

T-1131


NUCLEAR REGULATORY COMMISSION

ORIGINAL

In the Matter of: ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
SUBCOMMITTEE ON REGULATORY ACTIVITIES

DATE: September 8, 1982 PAGES: 1 - 46
AT: Washington, D. C.

TRP4
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
SUBCOMMITTEE ON REGULATORY ACTIVITIES

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Nuclear Regulatory Commission
1717 H Street, N.W.
Washington, D.C.

Tuesday, September 8, 1982

The Subcommittee on Regulatory Activities
convened at 8:30 a.m.

PRESENT FOR THE ACRS:

- C. P. SIESS, Chairman
- D. A. WARD
- M. W. CARBON
- W. KERR
- M. BENDER

DESIGNATED FEDERAL EMPLOYEE:

SAM DURAI SWAMY

NRC STAFF MAKING PRESENTATIONS:

- L. BERATAN
- W. MORRISON
- R. KORNASIEWICZ

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

2 MR. SIESS: The meeting will come to order.
3 This is a meeting of the ACRS Subcommittee on Regulatory
4 Activities. I am Chester Siess, Chairman of the
5 Subcommittee. The other members present today are,
6 starting from my left, Dave Ward, Max Carbon, Bill Kerr,
7 and Mike Bnder.

8 There is one item of business for this
9 meeting, and that is to discuss Regulatory Guide 1.145,
10 Revision 1. The title is Atmospheric Dispersion Models
11 for Potential Accident Consequence Assessments at
12 Nuclear Power Plants.

13 This meeting is being conducted in accordance
14 with the provisions of Federal Advisory Committee Act and
15 the Government in the Sunshine Act. Mr. Sam Duraiswamy,
16 sitting on my right, is the Designated Federal Employee
17 for the meeting.

18 The rules for participation in today's meeting
19 were announced in the notice in the Federal
20 Register on Wednesday, September 1, 1982.

21 You will note that a transcript of the meeting
22 is being kept and will be made available as stated in
23 the Federal Register. Please give your name the first
24 time you speak and use a microphone so that the reporter
25 can hear you.

1 We have received no written statements from
2 members of the public, nor have we received any request
3 for time to make oral statements.

4 Gentlemen, by way of introduction, this guide
5 is the first guide we have seen that has been previously
6 been through the CRGR, the Committee for Review of
7 Generic Requirements. That is only a part of long and
8 varied history which Sam spelled out for you in the
9 status report.

10 I think it went before the old RQC Committee
11 twice. It has been in here three times and this is the
12 fourth time. Of course, in the meantime, it has become
13 a staff position in the standard review plan, etc.,
14 etc. It has a long a checkered history. It came to us,
15 and we approved it go out for comment, but then there
16 were some differences of opinion in the staff, at that
17 time partly between Standards Development and NRR, and
18 maybe within NRR. It got kicked around quite a bit.

19 I don't think anybody on this Subcommittee
20 knows enough about meteorology to investigate the
21 technical aspects of this thing. We made free use of
22 our available consultants. On one of the first
23 go-rounds, we had Frank Gifford review it. Frank is one
24 of the experts in this area, and Frank had no real
25 problems with it. On the second go-round, we had Paul

1 McReedy, and Frank again looked at it.

2 Neither Frank nor Paul are current consultants
3 to us. Frank has retired, and is now working for
4 somebody else, if anybody. Paul is, I think, devoting
5 most of his attention to building manpower or solar
6 power and airplanes.

7 We do have a new meteorological consultant
8 from NOAA, Mr. Hosker, and we have some comments from
9 him. These were passed on to the staff. As he
10 indicated, they are all editorial, except two, and I
11 will ask the staff to address those two at the
12 appropriate time.

13 I would like to suggest that we stay away from
14 editorial nits on this. Maybe the best thing to do is
15 to just mark them up and give them to the staff to
16 consider. Dade Moeller has about two pages of editorial
17 comments, and at this stage of this thing, I think it is
18 just as easy for them to fix up the grammar and
19 references on the basis of the written comments, and
20 let's see if we can stick to the major issues.

21 Nobody along the line has ever objected to
22 this thing once it got straightened out within the
23 staff. It is a somewhat more complex way of figuring
24 out the meteorology, an essentially more flexible way of
25 doing it. It takes into account more meander, wind

1 direction, and so forth. It gives a little more
2 flexibility in siting and in establishing exclusion
3 boundaries. The industry has never really objected to
4 it. They give all sorts of comments on details.

5 This originally, I guess, was going to apply
6 to everything. The CRGR told you to make optional for
7 operating reactors.

8 MR. KORNASIEWICZ: Yes, they do want it to be
9 a backfit.

10 MR. SIESS: I don't really know what a backfit
11 is on the siting issue.

12 MR. KORNASIEWICZ: I am not sure either.

13 MR. SIESS: I will let you get to your
14 presentation later, but you made it clear that this is
15 to be used as part of Part 100 siting. This is to be
16 used as part of meeting the criteria for siting in Part
17 100.

18 MR. KORNASIEWICZ: Yes.

19 MR. SIESS: Part 100 says that in selecting a
20 site or in evaluating the site, we take the source term
21 in Reg Guide 1.3 and 1.4, depending on what kind of
22 reactor it is, which says how much radioactivity there
23 is in the containment. You take a leak rate and then
24 you use some -- You take the source term, you do
25 something about the leak rate, something about the

1 meteorology, and you calculate doses, and you take the
2 demography into account.

3 This does affect how you take the demography.
4 For doses that do not exceed 25 rem whole-body and 300
5 rem thyroid, etc., the site is okay. Of course, that is
6 all in the regulations, and it all seems a little bit
7 obsolete now that we are talking about severe accidents,
8 and looking at Zion and Indian Point, and Limrick, and
9 the probabilistic risk analyses, and using the CRACK
10 code, and worrying about the source term. But it is
11 still the official, legal way of deciding on whether a
12 site is acceptable under the regulations of the Nuclear
13 Regulatory Commission.

14 MR. KORNASIEWICZ: That is true.

15 MR. SIESS: This is not to be applied to
16 operating reactors, except optionally. It says that it
17 does apply to operating licenses, and I don't quite
18 understand how a siting criteria applies to an operating
19 license, which is already built.

20 MR. KORNASIEWICZ: I believe, Dr. Siess, that
21 sometimes on operating plants, if they modify some part
22 of their system -- again I am speaking ex-cathedra more
23 or less, because I am not in licensing -- in some of
24 those actions, particularly perhaps in the S&P Program,
25 they do use this procedure to, I guess, verify that if

1 there are some changes made in an operating reactor,
2 they are still in compliance with Part 100. This is how
3 I understand that.

4 MR. SIESS: They obviously don't change the
5 site, unless new people move in.

6 MR. KORNASIEWICZ: That is true.

7 MR. SIESS: But the number of people doesn't
8 enter into this calculation. It is only where they are,
9 right?

10 MR. KORNASIEWICZ: Right.

11 MR. SIESS: Unless the population center
12 distance moves because of some town of 25,000 closer in,
13 the demography doesn't change that much, and it really
14 shouldn't change because when you site the plant at the
15 CP stage, you are supposed to predict ahead on some of
16 the population.

