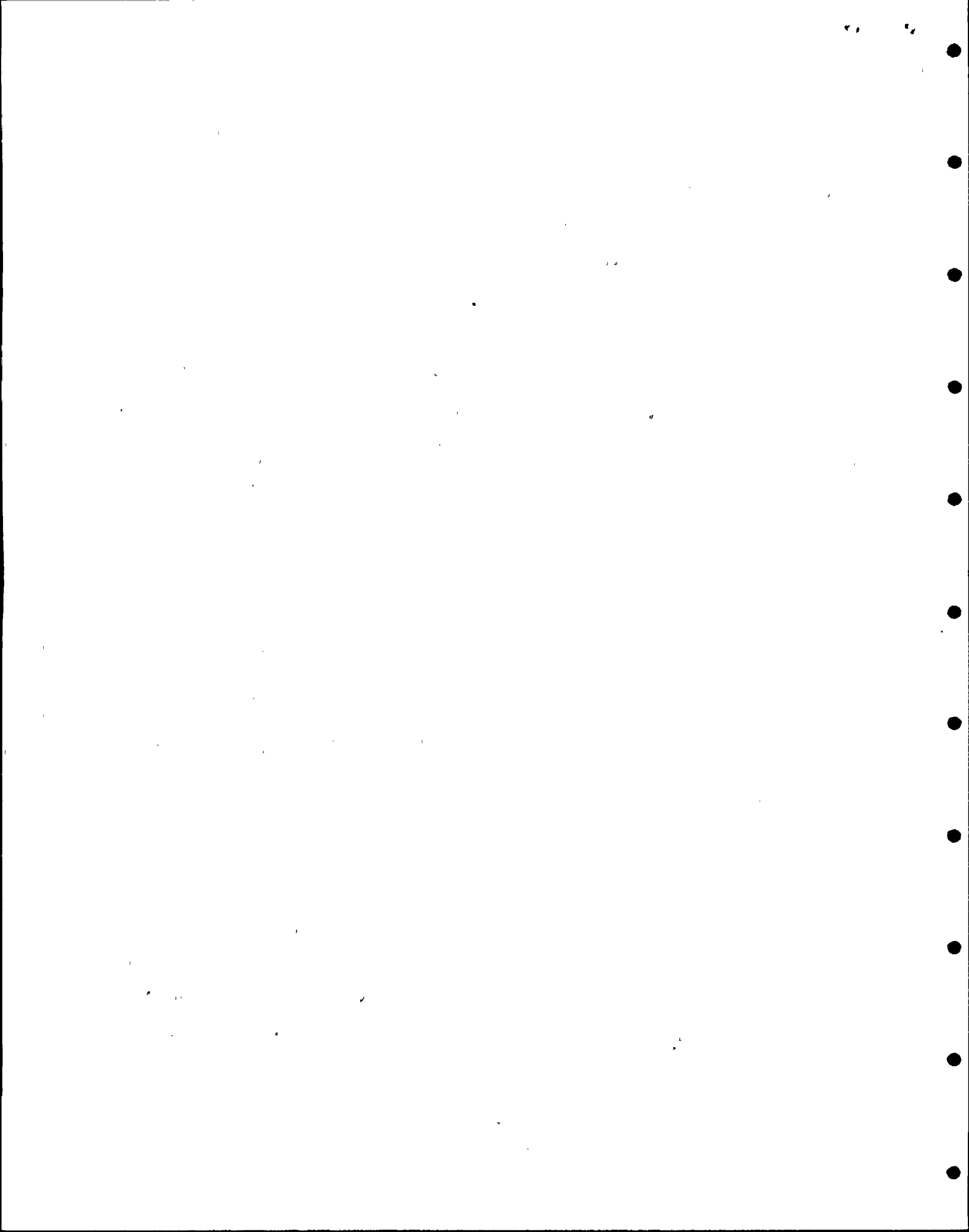


1 MR. VAN BRUNT: We have made a note of that.

2 MR. KEITH: I would just like to ask if you are talking
3 about the Crystal River, I know we addressed that in our last
4 system review, where there was some non-IE instrumentation
5 which gave some problems.

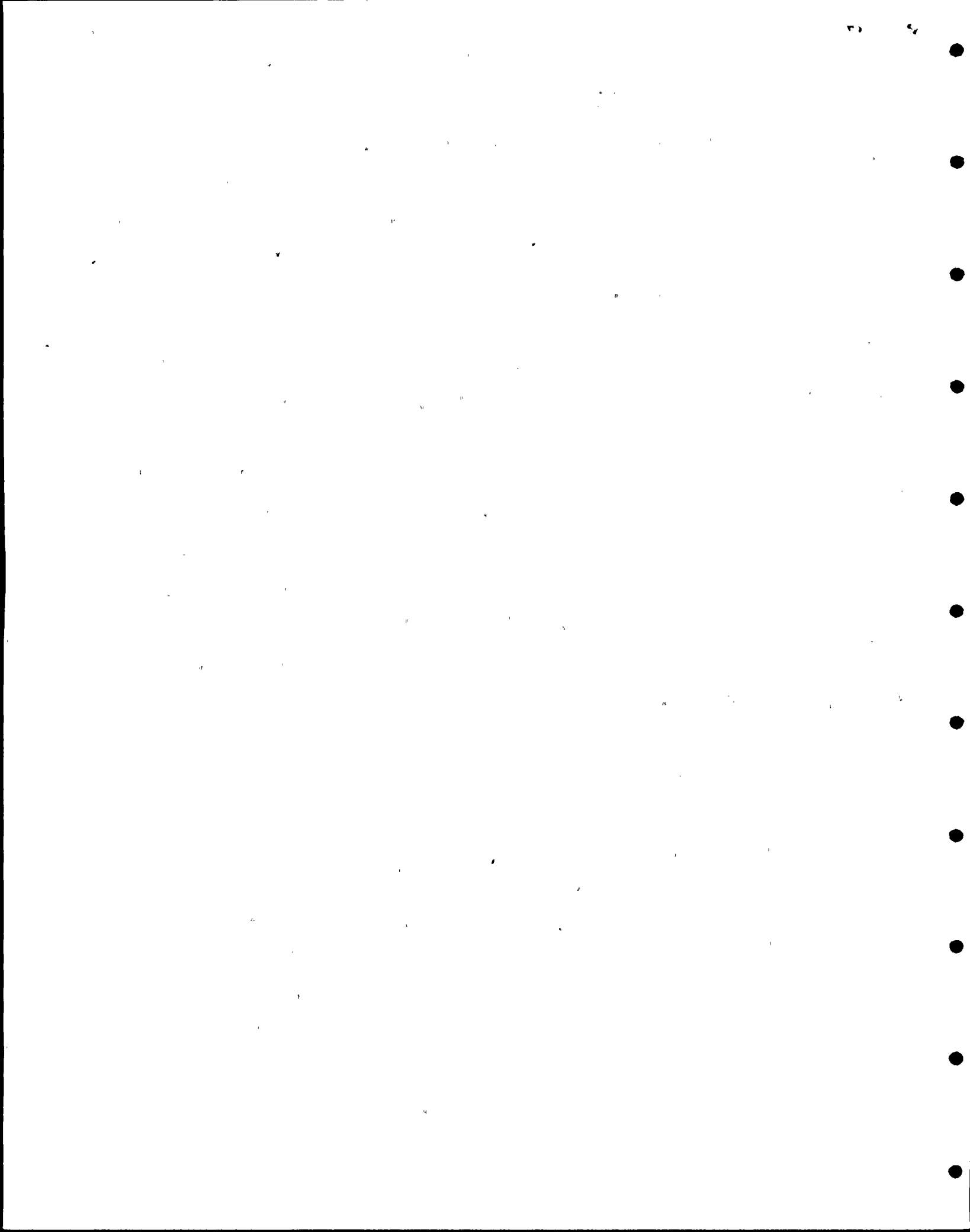
6 DR. ROSZTOCZY: I don't have anything specific in mind,
7 but I think if you go back to some of the actual cases when
8 something happened, yes, you can bring out examples like the
9 Crystal River problem and any others. Every time when there
10 has been an accident, that kind of cascaded. Almost always
11 I find some nonsafety grade equipment in the chain that had
12 some role in one way or another that contributed to the
13 accident. It is very difficult to address that. I am asking
14 you to try to do the best you can.

