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10 proceeding of the United States Nuclear Regulatory
11 Commission Advisory Committee on Reactor Safeguards,
12 as reported herein, is a record of the discussions
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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SUBCOMMITTEE ON REACTOR POLICIES AND PRACTICES WITH
RESPECT TO DRAFT FINAL REVISION 1 TO REGULATORY
GUIDE 1.141 (DG-1213), CONTAINMENT ISOLATION
PROVISIONS FOR FLUID SYSTEMS

+ + + + +

MEETING

+ + + + +

TUESDAY

DECEMBER 1, 2009

The Subcommittee met at the Nuclear
Regulatory Commission, Two White Flint North, Room
T2B3, 11545 Rockville Pike, at 8:30 a.m., Harold Ray,
Chairman, presiding.

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1 SUBCOMMITTEE MEMBERS PRESENT:

2 HAROLD B. RAY, Chairman

3 SAID ABDEL-KHALIK

4 J. SAM ARMIJO

5 DENNIS C. BLEY

6 CHARLES H. BROWN, JR.

7 OTTO L. MAYNARD

8 WILLIAM J. SHACK

9 JOHN D. SIEBER

10 NRC STAFF PRESENT:

11 ZENA ABDULLAHI, Designated Federal Official

12 JEROME BETTLE

13 ROBERT DENNIG

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TABLE OF CONTENTS

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

Page No.

Introductory Remarks, HAROLD B. RAY , Chairman	4
Discussion, NRC Staff	5
Committee Caucus	

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

8:30 a.m.

CHAIR RAY: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Regulatory Policies and Practices.

I'm Harold Ray, the Chairman of the ACRS's review of Revision 1 to Regulatory Guide 1.141. The purpose of this meeting is to discuss the staff's changes in Revision 1 to the Regulatory Guide.

I'm joined for this meeting by Members Said Abdel-Khalik, Sam Armijo, Dennis Bley, Bill Shack, Otto Maynard, Charles Brown and Jack Sieber.

The Regulatory Guide establishes the methods acceptable to the staff in meeting containment isolation requirements for fluid systems. The original Regulatory Guide 1.141 was issued to the public in 1978, and in 2009 the staff issued the revised Regulatory Guide for public comments as Draft Guide 1213.

Staff did not receive any comments. The Subcommittee will hear presentations by and hold discussions with the staff. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as

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1 appropriate for deliberation by the full Committee.

2 The rules for participation in today's
3 meeting have been announced as part of the notice of
4 the meeting previously published in the Federal
5 Register. We have received no written comments or
6 requests for time to make oral statements from members
7 of the public regarding today's meeting.

8 A transcript of the meeting is being kept
9 and will be made available, as stated in the Federal
10 Register Notice.

11 Zena Abdullahi is the Designated Federal
12 Official for this meeting.

13 It is requested speakers first identify
14 themselves, speak with sufficient clarity and volume
15 so that they can be readily heard.

16 We are glad to have as many members as we
17 have for this Subcommittee, it reflects the importance
18 that the ACRS has traditionally given to containment
19 boundary integrity.

20 We'll now proceed with the meeting, and
21 I'll call upon Jerome Bettle?

22 MR. BETTLE: Right.

23 CHAIR RAY: Thank you -- of the NRC staff
24 to begin.

25 MR. BETTLE: Good morning. My name is

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1 Jerome Bettle. I work in the Containment Ventilation
2 Branch of the Office of Reactor Regulation. My Branch
3 Chief, Bob Dennig, is here with me to sequence through
4 the slides.

5 This is just a revision of Reg Guide
6 1.141. As was just mentioned, there were no public
7 comments. I think a lot of what is in there has been
8 pretty well settled over the years. I expect this
9 will be a relatively short presentation. We are
10 removing nothing, and only adding stuff that had been
11 added elsewhere in the Regulations and Guidance.

12 CHAIR RAY: Well, on that point, I think,
13 let me say up front, the thing that caught my
14 attention was the role played by relief valves as
15 containment isolation valves, requirement for the
16 setpoint of the relief valves.

17 It seems to me like that has only been in
18 the Standard Review Plan, and I couldn't figure out
19 when it got inserted in the Standard Review Plan, but
20 now it gets included here in the Reg Guide. So, it's
21 one of those things that was in guidance that's going
22 to be in this guidance now.

23 MR. BETTLE: Okay.

24 CHAIR RAY: But, you'll get to that in due
25 course maybe at a better time to respond to what I'm

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1 mentioning.

2 MR. BETTLE: Well, I can cover that right
3 now.

4 What was in the Guidance previously was
5 that you could use the relief valves as just the point
6 of 1.15 times, and it was before the meeting started
7 was mentioned there had been a subsequent revision of
8 the ANSI N271 in 1984, and that incorporated the 1.5
9 times. So, I think it's possible that when it was
10 placed in the Guidance outside the Reg Guide here at
11 the NRC they just looked to see what was there, and
12 there was probably, you know, a matter of some
13 discussion, and back and forth over a number of years,
14 and it got put into the revision back then.

15 So, it's been --

16 CHAIR RAY: Put in what revision are you
17 referring to now?

18 MR. BETTLE: -- in the revision of the ANS
19 N271. That was revised back in 1984.

20 CHAIR RAY: Okay. I saw it in the
21 Standard Review Plan.

22 MR. BETTLE: Yes, it was incorporated
23 there.

24 CHAIR RAY: From there, it seems to be
25 coming into the Reg Guide.

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1 MR. BETTLE: I didn't go back to try to
2 replicate -- I'm giving this presentation, the person
3 who actually prepared this revision was Brian Lee, and
4 I'm standing in here to give the presentation in his
5 stead.