17 MR. MARKEE: There is a plant specific
18 parameter that enters into the calculation, I mean the
19 leak rate.

20 MR. SIESS: Yes, that is what I was getting
21 at. Part 100 in effect says that you can combine the
22 plant feature with the site feature because you can
23 presumably control the leak rate. You don't, you just
24 control the specified leak rate. You can change it from
25 two-tenths percent and make it one-tenth percent a day,

1 and the leak rate test simply becomes harder to make,
2 right?

3 I guess if a plant were built in such a way
4 that the leak rate were to change, then I can't possibly
5 figure out how you would do it since the leak rate is a
6 specified value, and you don't know what it is until you
7 make your first integrated leak rate test.

8 It is really a little difficult to see what
9 this really applies to. As you know, we have a bunch of
10 operating licenses coming up.

11 MR. KORNASIEWICZ: Right.

12 MR. SIESS: We have no new sites coming up in
13 the near future, so I don't see much chance of this
14 getting a real good work out.

15 MR. KORNASIEWICZ: I must agree. On the
16 operating licenses, I can see that they apply the guide
17 to make sure that the plant, you know, on the siting of
18 it. But on the operating reactors, I myself don't know
19 enough about the licensing activities that are going on
20 right now to answer that question.

21 MR. SIESS: I am just trying to see the change
22 between the CP and the OL. Reg Guide 1.3 and Reg Guide
23 1.4 tell you what the source term is, and that is a
24 function only of the power of the reactors, as far as I
25 recall. It says some percentage of what is in there, so

1 it is your core load really. The leak rate is the other
2 thing.

3 The leak rate is something you say, I am going
4 to meet. You don't really design a leak rate into
5 plant. At least I have never seen it in a PWR, a leak
6 rate designed into a plant. I have seen them coming in
7 and change it from two-tenths to one-tenth, without
8 changing a darn thing. They just say, look we have to
9 be a little more careful when you make the integrated
10 leak rate test.

11 MR. KORNASIEWICZ: The only other thing that I
12 can think of is that the rem goes from 300 to 150, or
13 150 to 300.

14 MR. MARKEE: Yes.

15 MR. SIESS: At the CP stage, you hold them to
16 150 because the calculations tend to change. At the OL
17 stage, they get up to 300.

18 MR. KORNASIEWICZ: Yes.

19 MR. SIESS: But that is really --

20 MR. KORNASIEWICZ: At the licensing, they redo
21 all the calculations at that point.

22 MR. MARKEE: From the meteorological
23 viewpoint, we recalculate at the OL stage because we
24 have a better data base. Usually, at the CP stage,
25 there is a limited amount of time to gather data.

1 MR. SIESS: That is a good point.

2 MR. MARKEE: So our standard format and
3 content for data requirements varies from the CP stage
4 to the OL stage.

5 MR. SIESS: Really, you don't have to wait to
6 the OL stage. The way things are going, you probably
7 get five years of data before they are half-way through
8 construction.

9 There is a statement in the regulatory
10 evaluation that on the average it is less restrictive.
11 Every time I see "average," my hair stands on end. But
12 the average of what, the averages of the sites, or the
13 averages of accidents, average of plants.

14 MR. MARKEE: Average of plants.

15 MR. SIESS: I mean, is it possible that for
16 one of those plants out there under construction that
17 this will be more restrictive rather than less
18 restrictive?

19 MR. KORNASIEWICZ: It is conceivable. When
20 they did the evaluations of the technical bases, for
21 example, they list a number of plants that are in the
22 kai Q values. I think the only place where it might be
23 more restrictive is, -- Earl, you may know about this,
24 but I am not sure -- if you have a combination of
25 circumstances where you had a short site boundary, a

1 high frequency of wind directions in that short site
2 boundary, and when you had the wind blowing, you had
3 poor dispersion.

4 MR. SIESS: You would have used those smeared
5 averages, and now this would require you to look at
6 that.

7 MR. KORNASIEWICZ: This would identify that
8 kind of a situation, and I don't think they are found.

9 MR. SIFSS: That kind of language is
10 bothersome because if the average happens to be the
11 median, that would mean that for half the sites it would
12 be more restrictive, and I didn't think that that was
13 what you meant.

14 MR. KORNASIEWICZ: That is not the case at
15 all.

16 MR. SIESS: This has been used for quite a
17 while.

18 MR. KORNASIEWICZ: Yes, sir.

19 MR. SIESS: It is in the new standard review
20 plan. Was it in the old one as a Branch Technical
21 Position?

22 MR. KORNASIEWICZ: Yes, I believe it has been
23 a Branch Technical Position --

24 MR. MARKEE: It was a Branch Technical
25 Position, and we have just modified it.

1 MR. KORNASIEWICZ: The recent revisions to the
2 standard.

3 MR. SIESS: Was it a Branch Technical position
4 before you got all the staff disagreement straightened
5 out?

6 MR. DEERATAN: Yes, it was a Branch Technical
7 Position in 1977, when we first started working on it.

8 MR. KORNASIEWICZ: As a matter of fact, the
9 history of it, the way it got started, the RRRC was
10 reviewing this Branch Technical Position, and their
11 decision at that point was, well, instead of making it a
12 Branch Technical Position, why don't you write a Reg
13 Guide on it, and that is when we started working on this
14 Reg Guide.

15 MR. SIESS: As I recall, the ACRS suggested
16 that there should be a description of the technical
17 basis. Why don't they put the date on the cover?

18 MR. KORNASIEWICZ: The guides are so slim that
19 there is no back on it. You have to turn the cover
20 over, and it is on the back of the cover.

21 MR. SIESS: It is never on the front.

22 MR. KORNASIEWICZ: I think the date is
23 November 1981.

24 MR. MARKEE: It is October 1981.

25 MR. KORNASIEWICZ: We had difficulty. The

1 staff was busy working on Three Mile Island for a quite
2 a while.

3 MR. BENDER: When you get this Reg Guide, what
4 is going to happen?

5 MR. KORNASIEWICZ: Well, in effect, we
6 reference this Reg Guide in the standard review plan.
7 It has been in use for a long time. But we reference it
8 as a guidance document, but the final version is not out
9 on the street, Dr. Bender, so we would like to get it
10 out on the street.

11 MR. BENDER: You don't expect any significant
12 changes from what is going on?

13 MR. KORNASIEWICZ: No, sir, because, in
14 effect, this Reg Guide has been in use since at least
15 1978.

16 MR. SIESS: If this had not been approved by
17 CRGR, would you have had to go back and change the
18 standard review plan.

19 MR. KORNASIEWICZ: I think there would have
20 been more ramifications than that because all the
21 licensing actions that have been taken under Part 100
22 since 1978 have used this methodology.

23 MR. SIESS: So you would have to get out Board
24 Notifications.

25 MR. KORNASIEWICZ: Yes, sir, and in fact a

1 Board Notifications went out when we were going to do
2 this, that they were going to have to rescind their
3 original --

4 MR. KERR: I guess I don't understand that,
5 because you presumably have satisfied the regulations,
6 if not the Reg Guide.

7 MR. KORNASIEWICZ: Yes, that is true.

8 MR. KERR: A change in the Reg Guide doesn't
9 mean that you are no longer satisfying the regulations,
10 as far as I can tell.

11 MR. KORNASIEWICZ: No. You have a good
12 point.

13 MR. SIESS: But how you satisfy the regulation
14 is one of the things the Board is looking at.

15 MR. KORNASIEWICZ: When we issue this Reg
16 Guide for public comment, in the Commission paper there
17 was a Board Notification.