15 The second area where I would like to hear a little
16 bit more, and this I think is addressed to APS, is the
17 quality assurance of the equipment qualification review.
18 Your final submittal is going to have the statement that you
19 have reviewed all of the safety-related equipment and you
20 found that they would function under their predicted environ-
21 mental conditions. What quality assurance programs do you
22 have now that are going to help you to this final conclusion?
23 First, if we look at the work that is being done within your
24 own organization, within APS' organization, what quality
25 assurance procedures are being used there? We were talking



1 yesterday about the equipment qualification team which has
2 members on it from APS. Are they doing the work? What are
3 they doing? Figuring out some of the sheets which we have
4 seen? Are they doing calculations? Are they doing these
5 under one of your quality assurance procedures? If yes,
6 then which one? Have you had discussions with the other
7 organizations like Bechtel and Combustion whether they are
8 doing their work within their organizations under safety
9 quality assurance procedures and which quality assurance
10 procedures are those? Then, finally, normally a quality
11 assurance department like your Quality Assurance Department
12 performs its work by auditing the process. They do go out and
13 they audit certain things within your organization and they
14 do go out and audit the other organizations, also. Have there
15 been any audits on equipment qualification programs or
16 procedures either within your organization or within the
17 Bechtel organization or the Combustion organization or whoever
18 is involved for Palo Verde, and if there have been any, what
19 was the outcome of those audits?

20 MR. VAN BRUNT: I will be able to answer that partly.
21 Unfortunately, John Roedel, who is our quality assurance
22 manager, could deal more specifically with your question as
23 to what audits have been done and this kind of thing, had to
24 leave and catch an airplane. Let me deal with it in a general
25 way and then we will deal with it specifically as an item after



1 I go back to check the record.

2 Take the APS work first, which is the easier. We
3 have a procedure, NS 15, I believe that is the correct
4 procedure, Revision 2, which is Class IE equipment qualifica-
5 tion. This is a Nuclear Services Department internal
6 procedure within APS. That is the procedure that is followed
7 by the engineers within our engineering organization in
8 doing the various and sundry reviews associated with equipment
9 qualification. That like all the other procedures that are
10 in the Nuclear Services Department procedures manual comes
11 under the complete quality assurance program of APS and is
12 audited under that program. As to whether there have been
13 audits made of that yet or not, John, can you answer?

14 MR. BARROW: I might just add the last time it was
15 audited, I had to rewrite the procedure, so it is right up
16 to date with what QA wants us to do.

17 MR. VAN BRUNT: I guess the answer directly as far as
18 APS' function is concerned is yes to all those items.

19 With the Bechtel situation, I think I can also say
20 the same thing, that there is a procedure. I don't know the
21 number offhand. I presume first that the Bechtel quality
22 assurance organization, which has been delegated various
23 aspects of the overall Arizona Public Service Company quality
24 assurance program, has been auditing that and I would expect
25 that our own quality assurance people have audited that whole

1 program as well or will under our normal plan of events for
2 the balance of this year or next year sometime. I don't know
3 specifically whether they have or not. I would have to go
4 back and check the records.

5 The CE program falls much in the same category.
6 CE has a quality assurance program. That program would
7 encompass the equipment qualification program, and again
8 within Combustion their quality assurance people would be
9 auditing that program and we ourselves or in conjunction with
10 the Bechtel quality assurance organization will or have
11 audited that program, too.

12 So I think across the board without getting into
13 the specifics of how many audits, when they were done and
14 what the results were, the answer to all three questions
15 is yes.

16 DR. ROSZTOCZY: In connection with your work, you
17 mentioned the procedure and you read the title of it. The
18 title had in it IE, which would indicate that it applies to
19 electrical equipment. We are talking here of equipment which
20 goes beyond the scope of electrical. Is there another
21 procedure that you use for the other areas or is this
22 procedure, even though it is called IE, being used in a
23 broader term?

24 MR. VAN BRUNT: I will have to give you an answer on
25 that. I don't know.

1 MR. BARROW: That procedure is being used.

2 MR. VAN BRUNT: Across the board?

3 MR. BARROW: Across the board to review all equipment.
4 Although it specifically addresses 323 and 344, it can be
5 used to address any of the qualifications. It is all done
6 on that basis.

7 DR. ROSZTOCZY: Those were the two questions. Then I
8 was asked if I wanted to make any comments. Yes, I would
9 like to make some comments.