6 MEMBER SHACK: Except they call the 1984
7 Revision ANS-56.2.

8 MR. BETTLE: Yes.

9 MEMBER SHACK: Which is the correct one.

10 MR. BETTLE: Exactly.

11 So, that has been out there for quite some
12 time, and, apparently, it got into the Standard Review
13 Plan.

14 CHAIR RAY: Okay. Well, our role here is
15 to question things like that sometimes, so you may
16 find as we get into this a little further that we,
17 nevertheless, want to raise a question.

18 MR. BETTLE: The original standard said,
19 you know, you could use the relief valve, but it never
20 provided, you know, any kind of criteria, as far as
21 what the setpoint would have to be. You know, and it
22 certainly makes sense that it's got to be above
23 containment pressure, you know, to be entirely
24 effective, and how much was the minimum that you'd
25 have to have at that setting.

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1 So, I guess at some point over the years,
2 you knwo, there was discussion, it kind of got hashed
3 out that 1.5 is the minimum.

4 CHAIR RAY: Well, as we're dwelling on
5 this, I mean, a relief valve is kind of like an
6 automatic isolation valve in a sense.

7 MR. BETTLE: Yes.

8 CHAIR RAY: Or, you can think of it as a
9 check valve if you are looking at in a reverse
10 direction.

11 But, there don't seem to be the
12 requirements on it that exist for other valves, such
13 as position indication. You have to wonder what the
14 requirements are for verifying the setpoint and so on.

15 MR. BETTLE: Well, it would come under the
16 O&M, Operation and Maintenance, under that valve
17 program, being in that class, being a containment --
18 identified as a containment isolation valve, or a
19 containment boundary valve, requirements of a relief
20 valve there.

21 CHAIR RAY: Well, let's do the
22 presentation, so that everybody has a chance to raise
23 their issues. I don't want to get us any further off
24 track here now. But, we'll come back to this later, I
25 think.

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1 MEMBER BROWN: Yes, I guess I would like
2 to make sure we come back to this later, because I
3 guess I never -- I went through the rule, the General
4 Design Criteria, and there's -- I was just wondering
5 how a relief valve got into the use as isolation
6 valves in the first place.

7 My past experience was that we didn't use
8 relief valves for isolation valves, you always put in
9 a separate isolation valve if you wanted to guarantee
10 it, because relief valves leak, traditionally.

11 CHAIR RAY: Well, the setpoints drift.

12 MEMBER BROWN: Lots of things happen.

13 CHAIR RAY: All kinds of stuff.

14 MEMBER BROWN: And, I saw when I read the
15 rule they prohibit simple check valves, they can't be
16 used as automatic isolation valves, but there's no
17 words at all in the rules of the design criteria for
18 relief valves.

19 How did it show up in the SRP anyway?

20 CHAIR RAY: Anyway, let's do the
21 presentation, to make sure we get that out there. I
22 think we've sufficiently pointed at this as a
23 question, at least, in our minds right now.

24 Go ahead.

25 MR. BETTLE: Okay. The objective of this

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1 briefing is to identify, you know, the why this
2 Regulatory Guide exists, where it came from, take a
3 look at the regulatory requirements that form the
4 initial impetus for having this Reg Guide, the
5 industry guidance that was developed based upon the
6 regulatory requirements, and the additional NRC
7 guidance that have occurred since the original issue
8 of the Regulatory Guide.

9 And then, I'll briefly identify at the end
10 on the regulatory positions that you see in the
11 Revision 1 of the Reg Guide, the ones that were
12 carried over and the ones that were new additions.
13 There wasn't any regulatory position withdrawn or
14 removed in this Guide.

15 10 CFR, Appendix A, you have the General
16 Design Criteria 54, 55, 56 and 57. They provide the
17 high-level requirement as far as isolation capability
18 for piping systems and penetrating primary
19 containment.

20 Criterion 54, it's the generalized one, it
21 gives you, you know, what the design is supposed to
22 accomplish, some considerations, it's kind of like the
23 general statement.

24 Criterion 55, if you have -- it gives a
25 little bit more detail, it deals with those

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1 penetrations that are going to connect to and
2 communicate with the Reactor Coolant System, and it
3 goes down through the four, I guess, idealized
4 containment boundary configurations that you might
5 have.

6 You also notice down there it has the
7 words, "Unless it can be demonstrated that containment
8 isolation provisions for a specific class line, such
9 as instrument lines, are acceptable by other -- some
10 other defined basis." I guess the other defined basis
11 goes into the industry standard and the Regulatory
12 Guide endorsement of the industry standard, you know,
13 for, I guess, specialized cases.

14 And, the instrument lines are covered in
15 Reg Guide 1.11, specifically, if they don't -- if they
16 are not -- the isolation condition is not in
17 conformance with this Reg Guide.

18 And, it goes into a little bit more of the
19 considerations that you'd have to have that are
20 fleshed out a bit more in the industry standard, or
21 quite a bit more.

22 This talks about the lines that
23 communicate directly with containment atmosphere that
24 penetrate primary reactor containment. It's very
25 similar to the Criterion 55 the wording is almost

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1 identical.

2 57, you have another situation that is
3 specifically identified here, where you can use a
4 closed system, the system, actually, pressure boundary
5 is your boundary inside or outside a containment.
6 And, in addition, the having one containment isolation
7 valve. So, you still have your required redundancy,
8 except for one of the boundaries being provided by the
9 pressure boundary of the system.

10 The American Nuclear Society -- the
11 Nuclear Power Plant Systems Engineering Committee of
12 the American Nuclear Society, they formed a working
13 group, ANS-56.2, and they started work in 1973 on an
14 industry standard to, actually, get down to the actual
15 working detail that those General Design Criteria, as
16 far as implementing them in a manner that would get
17 everybody on board.