18 MR. SIESS: Who is responsible for getting out
19 Board Notifications?

20 MR. KORNASIEWICZ: I think it is OELD.

21 MR. SIESS: I wondered because every Board
22 Notification comes to the ACRS, which is very nice, but
23 you get a generic issue and you notify 20 Boards, and
24 those are separate mailings and I get one copy of each,
25 which seems sort of a waste of paper.

1 MR. KORNASIEWICZ: The ones I have seen have
2 been signed out by the Office of OELD.

3 MR. SIESS: We will have to talk to them to
4 see if they can fix the system up to where they are
5 sending them out to 20 Boards, the ACRS could be looked
6 at as a Board, rather than as a copier for each Board.
7 I just threw away a stack like that the other day, I am
8 sure that everybody else is getting them the same way.

9 Are there any further questions or comments?
10 We have almost covered, I think, what they have got on
11 their viewgraphs.

12 MR. KERR: Is the somewhere an estimate of the
13 accuracy of either this method or the previous method?
14 How much of a departure from physical reality does one
15 expect these calculations to be, a factor of two, a
16 factor of ten, ten percent?

17 MR. KORNASIEWICZ: We have heard estimates all
18 the way from a factor of two to probably what?

19 MR. MARKEE: It would be a factor of two of
20 the typical exclusionary boundary, at a typical LPZ
21 distances, but it could go up to as high as a factor
22 ten.

23 MR. KORNASIEWICZ: We have a dispersion
24 program that we have been gathering various dispersion
25 data for probably five years, and we are going out to

1 about ten miles now. So hopefully when we analyze that
2 data, we will have a pretty good feeling for how
3 accurate these models are.

4 The other piece of information I have, the
5 people at the Savannah River Lab have been looking at
6 some crypton data that they have been collecting,
7 comparing it against these models. I was recently
8 talking to Dr. Pendergast who had been looking at the
9 Reg Guide 1.145, and his verbal comments to me were
10 that, at least in his opinion, the guide was doing what
11 he deemed a very reasonable job of calculating those
12 values, but he has not published anything on this yet.

13 MR. SIESS: Does this require any more
14 meteorological data than the old method?

15 MR. KORNASIEWICZ: No, it doesn't. As a
16 matter of fact, we developed methodology prior to 1978,
17 using just the data we were getting in at that. So
18 there are no new data requirements, it just makes better
19 use of the data we have got.

20 MR. SIESS: Yes, Max, you have a question.

21 MR. CARBON: I have a general question also.

22 The page 19 indicates that the sigma values
23 don't apply to coastal and desert areas. That is
24 addressed in general comment 1, and I think ConEd also
25 raised a question about it. You say that it is beyond

1 the scope of this guide to take into account coastal and
2 desert areas.

3 MR. KORNASIEWICZ: We don't think that it is
4 beyond the scope of this guide, the problem is that you
5 may have so many varied conditions. There are documents
6 that have other curves in, and we refer to them. Our
7 problem was that this guide, if you try to make this
8 guide cover all meteorological conditions, it would
9 become completely unwieldy. It becomes physically
10 impossible to provide all that information.

11 MR. CARBON: My question is: for example, for
12 the coastal and desert areas, you refer to a reference
13 12, which is an IAEA document. I have no concept of
14 whether the information in there is reasonably as
15 detailed and as accurate as the Reg Guide 1.145.

16 The question I guess I have is: Are we being
17 balanced in 1.145, or are we going heavily into
18 calculations for some sites, whereas for sites on
19 coastal and desert areas, we will end up with a lot less
20 attention, so to speak? Are we balanced in this?

21 MR. KORNASIEWICZ: I believe so. There are
22 relatively few plants in desert areas.

23 MR. CARBON: There are many of them on lakes
24 and coastal areas.

25 MR. KORNASIEWICZ: The coastal area problem is

1 no so much moving from the coastal location inland, but
2 if the plume has to travel over a body of water and then
3 striking on the opposite shore, then we have found in
4 some cases that dispersion is rather restricted in that
5 area.

6 Unfortunately, until recently, in fact until
7 last summer when we did some dispersion tests, the
8 information on dispersion over water was rather limited
9 primarily because it is rather expensive to do the kind
10 of measurement over water that you need to do to get
11 this kind of information. There have been some limited
12 tests done, but nothing definitive enough for us to
13 really say that this is really the set of curves that
14 you can use for dispersion over water.

15 MR. CARBON: What is the practical effect of
16 what you said for a plant like Diablo Canyon, which is
17 on the coast on one side, and the other side is land?

18 MR. KORNASIEWICZ: I think what you have to do
19 in the case of Diablo Canyon, you have to be very
20 careful when you make your calculations to not fool
21 yourself as to what the model is telling you. You have
22 to look at the model and realize that the accuracy that
23 you can expect with the model under those circumstances
24 is not as good as you could expect in a relatively flat
25 inland site where the terrain is fairly regular, and you

1 don't have this kind of complicated situation.

2 MR. CARBON: As I understand it, 1.145 would
3 not apply there. You are referring them to the IAEA
4 document.

5 MR. KORNASIEWICZ: That might be one method.

6 MR. CARBON: Does it tell them what you said?

7 MR. KORNASIEWICZ: It has additional
8 information in it. There are some curves for this kind
9 of terrain, and there is also some additional
10 information on what you can do to mitigate the effects
11 of this irregular terrain in coastal land boundaries
12 when you do apply a model under those circumstances.

13 MR. CARBON: When they end up at Diablo
14 Canyon, do they come up with a result, some conclusion,
15 some practical values that are reasonably as meaningful,
16 as accurate, and so on, as some plant located in the
17 middle of Kansas, or some such thing?

18 MR. SIESS: I would be willing to bet that the
19 doses for Diablo Canyon come out to be a fraction of the
20 Part 100 doses.

21 MR. CARBON: I don't care about a particular
22 plant. I am wondering about the methodology.

23 MR. KORNASIEWICZ: I think under that
24 circumstance, Dr. Carbon, when you apply the model, you
25 just have to be aware that you are not in a regular kind

1 kind of situation, and the models frankly do not work as
2 well under those circumstances. You have to be aware of
3 that and realize that any answer you get has a wide
4 error band on it.

5 MR. CARBON: You know that, but the people who
6 use it, do they know that?

7 MR. KORNASIEWICZ: Yes, sir, they are well
8 aware of that.

9 MR. SIESS: I have the impression that an
10 awful lot of the plants under construction, excluding
11 perhaps some of those that go back to 15 years, the
12 calculated doses at the CP stage were small fractions of
13 Part 100. I can't remember seeing anything that get up
14 -- We used to see them go up to 298 rem with a sharp
15 pencil. Recently, I have been looking at reports, and
16 seems to me that I have been seeing one rem whole body,
17 25 rem thyroid, and so forth. Are there any bad sites
18 under construction?

19 MR. KORNASIEWICZ: Mr. Speckler from my
20 office.

21 MR. SPECKLER: Not that I remember.

22 MR. SIESS: We sort of wiped out Bailey, and a
23 few like that.

24 If I am doing accident PRA type analysis, I,
25 what, use CRACK code, and it has the meteorology in it.

1 MR. KORNASIEWICZ: Yes, but it uses it in a
2 different manner.

3 MR. SIESS: It uses it for an estimate of what
4 might happen rather than the licensing. Is the
5 meteorology in there comparable to what is in here, or
6 is more elaborate or less elaborate?