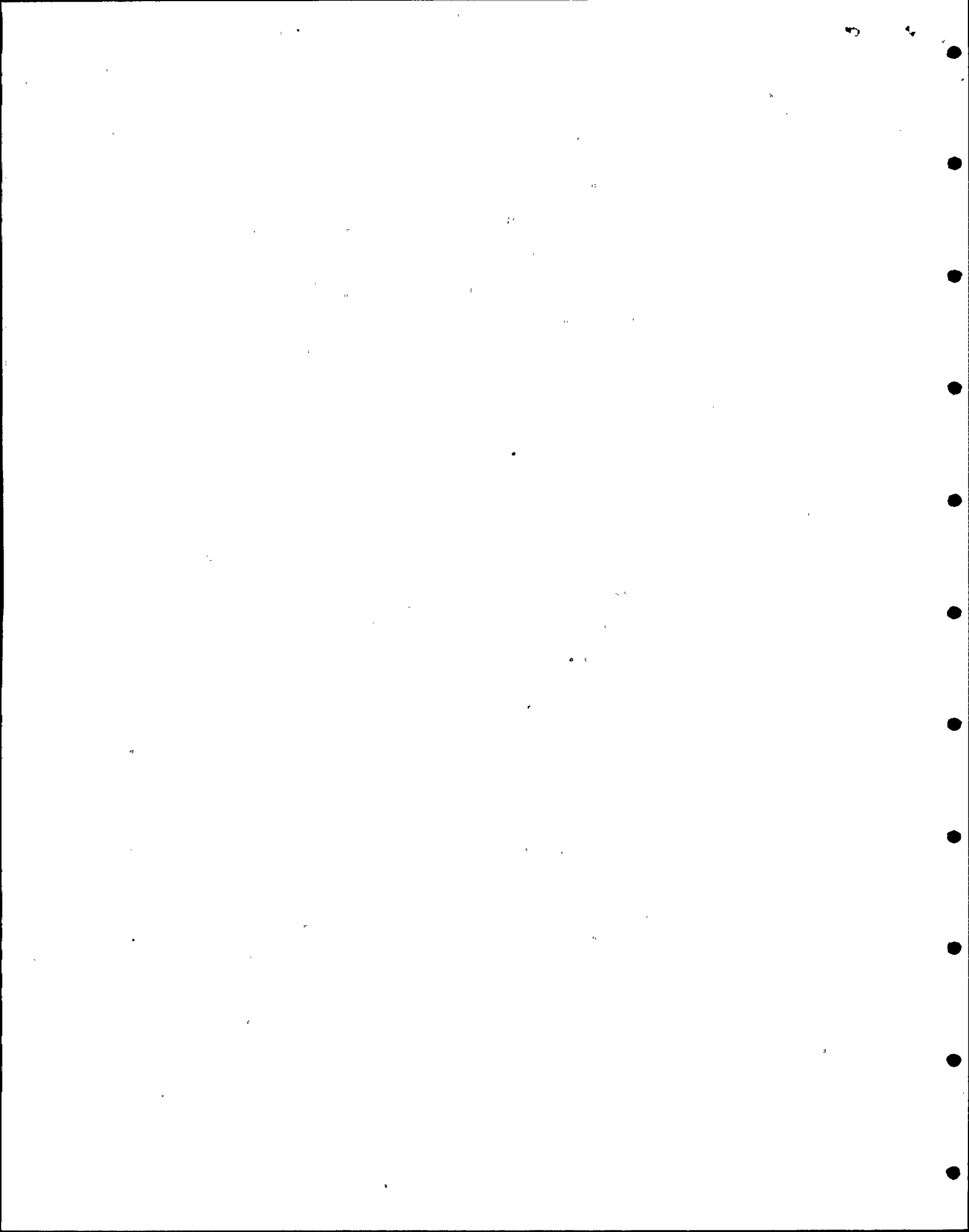
10 MR. QUAN: Excuse me, before you do, on your last
11 question, there was some remark that Ed made that he could
12 answer generally. Was there more detail that you would like
13 in answering that question?

14 DR. ROSZTOCZY: Yes. I think it would be appropriate
15 if you would put it on the open item list and then we would
16 have a more specific answer which would include the processes
17 used within the three organizations and some statement about
18 how the audits would have been performed and what was the
19 outcome of those audits.

20 MR. VAN BRUNT: And if we have not performed them, we
21 will give you the schedule for those.

22 DR. ROSZTOCZY: Just indicate that you haven't done it
23 yet.

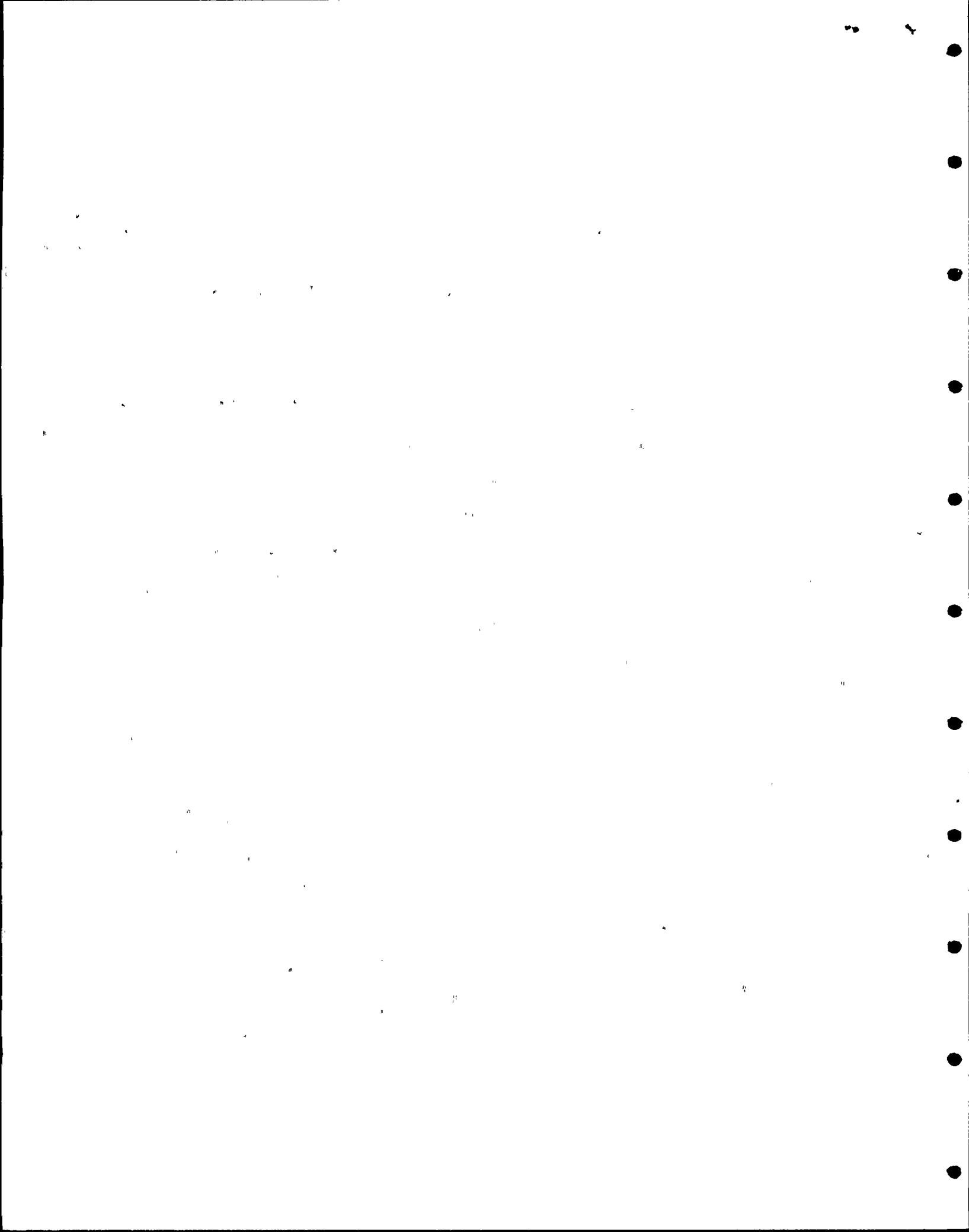
24 MR. VAN BRUNT: I can give it to you now that I intend
25 to. I know that for sure. I just can't tell you specifically



1 when.