18 1973, a number of plants that have already
19 been constructed, and were in service, so there had
20 been a considerable amount of discussion back and
21 forth by that time, hammering out what was, actually,
22 needed or required, and I think a lot of what goes
23 into that standard is what had been hammered out for
24 over several years. And, they issued that as N271 in
25 1976, the containment isolation provisions for fluid

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1 systems.

2 Reg Guide 1.141 was originally issued in
3 April of 1978, and endorsed N271, ANSI N271, 1976, and
4 had six regulatory positions identified.

5 And, there's also indicated there the
6 working -- this working group was disbanded in the mid
7 1980s. And, apparently, there wasn't, I guess, enough
8 industry interest in updating the standard, you know,
9 perhaps, incorporating some of the regulatory
10 positions, or some of the subsequently worked out
11 containment isolation requirements that hadn't been
12 resurrected in the industry standard, it has not been
13 changed in the last ten, 15 years.

14 Since the original issue of the Regulatory
15 Guide, Three Mile Island incident occurred. There's
16 the whole list of recommendations that came out of
17 that. Item II.E.4.2, containment isolation
18 dependability, was rolled into 10 CFR 50.34(f)(2) and
19 also into Section 6.2.4., Containment Isolation System
20 of the Standard Review Plan of 1981.

21 The Standard Review Plan was -- Revision 3
22 was issued in March of 2007, so it has been
23 considerably updated and smoothed out. Now, that
24 Standard Review Plan, those reference Reg Guide 1.141
25 as an applicable industry standard. It does not

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1 reference directly to the industry standard itself.

2 In summary, the changes to Reg Guide 1.141
3 are, essentially, in tact from the existing version.
4 The post TMI items were included, and then one other
5 identified here in the next couple of slides. So,
6 it's just rolling in what additional regulatory
7 requirements and guidance have been provided that were
8 not included in the ANSI N271, 1976.

9 CHAIR RAY: Well, let's just stop here for
10 a second, and let's say the original ANSI Standard,
11 you don't know whether it spoke to this relief valve
12 question as a containment?

13 MR. BETTLE: It said you could use relief
14 valves, but it didn't say the 1.5 times containment
15 pressure.

16 CHAIR RAY: But, it gave blanket use --
17 approval to use a relief valve?

18 MR. BETTLE: Yes.

19 CHAIR RAY: As a containment isolation.

20 MR. BETTLE: And, I think a lot of them,
21 there was a lot of them that got added on to the
22 penetration piping to protect it from thermal
23 overpressurization and failure. So, you'd have --

24 CHAIR RAY: Yes, but that's located inside
25 containment.

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1 MR. BETTLE: Right.

2 CHAIR RAY: I mean, we are talking here,
3 or I'm talking, about not overpressure protection for
4 the piping piece that's where you've got a risk of
5 thermal induced overpressure, but where you actually
6 have a relief valve serving as a containment isolation
7 valve, containment boundary valve.

8 MR. DENNIG: Bob Dennig, Branch Chief.

9 We have approved amendments that do use
10 isolation valves for containment isolation purposes,
11 and the configurations that this is always associated
12 with is a system that's otherwise closed outside of
13 containment. The only leak path, if you will, is
14 postulated to be the relief valve. So, it becomes a
15 containment isolation valve, since you can't entirely
16 take credit for that closed system outside containment
17 for the second barrier. And, those are the situations
18 in which we've been requested to allow those kinds of
19 uses of a relief valve.

20 CHAIR RAY: Well, is that request a
21 deviation? I mean, this just says you can use it
22 period.

23 MR. DENNIG: As with all of these things,
24 you know, they start out broad, and as situations come
25 up the interpretations are done. And, one of the main

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1 purposes of this revision exercise was to get all of
2 this miscellaneous guidance that had been used in
3 practice into one place. So, that's why it's showing
4 up here, and the amendments that I'm thinking of were
5 four or five years ago. It's been some time that
6 we've been doing this.

7 MEMBER BROWN: These are plant design
8 amendments?

9 MR. DENNIG: They are for operating
10 plants, not --

11 MEMBER BROWN: Yes, for operating plants.
12 So, it's amendments to their licensing
13 basis.

14 MR. DENNIG: Yes, it's to allow an
15 isolation valve to be placed in the containment
16 isolation valve category and credited.

17 MEMBER BROWN: You mean a relief valve to
18 be credited.

19 MR. DENNIG: Excuse me, relief valve, yes.

20 MEMBER BROWN: Okay.

21 MR. DENNIG: And, I don't know personally
22 what evolution or change to the otherwise closed
23 system would have necessitated this some time down the
24 road from the original license. It's just been, you
25 know, the consensus or sharpening of the Guidance

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1 resulted in the 1.5 number.

2 I suspect there were times when -- early
3 occasions where people wanted to take credit for
4 relief valves, and the question came back, what's the
5 setpoint, how you maintain the setpoint and so on and
6 so forth, and then that feedback in that informal
7 guidance in the context of a license amendment gets
8 codified into the SRP.

9 MEMBER BROWN: For my edification, these
10 are lines that exit the containment into another
11 closed system, whatever that form may be, and there's
12 a relief valve on that system to, obviously, prevent
13 exploding, you know, blowing up the pipes or whatever.

14 MR. DENNIG: It has to be there for other
15 reasons.

16 MEMBER BROWN: But again, it becomes
17 codified by default, it sounds like, I mean, they kind
18 of just decreed it into this manner of accepting
19 relief valves as an isolation valve. I mean, there's
20 no mention of it in the rules at all, and the ANSI
21 Standard has it in there, and it had the 1.5 times, I
22 guess, but the idea of the 1.5 times it's high enough
23 that you are not going to sneak up to the pressure
24 boundary, and just have it kind of incrementally leak
25 a little bit, because it's really going to be keeping

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1 it shut? I mean, is there an analytical basis for
2 that, or did somebody just say that's a good number?