7 MR. KORNASIEWICZ: In some ways, it is more
8 elaborate, and in others it is less elaborate. For
9 example, this guide considers the wind direction, wind
10 speed and stability jointly.

11 MR. SIESS: All three together.

12 MR. KORNASIEWICZ: The CRACK code, it
13 calculates the speed and the stability jointly, but it
14 doesn't consider the direction until later on in the
15 calculation.

16 MR. SIESS: But it does eventually get to
17 direction because it does have to get to people?

18 MR. KORNASIEWICZ: Yes, it does. Also, the
19 CRACK code -- The calculation made made with this looks
20 at a center line distribution, when you do your
21 calculation. The CRACK code uses a flat tophat
22 distribution, so it is kind of an average kind of Q
23 value.

24 MR. SIESS: The changes in this guide are
25 referring to what? Would you call it macro meteorology

1 or mesa?

2 MR. KORNASIEWICZ: Macro to mesa boundary.

3 MR. SIESS: I thought that macro was probably
4 real close.

5 MR. KORNASIEWICZ: We are talking about 100
6 meters to a few miles.

7 MR. MARKEE: A few kilometers.

8 MR. KORNASIEWICZ: The CRACK code is for a
9 much longer distance, a much longer travel time.

10 MR. SPECKLER: Dr. Siess, the CRACK assumes
11 that the plume blows in all directions at the same time,
12 and just multiplies the answer the times the frequency
13 of occurrence of winds in all directions. That is how
14 it is treated in the CRACK code.

15 MR. CARBON: I have a second question. At
16 various points in the comments, the commentators have said
17 that you use a certain procedure in here, Yankee Atomic
18 used the words, that is over conservative. The response
19 that you give to this is, "This is only a guide. We
20 point out that you can use a different procedure if you
21 can demonstrate that it is adequate," and so on.

22 It seems to me that by itself that is an
23 inadequate answer. If what is given in the guide is
24 truly overly conservative -- I don't know whether it is
25 or not.

1 MR. KORNASIEWICZ: That is the only comment we
2 have got that it is overly conservative. It is
3 conservative and it should be.

4 MR. CARBON: I don't have any question that it
5 should be reasonably conservative. What I am getting
6 at, if that is all it is, I would think that it would be
7 better to say that, because as it is I, as a reader, am
8 left with a question: You have said that I can use this
9 other procedure all right, but I have to justify it. If
10 the one that is in 1.145 is truly much too conservative
11 or something, you just said that it isn't, but if it is,
12 I think you would have an obligation to try and pick out
13 the best of the different approaches so that the user
14 doesn't have to justify something.

15 MR. KORNASIEWICZ: The old procedure, you may
16 not be familiar with it, did not involve any additional
17 credit for unilateral pluming. What we have done some
18 dispersion tests and the utilities have done some
19 dispersion tests, and we have gone through the results
20 of those tests and analyzed them. After sifting through
21 the available information, we did allow quite a bit of
22 additional credit for pluming in various wind speed
23 conditions.

24 There are still some areas where there
25 probably is some conservatism, but unfortunately we

1 don't have enough information to quantify it. For
2 example, in the vertical spreading of a pollutant behind
3 an obstruction, for example, there is probably some
4 additional dispersion there, but we don't have enough
5 evidence to justify including it in a Regulatory Guide.

6 Our position all along, and some of the
7 utilities and A&E firms have done this, if they have a
8 situation that is more extraordinary, for example, and
9 they feel it is worth their while to go out and do a
10 specialized study to show that the guide in their
11 particular circumstance is more conservative than
12 necessary, they have done dispersion tests in these
13 areas, they have gotten the results and established
14 them, and the results were incorporated in this guide to
15 take that into account.

16 The problem that we get into is that there is
17 always going to be some location where the guide
18 probably is conservative, but you can't write a guide --
19 it is not practical to write a guide to cover all those
20 circumstances.

21 MR. CARBON: I don't question that. I have no
22 doubt whatsoever in my mind --

23 MR. KORNASIEWICZ: There are areas where we
24 know that the guide is conservative, but we don't think
25 that it is overly conservative anyway.

1 MR. CARBON: I am only aiming at the sort of
2 generic case where if there are three different
3 approaches, and you pick one. If there is another that
4 is a better one, I would think that you should pick the
5 better one. I don't know whether you have or not. I
6 guess it would be helpful if one knew that you felt that
7 yours was as good as any, or better than the others.

8 My main point is, if yours is worse, then I
9 don't think you ought to use it. I think that you ought
10 to use the best one, so that other people don't have to
11 justify.

12 MR. KORNASIEWICZ: One example is the
13 logarithmic interpolation to get the kai Ps used for
14 varying time periods. Some people don't like this
15 because they claim that it is ultra conservative, and
16 this is when we first proposed the thing. But as we get
17 more and more evidence, it turns out that we are not all
18 that conservative at all.

19 However, if people want to go through, and it
20 is pretty expensive to do what they call the window
21 approach, step through each hour, go from hour one to
22 eight, and then go from two to nine, three to ten, and
23 go through the year that way, if they think that is
24 going to give them some additional credit, we are not
25 discouraging them from doing that, but from the evidence

1 that we have it is not cost-beneficial for us to
2 require, and the penalty for not doing it doesn't appear
3 to be all that great.

4 MR. CARBON: All I am really suggesting, from
5 a public relations standpoint or something, would be to
6 add a few words to some of these explanations like
7 saying, we believe this is as good as.

8 MR. KORNASIEWICZ: We will try to point what
9 out what options are available.

10 MR. CARBON: In this case, you tend not to
11 comment on their criticism, you just simply say that if
12 they don't like to use this one, they can use that one.
13 But I think a little more explanation might be
14 appropriate.

15 MR. KORNASIEWICZ: I appreciate your
16 comments.

17 MR. SIESS: You can really have a time with
18 Reg Guides 1.3 and 1.4 on that basis, they are more
19 important than this one.

20 MR. CARBON: I would make that as a general
21 comment. When someone has a criticism, then I think it
22 is worth saying more than, if you don't like this, you
23 can use something else if they can justify it. If they
24 happen to have a better approach, then I think that it
25 should be in here and not require extra justification.

1 MR. SIESS: I don't agree with you. If you go
2 back to source term Reg Guides, there is a large body of
3 opinion now that the source term is greatly overstated,
4 but I think the staff's position would have to be, you
5 have got to prove it beyond any reasonable doubt before
6 we will let you reduce the source term.

7 MR. CARBON: But that is not what I am
8 saying. I am saying that the staff's judgment is that
9 that is not so, all right, if that is the staff's
10 judgment. What I am saying is, when the staff's
11 judgment is that maybe the other is better, but we are
12 not going to put it in here, that is what I am talking
13 about.

14 MR. KORNASIEWICZ: When we get evidence that
15 something is better, that is what we do.

16 MR. CARBON: You may, but I can't tell from
17 that. You didn't say that.

18 MR. SIESS: It seems to me the staff's
19 attitude should be that, we have reasonable that what we
20 have got here is okay. If you want to do something
21 else, you have got to present the data, present the
22 evidence, and convince us, get us to a point where we
23 have reasonable assurance that an alternative is all
24 right.