2 DR. ROSZTOCZY: If some has already been done, I
3 would be interested to know what was the outcome of the audit.

4 Along the line of comments, I would like to
5 emphasize that this meeting has been the type of meeting
6 when we had Bechtel upon the stand presenting information to
7 us and we have been asking questions. Every time when this
8 type of a meeting proceeds, questions are being done in the
9 areas where some toughness for something missing is being
10 detected. Because of this, sometimes just listening to the
11 questions gave a negative picture of the overall process.
12 That is not necessarily the case. It should not be interpreted
13 along those lines. I think we have seen during the past two
14 days that paramount work has been done, certain things have
15 been accomplished. At the same time, also, there is need for
16 additional work. In this area, in the equipment qualification
17 area, one might be able to cut it into three steps, the
18 overall process. One of them I would call really specifying
19 what needs to be done, the second one is to do the actual
20 testing, and then the third one is to look at the results of
21 those tests and arrive at some conclusions from them. Because
22 the testing process itself is rather lengthy and extensive in
23 many cases, especially with sequential testing, it is very
24 important to straighten out the first part, the front part,
25 as early as possible. Without that, the testing would go the
wrong way or might go the wrong way.



1 There have been a few items brought up here which
2 are not fully resolved. I think you should pay special
3 attention to those items and try to resolve those and to
4 straighten those out so you won't be surprised later.

5 Mr. Noonan already mentioned the responsibility that
6 basically rests with the licensee. In this case, the utility
7 hopefully will be the licensee.

8 MR. VAN BRUNT: One and the same.

9 DR. ROSZTOCZY: I don't have to elaborate on that, but
10 I would like to emphasize that this is a very important
11 aspect of equipment qualification. In most areas when we are
12 reviewing the plant and the equipment qualification area,
13 we again in NRC do not review the equipment qualification
14 of every piece or every type of equipment. It is just too
15 broad and there is too much work involved with it and we have
16 no intention to do that. Instead, we are only auditing it.
17 We are only auditing how good a job you have done, so we rely
18 on you even heavier in this area than we rely on you in other
19 areas. That is why we are very interested to know how are
20 you doing your work, because we depend on you very heavily.
21 We would like to certainly encourage you, you meaning APS, to
22 exercise an aggressive leader role in this process. That is
23 where the main portion of the work is.

24 In terms of where do you stand today, we have not
25 received really a detailed account of this. We have seen some

1 slides and heard some remarks that provide some insight of
2 where you stand, but we didn't see kind of an itemized account.
3 Typically, we receive in the harsh environment area approxi-
4 mately 90 to 100 types of equipment qualification summary
5 sheets, which means more pieces of paper so many times. Even
6 though 100 sounds like a lot, it is maybe not impossible to
7 have some kind of a chart where you mark where you stand on
8 each of those and how close to accomplishment it is. From
9 the slides which have been shown, it appears to me that right
10 now you have approximately nothing that has been fully
11 completed yet. There was one item shown which was completed
12 at one time, but you are reviewing at least part of the process
13 again. It would be important to start to finish some of
14 them if you intend to finish all of them within a year.

15 The comments on the presentation in general, I
16 personally felt that the presentations were maybe a little
17 bit too general. We spent a relatively large amount of time
18 on overall requirements probably both you and us are familiar
19 with and we spent only a limited amount of time on specific
20 Palo Verde items. If there is any future meeting or anything,
21 I for one would be interested to hear more of the specific
22 cases, just exactly how you do your work. Obviously, you
23 cannot do it for many pieces of equipment, but you can select
24 the one like we discussed some examples today and then discuss
25 the process for the event case. I have not seen, for example,

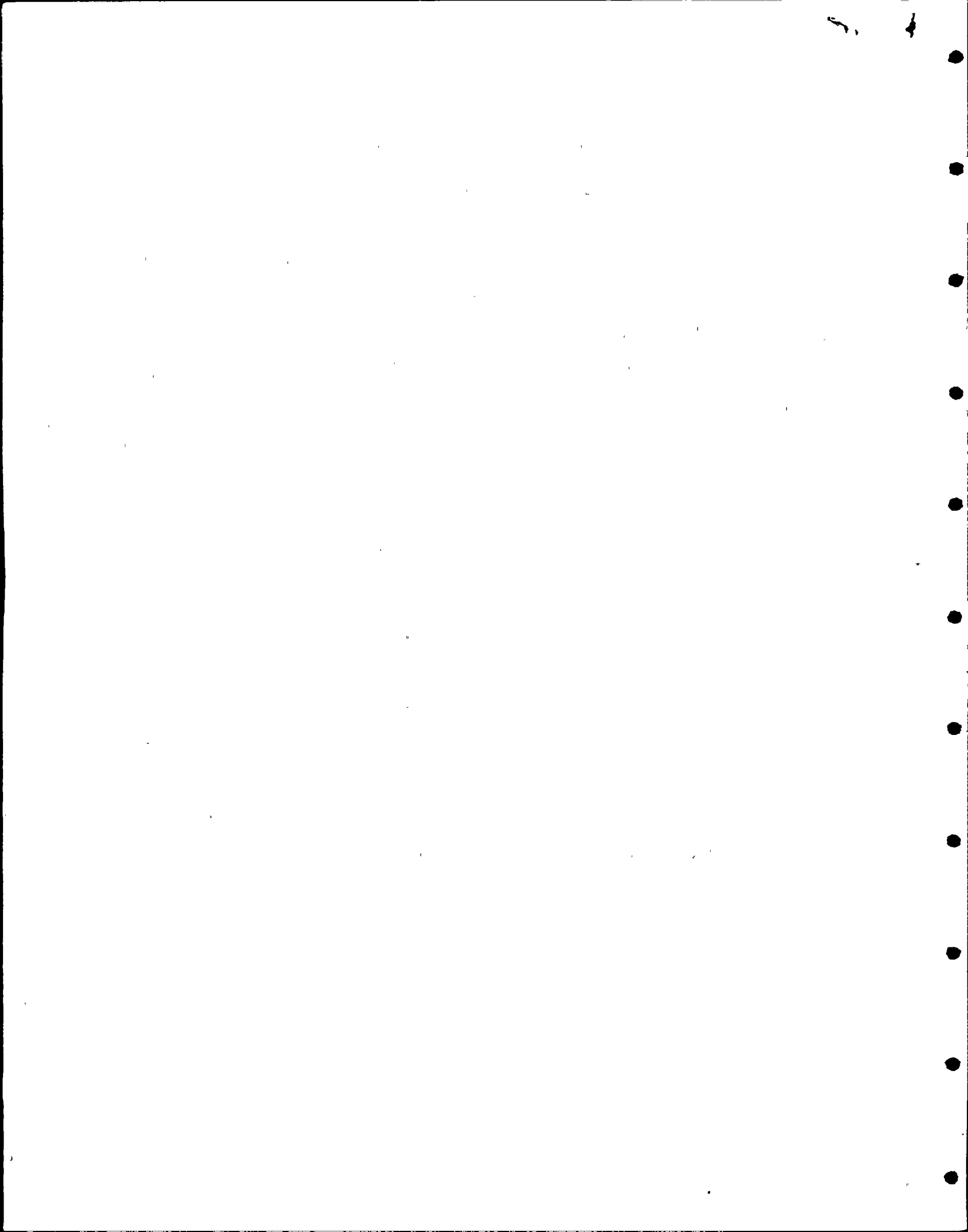
1 a sample specification. It was not presented, so I don't
2 know exactly what you do in writing the specification. How
3 detailed are those? Are those kind of general or quite
4 specific? We just didn't get to that. We discussed only
5 one part or maybe one-half of the scope. Obviously, one
6 big open item is the other half of the scope. Also, there
7 are still a fair number of unresolved issues even in the half
8 that we have discussed. I am not sure exactly what was the
9 goal of the board, what does the board want to accomplish by
10 this meeting, and maybe we could talk a little bit about that,
11 but because we have seen only half and because there are
12 outstanding items, I don't think we are at the final point
13 yet. Maybe it would be appropriate to have a second meeting.
14 If there is such a second meeting, then probably the focus
15 at that meeting should be on APS' role in the overall qualifi-
16 cation, how the whole thing is being pulled together, and then,
17 of course, on the second half, the part that we didn't have,
18 and the outstanding items which are not finished at this time
19 yet or weren't resolved.