3 MR. BETTLE: I think on most of these
4 systems that the relief valve setpoints is really many
5 times containment design pressure, but, I guess, in
6 just setting an actual limitation on how low you can
7 go, just to make sure that everybody is at least that
8 much above containment, you know, design.

9 MEMBER MAYNARD: I don't think -- are
10 there any of these relief valves that are being
11 credited, are they on any of the systems that just
12 have direct communication with the containment?

13 The ones I'm familiar with are more on the
14 secondary side, it's where the system is really
15 closed, but you may have a relief valve outside the
16 containment, that if you had a break inside the
17 containment that you would just be crediting the
18 relief valve for isolation. But normally, that line
19 is not going to see the containment atmosphere.

20 I'm trying to get the scope on this. Are
21 there any systems to where you have just direct
22 communication with the containment that the relief
23 valve is the containment isolation?

24 MR. DENNIG: I don't believe so, but we
25 can take this as a -- bring it back to you, the

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1 takeaway, to give you the actual situations where this
2 has been done.

3 MEMBER BLEY: Yes, I'd be real interested,
4 because everything I can think of has an isolation
5 valve anyway before you leave the containment. So, I
6 have trouble seeing one that --

7 MR. DENNIG: Well, this would be the
8 second area.

9 MEMBER BLEY: Oh, okay, this is the second
10 area.

11 CHAIR RAY: It doesn't say that, but you
12 have to conclude that that probably is what it would
13 be.

14 So, for example, steam generator relief
15 valves on a PWR, obviously, that's the second
16 boundary, and it can't be any other way.

17 There is an isolation valve, but that's
18 downstream of the relief valve.

19 MR. DENNIG: Yes.

20 CHAIR RAY: So, I'm thinking, Otto, that
21 we are talking more about containment cooling loops
22 and stuff like that, which are closed inside
23 containment, and then -- so that's one barrier, and
24 the other barrier is what we are talking about with
25 the relief valve, right?

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1 MR. DENNIG: That's what I believe we
2 said.

3 CHAIR RAY: So, it would like containment
4 cooling loops, that sort of thing, I guess. I mean,
5 that's at least one that I can think of.

6 MEMBER BLEY: There are lots of -- I mean,
7 as long as you have -- you know, you have one
8 containment isolation valve, there are a lot of
9 systems then that have a relief valve that's sitting
10 there behind it.

11 CHAIR RAY: No, wait, let's --

12 MEMBER SIEBER: The service water.

13 CHAIR RAY: Let's be clear, basically, we
14 are talking about two boundaries as the fundamental
15 principle. If it's closed inside containment, then
16 that's one boundary, and so you ask yourself the
17 question, where's the second boundary.

18 And, this would have to be in a system
19 where you don't want to have a containment isolation
20 valve that is upstream of the relief valve, for some
21 reason.

22 MR. BETTLE: Right.

23 CHAIR RAY: Okay. I mean, that's all I
24 can think of. You are closed inside containment, but
25 you don't want to have an automatic isolation valve

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1 that forms the containment boundary that's upstream of
2 this relief valve we are talking about, right?

3 MR. DENNIG: Right.

4 CHAIR RAY: Okay. Now, the question is,
5 why? And, why would this be addressed in amendments
6 to -- as Charlie was asking -- to licensing bases? I
7 mean, was it included in the design and overlooked, or
8 somebody wanting to operate the system differently
9 than they did when they designed it originally? I
10 mean, can you shed any light on that?

11 MR. DENNIG: I think either Jerry or I,
12 anything we say would be purely speculative about the
13 evolution and the history, and how this arose, and
14 circumstances, and I can imagine a number of
15 scenarios, where either for some reason it was not
16 concerned -- not a consideration in the original
17 design, it was assumed that that was okay.

18 CHAIR RAY: I don't think, Bob, we should
19 speculate. I mean, we all speculate, I speculate, and
20 you speculate. I hate to do this, because otherwise
21 this seems like such a ministerial function here, but
22 this is one thing that I think a number of us are
23 troubled by.

24 How did we get to this point that we are
25 talking about?

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1 I did what I could with what I had to
2 figure it out, and I couldn't figure it out.

3 MR. DENNIG: Well, we'll go back in the
4 archives and see what we can find.

5 CHAIR RAY: I mean, the mere fact that
6 some working group in ANSI decided it was okay, I
7 don't think amounts to much at all.

8 It got into the Standard Review Plan, I
9 can tell that.

10 MR. DENNIG: We weren't participating in
11 the standards.

12 CHAIR RAY: No, I understand, I understand
13 totally, but my point is, sitting here, I mean, and I
14 did, too, when I was in a different job, but sitting
15 here in the ACRS you've got to ask yourself, well, is
16 this something that has sort of sneaked into what's
17 allowed without any thorough consideration or not?

18 MR. DENNIG: It would really help if there
19 was an example or two, I think it would help to --
20 what's the scope -- what are we really talking about.

21 It's really difficult --

22 CHAIR RAY: Well, I can give you an
23 example, like I said, of a containment cooling that
24 has a containment isolation valve, but for some reason
25 you don't want to take credit for that, you want to

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1 leave it open within the containment, you want to take
2 off the isolation function, for example, and leave the
3 loop open when the containment isolation signal comes
4 in, thereby exposing the relief valve and making it
5 become part of the containment isolation. You've got
6 to wonder, well, what about the pump seals and other
7 things in the system.