25 MR. CARBON: That is not necessarily enough.

1 I don't believe you can say, this is okay, but there may
2 be something a lot better, and it seems to me that we
3 ought to have the best in here, the best reasonable
4 thing, so that 50 different applicants don't each have
5 to go through a lot of extra work.

6 MR. SIESS: What this Reg Guide says is that
7 50 different applicants don't have to go through
8 something different, they can use this and the staff
9 will find it acceptable a priori. If they want to use
10 something different, the staff doesn't have a basis for
11 accepting that a priori, somebody has got to establish
12 its acceptability.

13 MR. CARBON: But it is not clear that they
14 don't have the basis for that other approach.

15 MR. SIESS: In other words, the staff knew of
16 a better way to do it, and did not put it in here.

17 MR. CARBON: I am saying, I don't know.

18 MR. SIESS: Let's put the question to them.

19 MR. SPECKLER: We are trying to be
20 conservative and realistic. This is a conservative
21 approach. It is intentionally conservative.

22 MR. CARBON: I appreciate that.

23 MR. SIESS: Anything that the staff does is a
24 conservative approach. The question is, is that an
25 approach that the staff is satisfied that it is

1 conservative without additional evidence?

2 MR. SPECKLER: At this point, yes.

3 MR. KORNASIEWICZ: As a matter of fact, when
4 we get evidence that a method is better, that is grounds
5 for us to revise our Regulatory Guide. I think we are
6 fairly conscientious in doing that.

7 MR. SPECKLER: The track record in
8 meteorology, particularly in the accident meteorology,
9 has been to continuously reevaluate from a TIB 14844
10 that says you use type F meteorology at one meter per
11 second, centerline, for 30 days, to Reg Guide 1.3 to the
12 old standard review plan that says 5 percentile, and now
13 this approach. We are continuously upgrading, but still
14 trying to be conservative in our approach based on hard
15 evidence that we can buy. As it stands now, this we can
16 buy, and not very much beyond that right now.

17 MR. CARBON: I don't argue at all with what
18 you are saying. I am saying simply that I don't know
19 until I hear it said.

20 MR. SIESS: What would it take for you to
21 know, Max?

22 MR. CARBON: I don't think I need to know.

23 MR. SIESS: We have had three meteorologist
24 consultants who haven't found anything wrong with this.
25 The industry people in general seem to have accepted it

1 as a step forward, a relaxation allowing them to take
2 into account things that they would like.

3 Obviously, it doesn't go as far as it might
4 but, as I understand it, it goes as far, I think, as the
5 staff is willing to go at this particular stage. As he
6 pointed out, it is a heck of a big change from the old
7 TIB 14844. Right now, I doubt if you will see another
8 plant that will give you more than 25 by any
9 calculation. We are seeing low population sites.

10 MR. KORNASIEWICZ: I don't think that there is
11 any need for us to go through our prepared
12 presentation.

13 MR. SIESS: I think we covered all your
14 items.

15 MR. KORNASIEWICZ: We have gone through the
16 comments of Dr. Hosker and Dr. Moeller, and they are
17 mostly editorial. We will try to the best of our
18 ability to convince our technical editor to incorporate
19 all of those.

20 MR. SIESS: I suggest that you look at them as
21 benefitting you editorially.

22 Dr. Hosker pointed out that two of his items
23 were not editorial. The first item, which had to do
24 with temperature gradient, I realize that this has been
25 an issue all along and I think there are technical

1 reasons why you did it.

2 MR. KORNASIEWICZ: I discussed that over the
3 telephone with Dr. Hosker, and I satisfied him that for
4 the purposes we are using this guide, and I know I can't
5 quote the IAEA document without giving everybody 20
6 copies of it, but their opinion and the international
7 consensus for the conditions where this guide is most
8 important, where you have a stable atmosphere of low
9 wind speeds and short distances, Delta T probably does
10 the best job of any of the indicators.

11 There are cases, like for example Dr. Hosker
12 pointed out to me, where you have an elevated release
13 under unstable conditions, with relatively brisk wind
14 speeds, it is probably not a good indicator. That is
15 probably true, but then again that condition is not
16 going to give you the poor dispersion condition that we
17 are concerned with, the wind probability levels that are
18 going to affect this kind of population.

19 In addition, we have been doing the
20 atmospheric dispersion tests, and one of the results of
21 this work that we are hoping to come up with is that
22 perhaps we can find some other indicator, other than
23 Delta T, that may be useful. We have not completely
24 analyzed the results of these tests, but we are very
25 open minded on this issue. We have been aware of it for

1 a long time.

2 There are some criticisms, and there are some
3 areas where Delta T does not work. But for the purposes
4 for which this guide has been intended, our opinion is,
5 and I think the international community's is that Delta
6 T is probably better than anything else.

7 MR. SPECKLER: It is a balancing between
8 getting something that is readily measurable in the
9 environment with reliable equipment versus maybe
10 something that is potentially more indicative, but very
11 difficult to measure very closely. That is why the
12 decision was made to go with Delta T instead of other
13 potential indicators that become extremely expensive and
14 extremely difficult to keep running on a continuous
15 basis in an open environment.

16 MR. SIESS: Does anybody want some more on
17 this?

18 What about item 11, the reference to four
19 hours.

20 MR. KORNASIEWICZ: The reference there, the
21 four hours is correct. What we would do, we would
22 insert right after the four hours, again I talked to Dr.
23 Hosker about this, reference 11, and that would satisfy
24 him.

25 MR. SIESS: He would understand that?

1 MR. KORNASIEWICZ: We referenced 11 in the
2 first section, and we did not repeat it, but we could do
3 that without any problem.

4 MR. SIESS: Do you want to make any response
5 to his comment regarding the resolution of public
6 comments?

7 MR. KORNASIEWICZ: I don't think so. Again, I
8 discussed this with him. Some of his comments were
9 because he was not familiar with the use of this guide.

10 MR. SIESS: Do you have a reference to CR 2260
11 in the guide?

12 MR. KORNASIEWICZ: On page 2 of the guide, the
13 first footnote says, "For additional information
14 concerning the basis for the requisitions, see
15 NUREG-2260."

16 MR. SIESS: It is probably not in his
17 possession, or he is like me and doesn't read the
18 thing.

19 Tell me something. We have been talking about
20 a severe accident rulemaking, I guess, but the language
21 has changed. Have you thought about whether the severe
22 accident rulemaking might take a path that would change
23 the siting criteria to such an extent that this sort of
24 thing is obsolete?

25 MR. KORNASIEWICZ: Let me give you the

1 response that the Office Director gave to the CRGR.

2 MR. SIESS: This is siting now on the basis of
3 basically a large LOCA or a Chapter 15 accident, and Reg
4 Guide 1.3 and 1.4 source terms.

5 MR. WARD: They are not siting on the basis of
6 Chapter 15 accidents.

7 MR. SIESS: Yes, they are.

8 MR. SPECKLER: The design basis accidents are
9 used for siting.

10 MR. SIESS: The main steamline break, and all
11 the other accidents, and the source terms from 1.3 and
12 1.4.

13 Leon, you have been working on the revised
14 siting, haven't you?

15 MR. BERATAN: No, we haven't.

16 MR. SIESS: Anyway, the revised siting
17 criteria have been kicked around for a long time, but
18 one outcome of the severe accident rulemaking could be
19 an entirely different approach siting.