20 One comment that has been made by someone, and I am
21 not sure who made it, during the meeting was a recommendation
22 for some kind of a verification program on the environmental
23 parameters. The purpose of this would be that the environ-
24 mental parameters are postulated in a conservative manner and
25 the actual parameters like temperatures and equipment that is

1 exposed to aging or radiation levels and the accumulated
2 dosage to radiation might be significantly different than it
3 was assumed when the qualification was made. If it is
4 significantly lower, for example, than this could extend the
5 qualified life of the equipment. Maybe this is the right time
6 to give some thought to that and see if you want to undertake
7 some kind of a program. It really would require only to have
8 measurements taken at some locations and those be read at
9 certain intervals. Maybe that could be helpful for your staff
10 as well as for others who are having the same question.

11 Overall, I think the meeting has accomplished a lot,
12 but there is still some more to be done in the future.

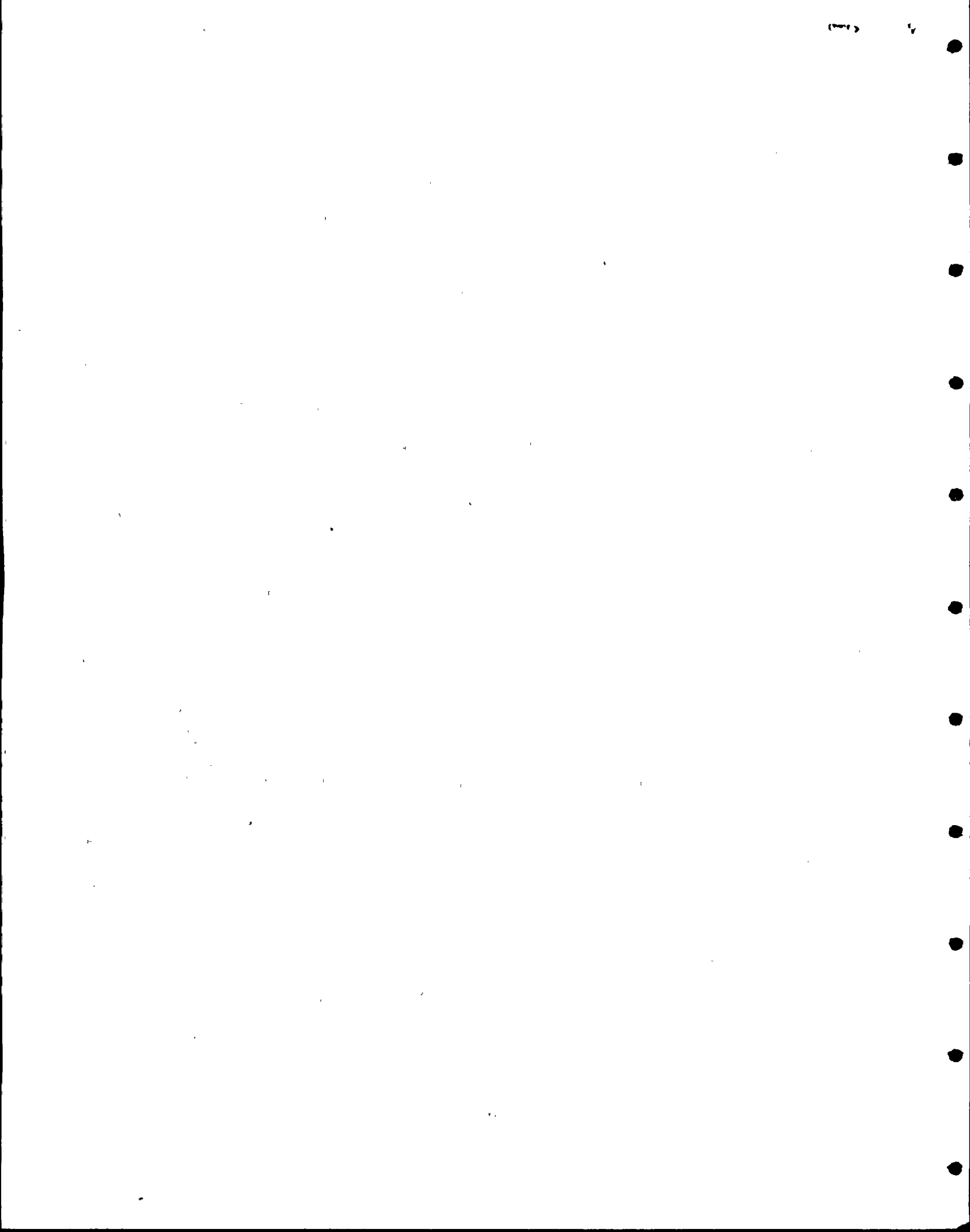
13 MR. VAN BRUNT: Let me respond to that. I think
14 really you only asked me one question. There may be a
15 number of areas that we ought to take a look at, and we will
16 take a look at it. The one question I heard directed to me
17 or to the board, and I will speak to that, is what did we
18 expect to accomplish. In the discussions that I have had with
19 Harold Denton about this particular program, when I say
20 program I mean the concept of a systems review, the intent of
21 that was to, in essence, replace what I call the 20 questions
22 phase that we used to use for getting through a construction
23 permit application or a licensing application wherein we
24 would submit an FSAR or a PSAR, as the case may be, the staff
25 would then review that and send us a myriad of questions and



1 we would send you a myriad of answers, and usually that would
2 beget more questions and we would give you some more answers,
3 and after while we would narrow it down so we only had a few
4 open items and then we would sit down and talk. The purpose
5 of this is that the board, in essence, was going to serve the
6 function of that question and answer phase on both sides of
7 the table.