8 You know, so there's just lots of
9 questions, but I don't think you guys, understandably,
10 came prepared to answer all the questions that we are
11 asking you now, and I don't think we want to just
12 leave it, well, we can speculate this, or speculate
13 that.

14 I mean, I think you've got to have a
15 takeaway, we need to understand this relief valve
16 thing better.

17 MR. DENNIG: We'll do that.

18 MEMBER BROWN: I have one other point, in
19 that the incorporation into the Reg Guide itself is
20 very, very general. I mean, it just says -- there are
21 no limits at all, it just says, as long as it's 1.5 it
22 doesn't make any difference where it is, what it is,
23 how it's used, it just states you can use them, as
24 long as you have a setpoint of 1.5 percent.

25 MR. DENNIG: But, as you know, the way a

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1 process would work is that, someone would come in with
2 a proposal, it would meet the 1.5, you'd ask another
3 question about how it was being applied, because it
4 was different from what was done before, and you'd get
5 another question. And, that generates another level of
6 guidance as far as approval of specific amendments.

7 So, the things that you see get refined in
8 practice, and that's, in fact, you know, how this
9 stuff gets in there over time, is individual cases
10 come up, it's broadly covered by the regulation or the
11 guidance, and somebody does it, and a reviewer asks an
12 RAI, and out of that comes the 1.5, perhaps.

13 Somebody comes in and wants to do just 1.3
14 and --

15 CHAIR RAY: Let's stipulate that that may
16 happen, but I think we've got to take a point of view
17 that, you know, there's a new generation of people
18 coming, we want to try and understand clearly the
19 requirements provide for all of the considerations
20 that they need to, and I don't think we want to depend
21 on people asking more questions later on, when they
22 might not think that it's necessary.

23 MR. DENNIG: We don't have any problem
24 with that.

25 CHAIR RAY: So, it's just an issue of,

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1 let's understand this better than I think we are
2 prepared to understand it right now.

3 Some of us who have run plants and, you
4 know, been on the other side of this kind of an issue
5 in the past, just have questions about, well, how did
6 this come about?

7 All right, well, your --

8 MEMBER BROWN: One point on that is, when
9 the rules don't even talk about relief valves, in my
10 mind, it talks about check valves and isolation
11 valves.

12 CHAIR RAY: Right.

13 MEMBER BROWN: Relief valves are totally
14 left out of the Regulations, the rules.

15 CHAIR RAY: In the backflow direction I
16 can buy that a relief valve is a check valve, in the
17 backflow direction, but that's not at issue here.

18 MEMBER BROWN: Well, I'm not an expert on
19 relief valves and whether it's forward or backflow, so
20 I'll leave that to someone who knows.

21 CHAIR RAY: The underseat -- pressurized
22 under the seat, a relief valves is a -- it's like an
23 automatic isolation valve, and for automatic isolation
24 valves, you know, you've got a signal, you've got a
25 position indication, and you are not relying upon a --

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1 well, you are relying upon an actuation system to
2 close the doggone thing under certain circumstances.

3 Obviously, we are going to end up with
4 relief valves as containment isolation valves, that's
5 not the issue here. The question is just, this is
6 being added now to the Reg Guide, it used to be only
7 in the Standard Review Plan, before that it was in the
8 ANSI standard, this is a pathway that, as Charlie
9 says, is hard to make sure we can reconcile with the
10 General Design Criteria, as we read it. And, we want
11 to just understand it better.

12 MR. DENNIG: Fair enough.

13 CHAIR RAY: All right? Okay.

14 MR. BETTLE: So, the substance and
15 regulatory positions from the original version of Reg
16 Guide 1.141 are, essentially, in tact.

17 Post TMI guidance has been included and
18 made its way into the CFR as well as into the Standard
19 Review Plan.

20 And, it again endorses the provisions of
21 the ANSI N271-1976. There was some discussion of
22 updating that to the 1984 version, but that was -- it
23 was identified that it would make negligible
24 difference on a practical level.

25 All right. In looking at the Rev 1 of the

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1 Reg Guide that you may have in hand, or have taken a
2 look at, the regulatory positions listed there, one is
3 a carryover from the original issue. The second one
4 was brought in, it's in both the 10 CFR 5034(f)(2) and
5 the Standard Review Plan, Section 624.

6 CHAIR RAY: Say what the regulatory
7 positions are, not just what their origin or status
8 is.

9 MR. BETTLE: Okay. Regulatory Position 1,
10 Section 364 of ANSI N271 states, "The closed system
11 shall be leak tested in accordance with 5.2 of the
12 Standard, unless it can be shown by inspection that
13 system integrity is being maintained for those systems
14 operating at pressure equal to or above containment
15 design pressure. The system integrity inspections may
16 be applied to closed systems inside the containment in
17 lieu of leak testing."

18 Regulatory Position 2, Section 366 of ANSI
19 N271, 1976, states, "Relief valves in the backflow
20 direction may be employed as isolation valves provided
21 they satisfy the requirements of the Standard."

22 CHAIR RAY: That's the check valve analogy
23 that I used.

24 MR. BETTLE: Yes, exactly.

25 MEMBER BROWN: That's the quote, right? I

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1 mean, you are reading from your proposed Reg Guide
2 right now, where that's a quote.

3 MR. BETTLE: Yes.

4 MEMBER BROWN: And then, the rest of it is
5 outside the quote, that's the change?

6 MR. BETTLE: Are you looking at the --

7 MEMBER BROWN: I'm looking at the new Reg
8 Guide.

9 MR. BETTLE: Okay.

10 MEMBER BROWN: And, I've just got -- it's
11 red lined, and it shows that the ANSI Standard states,
12 "Relief valves in the backflow direction may be
13 employed as isolation valves provided they satisfy the
14 requirements of the Standard."