20 MR. KORNASIEWICZ: That is right.

21 MR. SIESS: In fact, the most likely outcome
22 of it, I think, and it could just invalidate Reg Guides
23 1.3, 1.4, and 1.145, etc.

24 MR. SPECKLER: That is possible.

25 MR. KORNASIEWICZ: As a matter of fact, the 10

1 CFR Part 100 requirements covered by the procedures in
2 Reg Guides 1.3, 1.4, and 1.145 would to disappear. If
3 the generic siting criteria eliminated those
4 calculations as a basis for siting, and the design
5 criteria eliminated those calculations as a basis for
6 design, if that does happen, it is probably three or
7 four years away.

8 MR. SIESS: You are an optimist.

9 MR. KORNASIEWICZ: I mean, at least. Also,
10 there still may be requirements and environmental
11 considerations that would still exist.

12 MR. SIESS: When you look at Indian Point,
13 Zion, Limerick, which have fairly good populations close
14 in, nobody is going back and looking at those in terms
15 of Part 100. It is obvious that they meet Part 100.
16 They are going back and looking at them in terms of
17 severe accidents. Of course, the only way Part 100
18 could really be factored in severe accident is the
19 population center distance which really wasn't that much
20 help.

21 The other two criteria, you could meet with a
22 tight containment. We never put a minimum on
23 containment leakage. If we had said, you cannot assume
24 a containment leakage lower than 0.1 percent per day,
25 then you would have gotten some thing in there. But I

1 could make the containment tight enough, and I didn't
2 have the population center distance, I could set the
3 reactor right here. So the whole philosophy is
4 changing. This, of course, doesn't recognize it.
5 Codifies is not the right word, but it regulatorizes the
6 existing position.

7 Are there any other questions, Mike?

8 MR. BENDER: No, I don't have any.

9 MR. KERR: I have one on page 1.145-4.

10 MR. SIESS: Incidentally, in your response to
11 regulatory comments, it was somewhat confusing for me
12 because you had the comments referenced by page numbers,
13 which apparently are the page numbers that were printed
14 for comment.

15 MR. KORNASIEWICZ: We had a real dilemma on
16 how to do it because the commentators referred to the
17 printed version, and we had to make a choice as to
18 whether we should refer to the printer version or this
19 version.

20 MR. SIESS: I didn't have the printed
21 version. It is somewhere in my office.

22 MR. KORNASIEWICZ: We didn't know what to do,
23 it was a dilemma, and we picked one of two possible ways
24 of doing it.

25 MR. SIESS: The dilemma is easily solved, if

1 that goes out as a part of a package, your references
2 should be part of the package. That confused me for
3 about ten minutes.

4 MR. KERR: Page 1.145-4, beginning on page 18,
5 there are two sentences, and especially the first
6 sentence, I am not sure what the reader is being told,
7 "Models described in this guide may require
8 modification."

9 MR. KORNASIEWICZ: If you are using a
10 different indicator to determine you Sigma Y or Sigma Z
11 values, for example, in some cases you may have to use a
12 modified version.

13 MR. KERR: What does the reader do as a result
14 of that first sentence?

15 MR. KORNASIEWICZ: It raises a flag to him
16 that if you are using another stability indicator --

17 MR. KERR: I don't know what to do when the
18 flag is raised. I have a Reg Guide that is supposed to
19 tell me how to satisfy a requirement, and I don't know
20 what that sentence tells me to do.

21 MR. SIESS: What does "models" refer to?

22 MR. KORNASIEWICZ: The mathematical
23 formulations number, equations.

24 MR. KERR: If what that is saying is if you
25 are going to use other parameters, you had better call

1 up the NRC and find out what to do, I understand that.

2 Is that what you mean with that sentence?

3 MR. SPECKLER: I think that it is really
4 saying that it is applicable to a Delta T approach, and
5 not applicable for any other means, or may not be.

6 MR. MARKEE: The first two sentences refer to
7 the Delta T approach.

8 MR. KERR: I still wonder what the reader is
9 supposed to do when he reads that sentence. Is that
10 supposed to say, you had better not use anything other
11 than the Delta T, or you are going to get in trouble?
12 What does it say?

13 MR. MARKEE: It says that if you use something
14 else, you will have to justify what you have used.

15 MR. KERR: That is not what it says. It says,
16 "The models may require modifications." It doesn't say
17 justification.

18 MR. KORNASIEWICZ: I think that what it says
19 that the models are predicated on using a Delta T
20 stability characterization.

21 MR. SIESS: It says that model is empirical.

22 MR. KORNASIEWICZ: Yes, especially for the
23 weight correction.

24 MR. WARD: If you use another parameter, you
25 are going to have to modify the equation.

1 MR. SPECKLER: Exactly. For example, if you
2 are measuring Sigma Theta, Sigma Theta is measuring the
3 meander, so you can't a meander factor on top of
4 something that is already measuring meander. You are
5 adding something on top of something that is already
6 measuring what you are trying to take credit for.

7 MR. SIESS: You have to recognize that this
8 guide is written by meteorologists for other
9 meteorologists. Meteorologists are peculiar people,
10 they don't know the value of Phi, did you notice that,
11 you have to put that in the definition form.

12 MR. KERR: I guess, since I am not a
13 meteorologist among other things that I am not, maybe I
14 should not pursue the question further. It is just that
15 this didn't give me very much guidance.

16 MR. SIESS: I understood it, so I guess I am
17 closer to the meteorologists.

18 MR. SPECKLER: That didn't get any comments
19 from industry.

20 MR. KERR: On page 1.145-10, line 5, I
21 thought, until I read the LPZ boundary distance as part
22 of the sentence, that this was going to talk about
23 values during the first two hours of the accident. Then
24 I find that the two-hour Kai Q values should be
25 calculated at the outer LPZ boundary distances. Why is

1 that?

2 MR. KORNASIEWICZ: Because you have to obtain
3 intermediate values, and the way you do this --

4 MR. KERR: Intermediate values for what?

5 MR. KORNASIEWICZ: There are different kinds,
6 when you do the calculations, eight hours, 16 hours,
7 three days.

8 MR. MARKEE: The requirements in Part 100 are
9 for doses for the course of the accident.

10 MR. KERR: Right.

11 MR. MARKEE: But for the exclusionary
12 boundary, they are for the first two hours following an
13 accident. Using the two hours as a base, and using a
14 longer time period, as another base, then we can
15 establish what the average relative concentration might
16 be for various contexts to make the definition for time
17 periods greater than two hours.

18 MR. KORNASIEWICZ: What you do, in effect, is
19 plot the two-hour data point on the curve, the
20 eight-hour data point and then interpolate
21 logarithmically for the other time periods. That is one
22 method of getting at the intermediate periods.

23 MR. KERR: The purpose of this, then, is to
24 say that if you are going to get the dose during the
25 course of an accident, you have to calculate the dose as

1 a function of time. The two hours is sort of arbitrary,
2 it could just as well be 2.5 hours.

3 MR. KORNASIEWICZ: That is true. It is just
4 to establish one data point, so that you can draw
5 logarithmically a short period --

6 MR. KERR: So there isn't anything sacred
7 about the two hours.

8 MR. KORNASIEWICZ: No.

9 MR. SIESS: Is there anything sacred about six
10 and then the figures for Phi? That looks absolutely
11 absurd.

12 MR. KORNASIEWICZ: I would defer to our
13 editors, for every parameter you have an equation, and
14 you are supposed to have an explanation.