8 We as the applicant are responsible. We should know
9 as much about this plant if not more than you do. Your
10 purpose here is certainly to observe what we have done and
11 see whether we are knowledgeable about the plant and to
12 participate to the extent that is appropriate. In this
13 particular instance with equipment qualifications, I think
14 your participation was very important, because, without being
15 critical at all of the staff, and that is not my intention,
16 it is an area that is very dynamic. While there are
17 standards and other documents that supposedly describe the
18 area, there is an enormous amount of interpretation that goes
19 with them. So the question and answer exchange that has
20 gone on here is one that I think has given you the opportunity
21 to understand what we were doing, where we were heading, what
22 our interpretations were, and it gave us an opportunity to
23 hear from you after you looked at what we were doing to see
24 whether that matched what your interpretations were. I think
25 in many cases, it did, and in some areas, it didn't, and

1 possibly in some areas we have given you some food for
2 thought as to whether maybe you are going down the wrong line
3 or not. That is what the purpose of the board was. The board
4 is meant to be a group that is knowledgeable in this area.
5 It is a group that understand what Bechtel is doing from
6 inside, what Bechtel is doing as we view it from outside,
7 what APS is doing, and then some independent people who are
8 not involved in the day-to-day fray, so to speak, who can
9 look at all of us and tell us a little bit about what we're
10 doing or ask questions that we may not be able to see. So
11 that is the purpose of it. The open items then that come out
12 of it are questions that I would see in the old way of doing
13 business that would be at the end of the two or three
14 exchanges when you really get down to the nitty-gritty issues
15 that have to be solved. Those now will be extracted from the
16 transcript from the list that Terry and Gerry have kept and
17 dealt with letterwise and will form an addition to the
18 transcript. Then somebody like yourself sitting down in the
19 evening quietly can read all that stuff and you should have a
20 complete picture of our program and what we are going to do.
21 From that, then you should be able to draw a conclusion as
22 to whether you think our program is adequate or not, whether
23 we are doing the right thing, whether we satisfy all the
24 regulations, and then, certainly because there is information
25 yet to be submitted, audit that information. Having done all



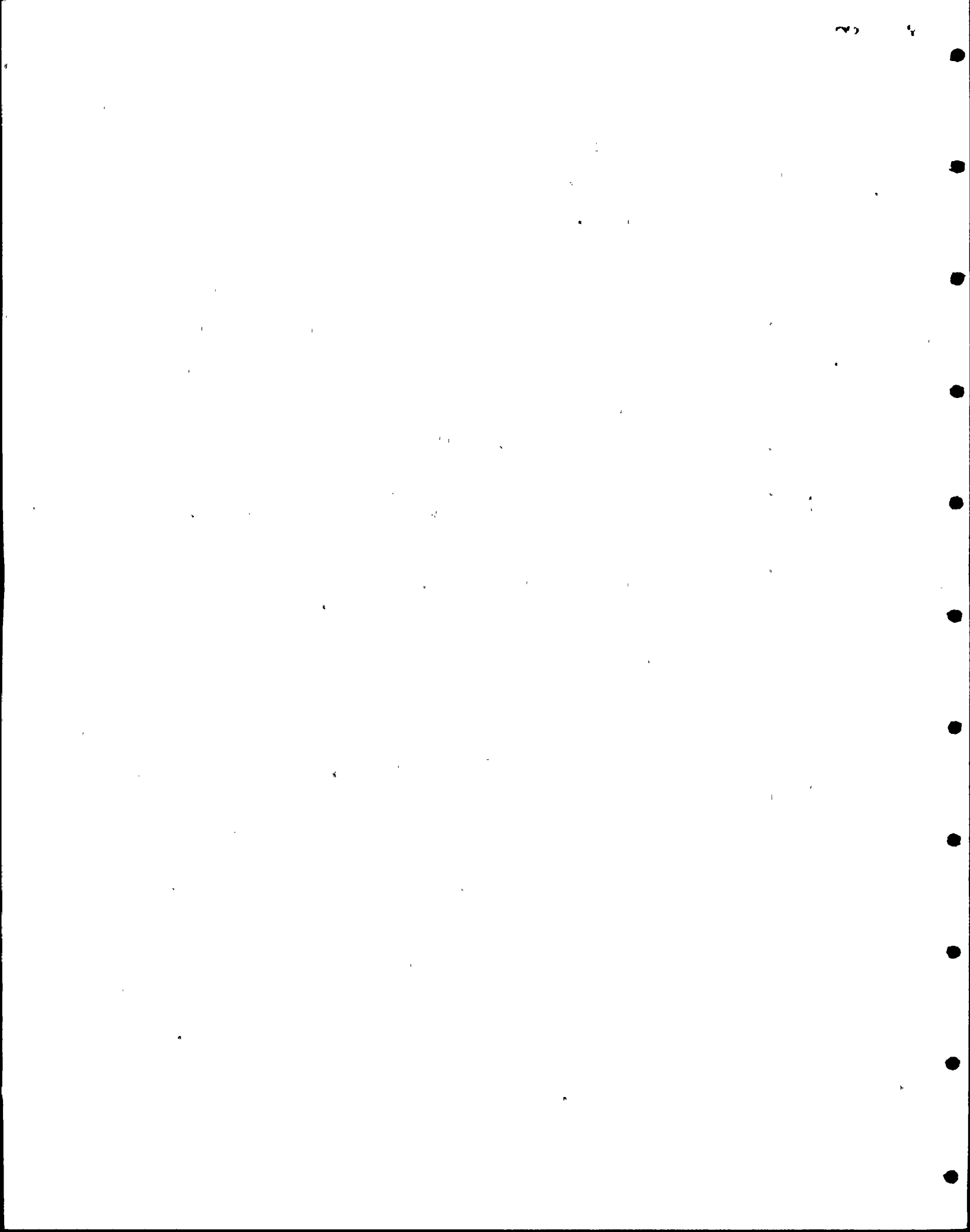
1 that, you ought to have a nice warm feeling that all the
2 equipment that goes in this plant is satisfactory.

3 I think that is a lot of words to indicate what we
4 see this whole thing is about. I have some question in my
5 mind whether a programmatic type of review such as this one
6 was lends itself as much to this kind of an exchange as a
7 true systems review where you've got a piece of hardware you
8 are looking at, because there is so much interpretation that
9 goes on, but I can say from our side of the table, so to speak,
10 that it has been very, very helpful to us to have this
11 interchange and get some information. I hope it has been the
12 same to you folks.