15 MR. BETTLE: Right.

16 MEMBER BROWN: It goes on to state, "The
17 licensee may use relief valves in the backflow
18 direction or the forward relief flow --

19 MR. BETTLE: Yes.

20 MEMBER BROWN: -- as long as the relief
21 valve setpoint is greater than 1.5 percent."

22 MR. BETTLE: Right.

23 MEMBER BROWN: Or, 1.5 times the
24 containment pressure, consistent with this. So, that
25 seems to be the new part that's been added, is that

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1 correct?

2 MR. BETTLE: Yes.

3 MEMBER BROWN: Okay, in addition to the
4 ANSI Standard words, which only dealt with backflow.

5 MR. BETTLE: Yes.

6 MEMBER BROWN: That's the way I read that.

7 MR. BETTLE: And, the fact that you could
8 use relief valves for the purpose.

9 MEMBER BROWN: Well, forward flow.

10 MR. BETTLE: Right.

11 MEMBER BROWN: ANSI Standard doesn't sound
12 like it used them in the forward flow.

13 MR. BETTLE: Right. Well, just as my own
14 personal experience, I guess some of the old plants,
15 one of which that I worked at for a while, since the
16 primary containment was a pressure vessel they
17 actually had relief valves for the primary containment
18 that just moved out the ambient originally.

19 And, in that case, you know, they are
20 relieving forward flow, and it's going right out to
21 the ambient environment, and I guess if you looked at
22 it from the standpoint of a relief valve the setpoint
23 wouldn't necessarily have to be 1.5 times. So, you
24 know, that might have also had some input in
25 establishing a minimum.

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1 CHAIR RAY: Well, containment overpressure
2 protection is different than containment isolation.
3 WE are talking about containment isolation. So, let's
4 stick to that.

5 The question Charlie asked you was, is the
6 standard only addressing the use of a relief valve in
7 the backflow direction, or did it also include credit
8 for a relief valve as containment isolation boundary
9 in the direction under the seat or in the forward flow
10 direction?

11 MR. BETTLE: The additional item is the
12 forward direction, and that --

13 CHAIR RAY: Okay, and that's a big deal,
14 right?

15 MR. BETTLE: Yes.

16 CHAIR RAY: That's not just saying, oh,
17 well, it's been allowed since day one, it doesn't
18 sound like that's the case.

19 MEMBER SHACK: Although it's in the 1984
20 version of the standard.

21 MR. BETTLE: Yes.

22 MEMBER SHACK: But not the 1976.

23 MEMBER BROWN: But not the 1976.

24 MEMBER SHACK: So, they are updating. So,
25 I mean, this accretion of --

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1 CHAIR RAY: Yes, I know, but -- hold on,
2 I'm trying to get the chronology down here. So, the
3 forward flow direction credit for the containment
4 isolation valve as a boundary valve appeared in the
5 1994 --

6 MEMBER SHACK: '84.

7 CHAIR RAY: -- '84 version of the ANSI
8 Standard. Okay. Because I couldn't -- I'm not as
9 skilled --

10 MEMBER BROWN: Use of relief valves in
11 this manner should be minimized and should be used
12 only when there are no satisfactory alternatives to
13 either the system design or selection of valve type.

14 CHAIR RAY: Now, Bob, that's the kind of
15 language that I was looking for here. Some guidance
16 somewhere that says, this is not something you should
17 want to do. And, I caution against just doing --
18 having relief valves -- because like I say, I mean, I
19 can think of systems where you had an isolation signal
20 to close the containment isolation valve, and it was
21 damned inconvenient. You'd rather not do that, if you
22 didn't have to. You'd rather leave the valve open,
23 and keep the system in service, and that's maybe where
24 these amendments come from, that you are talking
25 about, because you can create a lot of havoc by

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1 securing a system that you don't want to secure.

2 So anyway --

3 MEMBER ABDEL-KHALIK: Would this issue
4 disappear if this revision to the Reg Guide were to
5 adopt the updated standard?

6 MR. BETTLE: It would.

7 MEMBER ABDEL-KHALIK: Right, instead of
8 the 1976 then.

9 MR. BETTLE: It wouldn't make all the
10 regulatory positions go away.

11 MEMBER ABDEL-KHALIK: Yes, but this
12 particular issue with regard to relief valves.

13 MR. BETTLE: Yes.

14 CHAIR RAY: It would -- when you say make
15 it go away --

16 MR. BETTLE: Meaning it would be part of
17 the clean endorsement on this point.

18 CHAIR RAY: Well, yes, but it would still
19 be -- have been an issue, but I like the language that
20 Bill read.

21 MEMBER SHACK: I mean, you could add that
22 language to the Reg Guide.

23 CHAIR RAY: Either way. Either way.

24 MR. BETTLE: Sure.

25 CHAIR RAY: Okay, I think we are on

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1 Position 2, or had you finished Position 2?

2 MR. BETTLE: I was finished with Position
3 2.

4 CHAIR RAY: Okay, sorry.

5 MR. BETTLE: Okay, Regulatory Position 3,
6 this is something a little different, it's brought in
7 from the Generic Letter 96-06, having to do with
8 provision for thermally induced overpressure
9 protection. And, the Reg Guide states, "The licensee
10 should provide thermally induced overpressure
11 protection for liquid-filled piping between
12 containment isolation barriers inside containment to
13 prevent damage on the piping as isolated, unless the
14 licensee can demonstrate that pressure between the
15 isolation barriers cannot exceed the design pressure
16 of the isolation barriers of the design pressure of
17 the piping."

18 The standard guidance talked about this
19 sort of protection for the lines outside containment,
20 so this included saying that you had to provide that
21 protection for those lines, susceptible lines, inside
22 containment.