15 MR. SIESS: It is not as silly as it seems
16 because Phi could stand for some other quantity, I
17 guess.

18 MR. KERR: On page 1.145-14, line 3, why
19 should Kai over Q monotonically decrease with time?

20 MR. KORNASIEWICZ: Herb can tell you this.
21 From the information we have gotten from the dispersion
22 tests, it is just the way the data falls out.

23 MR. SIESS: Then if anybody comes up with a
24 calculations don't do that, then they must be wrong?

25 MR. KORNASIEWICZ: They may not be wrong, but

1 they should have some good evidence to show why.

2 MR. MARKEE: The monotonic decrease of the
3 average. As you expand the time period, the average
4 during that time period has to decrease. The individual
5 value can increase.

6 MR. KERR: Kai over Q ought to give, it seems
7 to me, a relationship between a source term, which could
8 be constant with time, and a concentration.

9 MR. SIESS: Kai over Q is a concentration.

10 MR. KERR: Kay over Q is a concentration
11 divided by the source. You multiply it by source, and
12 you get concentration.

13 MR. SIESS: It is a fraction.

14 MR. KERR: When Kai is a concentration in
15 curies per cubic meter, as I understand it.

16 MR. MARKEE: That is correct.

17 MR. KERR: Physically, if I am releasing at a
18 constant rate, it does not seem to me it is any more
19 logical that Kai over Q should decrease with time than
20 if it increased. It may be the calculation method, if
21 you increase the time over which you average, always
22 gives you a monotonically decreasing value, but I can't
23 believe that physically you always get a monotonically
24 decrease.

25 MR. SPECKLER: You do.

1 MR. KORNASIEWICZ: This would be true if the
2 meteorological conditions were constant, but they
3 change.

4 MR. KERR: Then why do they always change in
5 the direction which makes Kai over Q smaller.

6 MR. SPECKLER: It is statistics, it is not
7 really meteorology. We are talking about an individual
8 standing at a point and over a two-hour period -- Could
9 I use the board for a second?

10 MR. KERR: You can, if you want to, but you
11 will not convince me by using the blackboard.

12 MR. SPECKLER: What you are talking about is
13 the probability of the plume being over a given point.
14 If it is a short term release, it is either going to be
15 a peak or nothing. If it is a longer time period, what
16 essentially happens is that calculation tends to flatten
17 with the exposure time if an individual is standing at a
18 given point. As I said, for a few second release, you
19 get a very big peak, and then it drops over the long
20 time period.

21 MR. KERR: If you are talking about a
22 calculational method, then I agree that you set a
23 calculational method that will always do this.

24 MR. SPECKLER: It always does that. In life,
25 it does that.

1 MR. SIESS: There was a point made initially,
2 I don't know if it was important enough, that it wasn't
3 the instantaneous Kai over Q with the average. The day
4 Kai over Q decrease.

5 MR. SPECKLER: It is the average over eight
6 hours, 16 hours, or three days, or 30 days.

7 MR. SIESS: This is not instantaneous. It is
8 the average that you decrease monotonically.

9 MR. MARKEE: That is right.

10 MR. SIESS: Does that help you any?

11 MR. SPECKLER: You are talking about a plume,
12 and if you are trying to determine what the average is
13 over a very short period of time, it is going to be
14 different than if you are talking 30 days averaging,
15 what could be happening with the winds, and so on and so
16 forth.

17 MR. SIESS: In that statement, shouldn't the
18 word "average" be in there somewhere?

19 MR. KERR: Again, if you use an argument that
20 meteorologists do understand, then there is no concern
21 about that. It did strike me as being physically not
22 logical.

23 MR. SIESS: Should "average" be in there?

24 MR. MARKEE: Average concentrations.

25 MR. SPECKLER: The word "average" would help.

1 MR. SIESS: Back on the preceding page, it
2 talks about the annual average Kai over Q.

3 MR. KORNASIEWICZ: The next one is the average
4 over 100 hours.

5 MR. KERR: If it perfectly understandable to
6 the people who use it, I don't have a problem with the
7 language, I just wanted to understand what you meant, or
8 what you had in mind.

9 MR. KORNASIEWICZ: I would be willing to put
10 the word "average."

11 MR. SPECKLER: It may help.

12 MR. KERR: Just so that it will be
13 understandable to the people who will be using it, and
14 not to me.

15 MR. KORNASIEWICZ: I think that you may have a
16 reasonable point.

17 MR. SIESS: Any other questions?

18 MR. KERR: I have no other comments.

19 MR. SIESS: Max, do you have any other
20 comments?

21 MR. KERR: I think that it is sufficiently
22 more complicated than the earlier one that it looks like
23 a better guide.

24 MR. SIESS: It looks like a better method,
25 anyway.

1 MR. KERR: You people are aware that there is
2 a mistake in the lose calculations in 1.3 and 1.4,
3 aren't you?

4 MR. KORNASIEWICZ: Yes.

5 MR. MARKEE: Yes.

6 MR. KERR: Those numbers are in error.

7 MR. SIESS: Is there anything else?

8 Gentlemen, the question is, should we
9 recommend to the full committee that the subcommittee
10 concurs in the position in Reg Guide 1.145, Revision 1.
11 Is there any objection.

12 (No response.)

13 MR. SIESS: We will so recommend. Sam will
14 prepare a memo.

15 Thank you, gentlemen.

16 (Whereupon, at 9:25 a.m., the meeting
17 concluded.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

in the matter of: ACRS/Subcommittee on Regulatory Activities

Date of Proceeding: September 8, 1982

Docket Number: _____

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Patricia A. Minson

Official Reporter (Typed)

Patricia A. Minson

Official Reporter (Signature)



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES

Post Office Drawer F
Oak Ridge, Tennessee 37830

August 30, 1982 RF/326

Mr. Sam Duraiswamy
Senior Staff Engineer
Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Duraiswamy:

The following are my comments, as requested on August 17, 1982, on the proposed Revision 1 to Regulatory Guide 1.145. My comments are mostly editorial in nature, with the exception of (1) and (11), which are technical. I am pretty well satisfied with the technical accuracy of the proposed Revision, with the possible exception of these two issues.

- (1) p.1.145-4, lines 15-16. The method continues the use of temperature gradient as the main stability indicator; Drs. Frank Gifford and Paul MacCready took issue with this at the November 2, 1977 meeting on this revision, and the controversy is still continuing. Our problem is that ΔT (or $\Delta T/\Delta Z$) is not always a good indicator of lateral dispersion. However, the staff's following sentences do allow the option of using site-specific diffusion test results, so I am willing to accept the method for now. But I believe the NRC staff should reconsider this procedure in the light of the past decade's research and field test results.
- (2) p. 1.145-7, lines 29-30; p.1.145-8, lines 1-4. The text does not make it clear (although the Appendix does) that the procedure described is to be applied at each distance of interest, and not just at some arbitrary single point. A sentence clarifying this should be inserted just before the last sentence of the paragraph.
- (3) p.1.145-9, equation (5). The subscript on the wind speed symbol should be corrected; compare to line 15 on same page.
- (4) p.1.145-9, line 15. The phrase " h_e layer of depth h_e " should be changed to read "fumigation layer of depth h_e ."
- (5) p.1.145-11, line 9. I object on general principles to describing calculated values of χ/Q as "data points." Call them "computed values" or "computed points" or something similar; "data" always suggests something measured, rather than calculated.