13 Anybody else on the board want to say anything?

14 MR. ALLEN: I think that summarizes it pretty well.

15 MR. NOONAN: If I could just make one more minor
16 comment. A lot of utilities seem to have a problem sometimes
17 coming to us and discussing problems in advance. They know
18 about it, but they don't feel like they can come to NRC and
19 open Pandora's box, so to speak. I would like to change
20 that attitude at least in the areas that I am responsible for
21 and I would offer that any time you want to talk about any
22 matter, whether it is during business hours or even after
23 business hours, problem that you have or matters of interpre-
24 tation, I would sure offer to do whatever I could to get you
25 that interpretation in as short a time as possible.



1 MR. VAN BRUNT: We appreciate that. I assure you we
2 are not bashful.

3 MR. ALLEN: If there are no further comments, I think
4 we should review the open items that we have identified today.
5 Why don't we take about a 15-minute break.

6 (Thereupon a brief recess was taken, after which
7 proceedings were resumed as follows:)

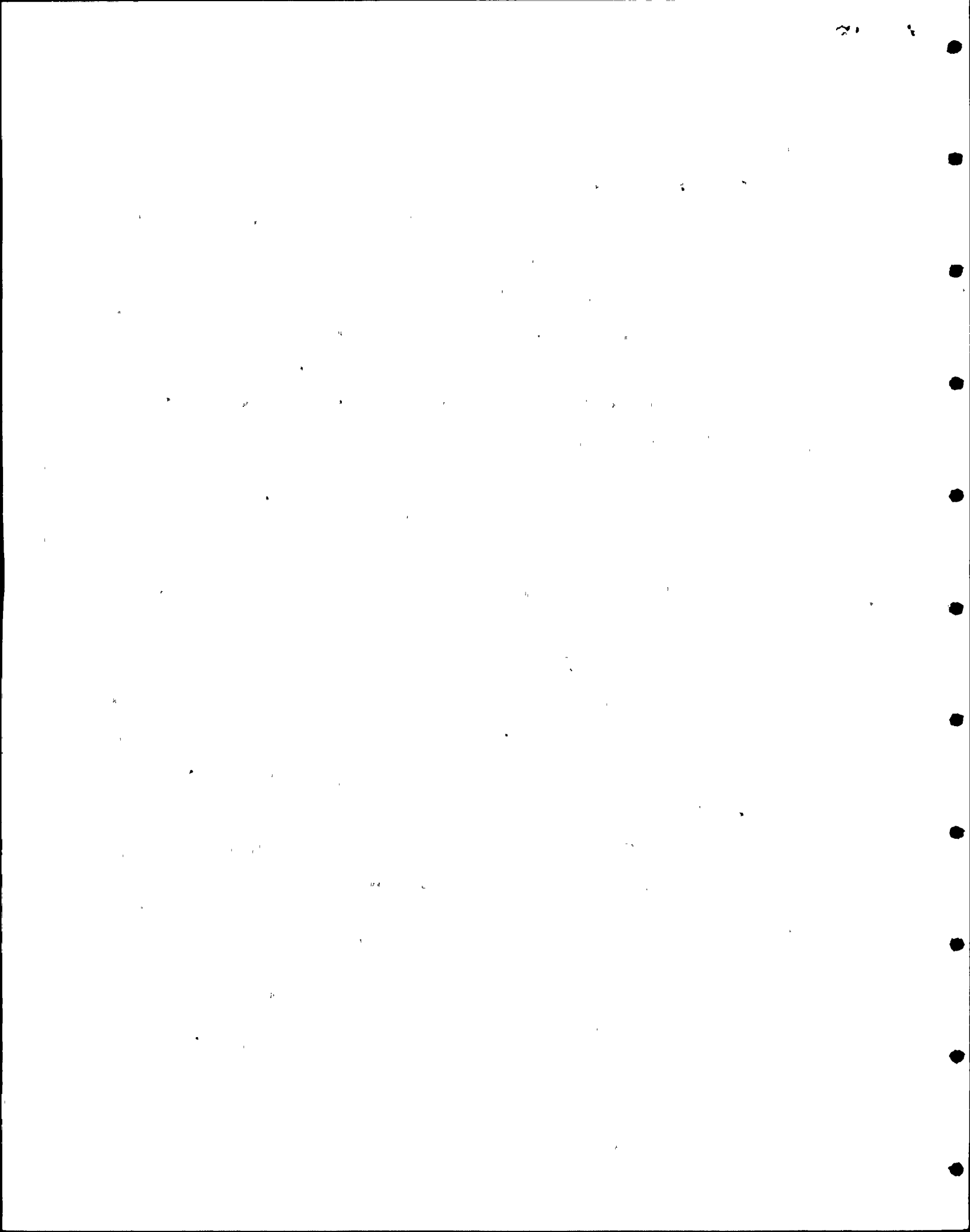
8 MR. ALLEN: Terry Quan will read the open items that
9 we have identified today.

10 MR. QUAN: Continued from yesterday's list, Open Item
11 23: How thoroughly does the qualification team ensure that
12 the required response spectrum supplied to the vendor for
13 instrumentation is not for the floor only, but includes
14 instrumentation support?

15 Open Item 24: How is it verified that the equip-
16 ment installed in the field is the same type as the equipment
17 that was seismically qualified? Different types of equipment
18 have different seismic effects; i.e., rigid versus flexible
19 conduit.

20 Open Item 25: What are the exceptions to full-sized
21 equipment seismic tested? For these exceptions, is additional
22 more accurate instrumentation required to provide data to
23 perform proper scale analysis?

24 Open Item 26: How are seismic loads combined with
25 accident loads?



1 Open Item 27: On Exhibits IV-5 and IV-5A, various
2 items should be corrected to show IEEE 344-1975 and IEEE
3 323-1974.

4 Open Item 28: In Exhibit IV-11, the equipment
5 qualification checklist is to be modified to show that the
6 equipment can perform in its operational mode during and
7 after the testing. Also include operational parameters that
8 were monitored during testing.

9 Open Item 29: How will preventive maintenance
10 necessary to maintain qualification be differentiated from
11 other preventive maintenance in the environmental qualifica-
12 tion sections?

13 Open Item 30: In Exhibit VI-4, add to the
14 environmental qualification checklist a check-off box for
15 acceptance of the Arrhenius method used in Item 4) of that
16 exhibit.

17 Open Item 31: Define the qualification team's burn
18 in policy.

19 Open Item 32: How is it assured that complete
20 systems are qualified when system components are qualified
21 individually, especially systems requiring a BOP/NSSS
22 interface.

23 Open Item 33: In Exhibit VI-1, review the checklist
24 for applicability of the DBA and time when required shown
25 for nonharsh environments.

1 Open Item 34: In Exhibit VI-1, consider listing
2 not only the systems, but also the components of that system
3 on the equipment qualification checklist.