23 CHAIR RAY: Yes, in that case, the relief
24 valve isn't serving as a containment isolation
25 boundary valve, right? It's discharging inside

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1 containment. It says the tail pipe or discharge pipe
2 has to take account of the containment backpressure.

3 MR. DENNIG: This is a provision to
4 maintain the integrity of the isolation.

5 CHAIR RAY: Right, protect from
6 overpressure due to thermally induced loading when
7 you've got both valves closed, in a liquid-filled
8 line.

9 So, that's not a containment boundary
10 question, that's an -- as you say, Bob, protection of
11 the integrity of the pressure boundary issue.

12 MR. BETTLE: Okay, Position 4, this is a
13 carryover, "Section 423 of ANSI N271, 1976, states,
14 "Seal closed isolation valves are under administrative
15 controls and do not require position indication in the
16 control room for valve status. Because of the
17 components of the containment isolation system, which
18 is an engineered safety feature system, all power
19 operated valves should have position indication in the
20 control room."

21 CHAIR RAY: Okay, and that's one of the
22 things that kind of bothers me about this relief valve
23 issue is, you don't have any position indication, the
24 doggone relief valve can be lifting, and you only know
25 it when somebody figures it out.

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1 So again, I'm concerned about the fact
2 that these valves in this kind of service, the way the
3 Reg Guide was issued for public comment, doesn't
4 impose any requirements on -- so that the control room
5 would even know that the isolation valve was open, if
6 it were open. And, that is another matter of interest
7 to me.

8 Anyway, proceed.

9 MR. BETTLE: Okay. Regulatory Position 5,
10 this was brought in, it was one of the post TMI, you
11 know, this was put into SRP 6.2.4, and also 10 CFR
12 50.34, Section 424 of ANSI N271, 1976, states,
13 "Isolation valve closure shall be completed when an
14 isolation signal received in the valve shall not be
15 opened until the signal is removed and delivered,
16 operator action is taken, such as a reset switch. The
17 reactor operator should not be able to override a
18 containment isolation signal in such a way they could
19 return any isolation valve to its normal pre-accident
20 condition by a single action. More specifically,
21 neither the reset override, the safety injection
22 actuation signal, nor the reset override of the
23 containment isolation actuating signal for a group of
24 valves should cause ..." --

25 COURT REPORTER: Sir?

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1 MR. BETTLE: Yes.

2 COURT REPORTER: Can you please read
3 clearly, this is all going to be transcribed.

4 MR. BETTLE: Oh, okay.

5 "More specifically, neither the reset or
6 override of the safety injection actuation signal, nor
7 the reset override of a containment isolation
8 actuation signal, or a group of valves, should cause
9 the reopening of any isolation valve. The licensee
10 should not consider the use of procedural controls to
11 prevent the reopening of a valve upon reset or
12 override as an acceptable design alternative. The
13 design of the reset override capability should require
14 a deliberate, separate operator action, in addition to
15 the reset override of the signal, for the reopening of
16 each isolation valve. Written approved procedures
17 should control the reopening of each containment
18 isolation valve. Regulatory Guide 1.33, Quality
19 Assurance Program Requirements for Operation provides
20 additional guidance on procedures."

21 And, the addition here was the words "for
22 each valve," that was not in the previous requirement.

23 Instead of being able to do like a group opening,
24 they have to reopen each one.

25 CHAIR RAY: Now, it imposes a real burden

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1 on opening containment isolation --

2 MR. BETTLE: Yes.

3 CHAIR RAY: -- valves that have been
4 closed.

5 And again, that seems to reflect the
6 importance of containment boundary integrity and
7 isolation.

8 The relief valve, just saying when you use
9 a relief valve, period, seems inconsistent with that
10 caution that you just read, which deals with something
11 else, but, nevertheless, reflects how deliberate
12 opening the containment isolation boundary is.

13 And, that's one reason, frankly, why
14 plants don't like to have lots of valves disabled by
15 containment isolations, they know it's a big pain in
16 the neck to put stuff back in service, and get it
17 started up again.

18 So, you don't want to do that, and,
19 obviously, that means that relief valves get treated
20 as boundary valves.

21 MR. BETTLE: Regulatory Position 6, is
22 also a carryover from the original issue. Section 425
23 of ANSI N271, 1976, states, "Diversity and means of
24 actuation of automatic isolation valves in series
25 should be considered to preclude common mode failure.

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1 The NRC staff's position is that the licensee should
2 provide diversity in the parameter sense, types of
3 isolation signals for the initiation of containment
4 isolation. The licensee may design containment
5 isolation logic to automatically initiate containment
6 isolation upon the occurrence of an isolation signal
7 derived from the individual coincident logic of any of
8 the continuously monitored parameters, such as those
9 given in Section A2 of Appendix A of ANSI 271, 1976,
10 for boiling water reactors, or Section B2 of Appendix
11 B to ANSI N271, 1976, for pressurized water reactors.

12 As a minimum, the licensee should monitor the
13 following parameters, each with a capability of
14 initiating containment isolation. High containment
15 pressure, high radiation level within containment, and
16 any manual, automatic or coincident actuation
17 engineered safety feature system or sub-system."

18 Regulatory Position 7, this was also
19 brought in from the TMI follow-up, Section 4.4.2 of
20 ANSI N271, 1976, states, "For power-operated isolation
21 valves which do not receive a containment isolation
22 signal, the primary mode shall be a remote manual
23 initiation signal from the main control room.
24 However, a containment isolation signal should
25 automatically isolate all non-essential systems, as

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1 required by 10 CFR 50.34(f)(2)." And, that's one of
2 the -- directly from one of the post TMI items.