- (6) p.1.145-11, line 9. Change "from each" to "for each," to indicate that there will be a set of 16 such values.
- (7) p.1.145-11, line 17. Insert "fumigation" between the words "sector" and " χ/Q 's."
- (8) p.1.145-12, line 5. "3200 meters" must be a conversion from the English 2 miles, but seems unnecessarily precise. Why not "3 km" or "3.5 km"?
- (9) p.1.145-12, line 18. Delete the comma after " χ/Q ."
- (10) p.1.145-12, line 20. Insert a comma after "values."
- (11) p.1.145-14, line 26. Is "4-hour" correct, rather than "2-hour"? If so, offer some justification.
- (12) p.1.145-15, lines 11-12. The χ/Q value selected is not "the dispersion condition indicative of the type of release being considered"; rather, it is a consequence of that dispersion condition. This phrase should be reworded, or even dropped.
- (13) p.1.145-15, lines 14-15. Change "the appropriate time periods" to "intermediate time periods."
- (14) Appendix A. The Appendix is clearly written and I have no real quarrel with its technical content. I do take issue with its method of presenting technical results. I believe the NRC should encourage its staff to publish papers in the reviewed technical literature describing the bases for bounding procedures such as those described here. It is difficult to either endorse or reject an estimation method without seeing a detailed discussion of its foundation.

Remarks on resolution of public comments. I have listed these in the order encountered in the description prepared by the NRC staff.

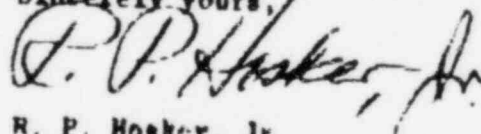
Comment 8.1 A request for methods to deal with wet deposition and complex terrain. Staff response is that these topics are beyond the scope of the Guide. I am not convinced that this should be the case; these are both important areas that can strongly affect χ/Q estimates. However, they are also topics of current research, and it may not be possible to say much in an authoritative way at this time. I recommend that the staff aim toward incorporating such information in the next revision of the Guide.

Comment 6.3 Asks for basis of setting wind speed during calms equal to higher of instrument starting speeds. As far as I can tell, the staff did not respond to this query. See also the discussion of Comment 5.1, below.

- Comment 9.7 Requests some justification for using a 4-hour fumigation period (rather than 2 hours) at coastal reactor sites. The staff has not done this. I also raised this point in my comment (11), above; if the Guide is correct, a reference or justification should be provided.
- Comment 5.1 Points out conflicting definitions of calms in Regulatory Guides 1.111 and 1.145. The staff's response is that this apparent conflict is deliberate, and is rooted in the different purposes of the two Guides. My sympathy is with the commenter, especially since both definitions are quite artificial. The staff should rethink this, and try to resolve the conflict. It seems needlessly confusing to change definitions from one document to another.
- Comments 2.1, 4.4, 5.3 These are directed at the method of selecting the bounding values of χ/Q and the method of time interpolation. The staff really has not answered these questions at all; they have merely responded that there may be other ways to skin these cats. I would like to see a more rigorous (and vigorous) defense of the method recommended.
- Comment 3.1 Asks for guidance in determining site boundary distance over large bodies of water. The staff seems to be saying that this is a decision beyond the scope of the Guide. This is probably true, but the staff could be a bit more helpful by suggesting a reference for guidance.
- Comment 3.4 Asks that algorithms for the dispersion sigmas be included in the Guide. I agree with the staff that these are available elsewhere, but the staff again could be helpful and include a sample reference in the Guide.
- Comment 6.5 Asks about supporting technical information for the Guide (see also my comment 14, above). I think this is a legitimate question; NUREG/CR-2269 should be referenced in the Guide, either in the Introduction or in the Appendix.

I hope you find the above remarks helpful. If you have any questions, please don't hesitate to call (ETS 626-1248).

Sincerely yours,



R. P. Hoaker, Jr.
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Atmospheric Turbulence
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27 Wildwood Drive
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September 7, 1982

Mr. Sam Duraiswamy
Senior Staff Engineer
Advisory Committee on Reactor Safeguards
U. S. Nuclear Regulatory Commission

Dear Sam:

Listed below are my comments on the Proposed Revision 1 of Regulatory Guide 1.145. As you will note, all of them are of an editorial nature.

1. On page 2, the titles of Regulatory Guides 1.3 and 1.4 are included; on page 3, the title of R. G. 1.23 is not included; on page 3 when R. G. 1.3 and 1.4 are mentioned a second time, their titles are not given; on pages 4 & 5, the title of R. G. 1.23 is not given. Then on page 9, the title of R. G. 1.111 is not given, but on page 10 it is. What is the procedure or editorial approach that is being taken? Whatever it is, it does not appear consistent to me. On page 13, the title of R. G. 1.70 is given.

2. On page 11 (line 14), reference is made to regulatory position 1.3.2 (which, in reality, is Section 1.3.2 of this same R. G.). On page 13 (line 8), reference is made to "Section 2.3.4" of R.G. 1.70. Was the latter not a "regulatory position." Perhaps others are familiar with this editorial procedure but I found it confusing initially.

3. On page 12 (line 6), reference is made to the "oceans or Great Lakes". Although is is minor, I found it interesting editorially that you would be specific about the Great Lakes, but not about the Oceans (Atlantic or Pacific). What about the Gulf of Mexico?

4. Page 14 (line 4) -- I think this would read better if it said: ". . .studies and should produce"

5. In the "Regulatory Analysis for R. G. 1.145, Proposed Revision 1," the first page, 2nd paragraph --the word "accommodate" has a typo; a similar problem exists twice with the word, "commitment." Also, in the 3rd paragraph, line 2 -- I would have said: "...staff time could not be allocated for work"

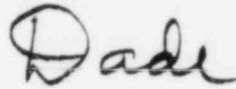
6. Second page of Regulatory Analysis, 1st paragraph -- the words "to the guide" (2nd line), and "of the guide" (3rd line) could be deleted. In the 2nd paragraph, why are the words, "Public Comment" capitalized? Last line (2nd paragraph) would read better as ". . . . and which represents". In the 3rd paragraph, last line, it states that "the method described in this guide will be used in evaluating . . ." "(4) operating reactors." Yet on page 17, it implies that its application to "operating reactors" is optional. Back to page 17 of the Guide, why does this say (line 5) "Operating reactors"? What it actually applies to are "Operating commercial nuclear power plants." This should be corrected.

7. Page 3 of "Regulatory Analysis," (line 5) -- would it not be more accurate to say: "...on the average, to reduce estimates of relative concentration"? Same page, 3 lines up from the bottom -- the semicolon should be deleted.

8. The "Resolution of Public Comments" section contains many errors of English but I assume this will not be published. For example, on the 1st page, near the bottom for part 2, it states that "The staff has considered this comment but have" On the second page, item 4, the last sentence: "Others were unable to provide comments." leaves me confused. Other similar problems exist.

I hope these comments will be helpful. The Revision 1 of the Guide reflects a lot of hard work and is basically a good document.

Sincerely,



Dade W. Moeller,
ACRS Member