4 Open Item 35: Insert updated Exhibit VI-6.

5 Open Item 36: Change the sign off on the equipment
6 qualification checklist from "Evaluation Approval" to more
7 appropriate wording such as "True and correct to the best of
8 my knowledge.

9 Open Item 37: For equipment that has been aged
10 to required qualification, its continued life is uncertain.
11 What assurance is there that this equipment can be installed
12 in the plant.

13 DR. ROSZTOCZY: I think that it should not be installed
14 in the plant.

15 MR. QUAN: I think there was some question of whether
16 the equipment can be refurbished and then installed.

17 DR. ROSZTOCZY: It should not be. It should not be and
18 it should never be used in the plant, so you need assurance
19 that it will not be installed in the plant.

20 MR. QUAN: I thought there was some question that our
21 assurance could cover possibly refurbishing.

22 MR. ALLEN: Rebuilding. Rebuilding or replacing aged
23 components and then put them back in the plant.

24 DR. ROSZTOCZY: It is very questionable.

25 MR. ALLEN: Well, like a piece of equipment that has
a limited life component, if it is qualified overall for

1 40 years and the capacitor for ten years, then you would
2 have to change the capacitor out in ten years, but the
3 equipment overall still remains qualified.

4 DR. ROSZTOCZY: The emphasis was that if you have aged
5 a piece of equipment to the extent of the 40-year life of
6 the plant, that piece of equipment should not be installed
7 in the plant because it is starting its 41st year now and
8 it is not qualified to work in its 41st year.

9 MR. ALLEN: Because it is over 40 years. Okay, we
10 understand what you mean.

11 DR. ROSZTOCZY: You need assurance that the tested
12 piece will be discarded because it has already been aged.

13 MR. ALLEN: Yes.

14 MR. QUAN: Let me rephrase that.

15 DR. ROSZTOCZY: When it is appropriate, I think
16 refurbishment can be consummated, but it would have to be
17 very carefully done to be sure that all those parts which
18 are susceptible to aging or susceptible to radiation, that
19 all of those parts have been fully replaced in the system.

20 MR. QUAN: Is it all right as it stands? I would
21 think that would be part of the assurance program.

22 DR. ROSZTOCZY: Would you please read the question
23 again?

24 MR. QUAN: For equipment that has been aged the
25 required qualification, its continued life is uncertain.

1 What assurance is there that this equipment can be installed
2 in the plant by refurbishing?

3 DR. ROSZTOCZY: No, I think it should be reworded.
4 What assurance is there that it will not be installed in the
5 plant unless it is appropriately refurbished?

6 MR. QUAN: I will restate the question. Open Item 37:
7 For equipment that has been aged the required qualification,
8 its continued life is uncertain. What assurance is there
9 that this equipment is not installed in the plant unless it
10 is appropriately refurbished?

11 Open Item 38.

12 MR. ALLEN: Just a second. Ed, did you have a question?

13 MR. STERLING: For clarification's sake, instead of
14 referring to it in the second section as pieces of equipment
15 which have been qualified, mention test specimen, because we
16 are not talking about a generic group of equipment, but rather
17 that piece of equipment that was actually tested and aged.

18 MR. VAN BRUNT: John, I think you've got enough
19 information in the record on this so that we understand what
20 the question is. I don't think Terry needs to rephrase the
21 question again.

22 MR. QUAN: Open Item 38: For the seismic example,
23 Exhibits VI-8 through VI-11, incorporate the open items included
24 in the environmental example, Exhibits VI-1 through VI-6.

25 Open Item 39: What is being done to assure there

1 isn't any possibility of the failure of nonsafety-related
2 equipment affecting the operation of any safety-related
3 equipment?

4 Open Item 40: Describe the Arizona Public Service
5 Company's quality assurance program in detail as it relates
6 to the equipment qualifications. Also describe the audit of
7 APS' equipment qualification procedures, vendor qualifica-
8 tion programs, and Bechtel equipment qualification programs,
9 including the outcome of those audits.

10 That's all. Does anybody have any additional open
11 items?

12 MR. ALLEN: Carter.

13 MR. ROGERS: I would like to add one from yesterday.
14 Yesterday during the proceedings, there was discussion
15 pertaining to qualification of equipment in safety-related
16 areas. Question was made as to whether there is redundant
17 cooling in all of the safety-related areas. The response
18 made at that time was yes, there is redundant cooling. I
19 talked to Bechtel after the meeting and, while I am sure that
20 there is some redundant equipment in some areas, I am not
21 certain that all areas have redundant equipment. Bechtel,
22 due to the time problem, was unable to confirm one way or
23 another this afternoon, so I would like to add as an open
24 item this particular subject, and I would like to further ask
25 Bechtel that if there are areas that contain safety-related

1 equipment where the cooling is not redundant and the failure
2 of a cooling system could cause excursions into temperatures
3 above normal to address how those are to be handled in the
4 qualification program. That is a lot of words. I think that
5 the question, Terry, we could phrase fairly easily by saying
6 are all areas containing safety-related equipment served by
7 redundant HVAC and, if not, what is done to account for this
8 in the qualification program.

9 MR. QUAN: I am not quite sure that second question is
10 phrased correctly.

11 MR. ROGERS: If not, and if a failure of a nonredundant
12 system occurs, how is that failure handled in the qualification
13 program?

14 MR. VAN BRUNT: Terry, why don't you give all those
15 words in the record a number.

16 MR. QUAN: Open Item 41: Is there redundant HVAC in
17 all areas where safety-related equipment is located? If not,
18 what is done to assure a failure of the nonredundant HVAC
19 will not affect the qualification parameters of the safety-
20 related equipment?

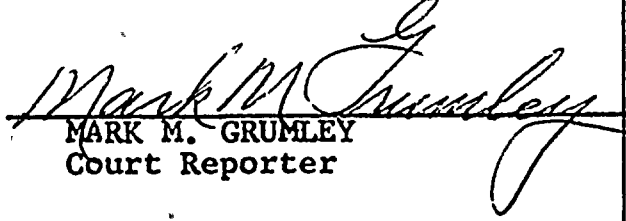
21 MR. ALLEN: Any further questions or items that you
22 would like added to the open item list? Are there any
23 additional items that anyone would like to discuss? Okay,
24 fine.

25 I would like to thank the board members for their

1 participation and the NRC for taking their time to come out and
2 participate in our system review. I would like to thank the
3 presentors from Bechtel and everyone that showed up to
4 observe the proceedings. I will declare the meeting closed.

5
6
7 * * *

8
9
10 I HEREBY CERTIFY that I was present at the meeting
11 before the Palo Verde Generating Station Equipment Qualifica-
12 tion Review Board; that I made a shorthand record of all
13 proceedings and testimony had and adduced before said Review
14 Board at said meeting; that the foregoing 389 typewritten
15 pages constitute a full, true and accurate transcript of said
16 record, all to the best of my skill and ability.

17
18 
19 MARK M. GRUMLEY
20 Court Reporter
21
22
23
24
25