3 Regulatory Position 8, this is a carryover
4 from the original issue, Section 4.4.8 of ANSI N271,
5 1976, gives the general design requirements for closed
6 systems. In addition, all branch lines and their
7 isolation valves in closed systems, both inside and
8 outside containment, should meet the design criteria
9 of Section 3.5 or Section 3.6.7 of ANSI N271, 1976, if
10 the branch lines constitute one of the containment
11 isolation barriers."

12 Regulatory Position 9, also a carryover
13 from the original issue, Section 4.6.3 of ANSI N271,
14 1976, cites, "Regulatory Guide 1.7, control of
15 combustible gas concentrations in containment
16 following a loss-of-coolant accident, for guidance in
17 determining radiation exposures for a loss-of-coolant
18 accident. Regulatory Guide 1.8.9, qualification of
19 class 1E equipment for nuclear power plants, gives
20 more appropriate guidance to determine radiation
21 exposures for loss-of-coolant accidents. For plants
22 that have amended their licensing basis to use an
23 alternative source term, see Appendix I of Regulatory
24 Guide 1.183."

25 So, what was added here is the reference

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1 to Regulatory Guide 1.89 and 1.183, to update the
2 reference as far as radiation conditions.

3 Regulatory Position 10, carryover from the
4 original Reg Guide issue, Section 4.1.4 of ANSI N271,
5 1976, states, "The piping between isolation barriers
6 of piping, which forms part of isolation barrier,
7 shall meet the requirements of 3.7 and applicable
8 requirements for isolation barriers. Piping between
9 isolation barriers should meet the applicable
10 requirements of Section 3.5 or Section 3.7 of ANSI
11 N271, 1976."

12 CHAIR RAY: All right. This adds to what
13 the -- there's quotes here kind of like the other one
14 that Charlie was questioning -- this adds 3.5 to 3.7,
15 instead of just 3.7, it's 3.5 or 3.7.

16 MR. BETTLE: Yes.

17 CHAIR RAY: What's the significance of
18 that? I realize it's a carryover, so -- but what does
19 it do, the addition of 3.5?

20 MR. BETTLE: I'd have to look it back up
21 to see that. I wasn't trying to load up in my mind
22 what the original issue was.

23 CHAIR RAY: Yes, no, I appreciate that.

24 MEMBER SHACK: I think it brings into
25 things like using B31.1, to design the lines, you

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1 know, it's a design code for the piping.

2 CHAIR RAY: Is that what it is?

3 MEMBER SHACK: Yes.

4 MEMBER BROWN: I didn't get that out of
5 the quote. I mean, it looked -- I've got the red
6 lined version open, and that all looked like it was
7 the same.

8 CHAIR RAY: It is the same, I was just
9 asking what did we do originally --

10 MEMBER BROWN: Okay.

11 CHAIR RAY: -- that involved the addition
12 of 3.5, when that's not what the standard -- it added
13 to the standard something. I was just asking a
14 question, it's something I guess I'll have to look up
15 myself. That's all right, because it's a detail.

16 Okay.

17 MR. BETTLE: Okay, in summary, there are
18 no public comments received. There's no reduction or
19 lessening of any regulatory position, and there's --
20 as the Reg Guide states, there's no backfit intended
21 for the existing plants.

22 CHAIR RAY: Okay, any other comments you'd
23 like to make to us?

24 MR. BETTLE: No.

25 CHAIR RAY: All right. We'll ask then

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1 that, I guess, you'll hear, as we go around the table,
2 each member's thoughts at this point in time, and we
3 can consider that in follow-up.

4 But, at least we would, I'm sure, like to
5 understand -- well, Said made the point that based on
6 what Bill read there are more cautionary words in the
7 standard at least, with regard -- the revised standard
8 -- with regard to the use of relief valves than would
9 be in this Reg Guide as it stands, and they seem like
10 they are well-taken cautions.

11 There are other questions, I think, that
12 we would have about -- I'm trying to remember back
13 quite a few years now -- about whether the relief
14 valves -- you didn't need position indication, Otto,
15 on the main steam relief valves, when they lifted
16 there was no doubt about that.

17 MEMBER MAYNARD: I know, that's right.

18 CHAIR RAY: But, there are other relief
19 valves maybe that could benefit from position
20 indication.

21 I guess we'd just like to be sure that the
22 relief valves weren't a weakness, the use of relief
23 valves wasn't a weakness in the containment boundary
24 protection that is so specifically addressed, with
25 regard to other valves, and the limited use of check

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1 valves, and the protocols that have to be followed in
2 opening isolation valves, once containment isolation
3 has been established, that sort of thing. The relief
4 valves, as it stands now in the Reg Guide, seem
5 inconsistent with that, and we'd like to --

6 MR. DENNIG: We will go back --

7 CHAIR RAY: -- revisit that, please.

8 MR. DENNIG: -- and pull the string on the
9 history of that.

10 CHAIR RAY: Yes.

11 And also, in doing that, would you give us
12 the benefit of these amendments, the circumstances
13 that you referred to, recognizing that that's action
14 that's been taken. We are not expecting to challenge
15 that. It's a matter of understanding what the
16 circumstances were.

17 MR. DENNIG: I think that's the best way
18 to make it concrete.

19 CHAIR RAY: Okay. All right. If there's
20 nothing further, I'll go around the table here and ask
21 for any other input from the Subcommittee members.

22 Jack?

23 MEMBER SIEBER: Just so I understand, the
24 ANSI standard currently in the revision was being
25 endorsed is the '76 version?

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1 MR. BETTLE: That's correct.

2 MEMBER SIEBER: And, there is a later
3 version?

4 MR. BETTLE: Yes, that's correct.

5 MEMBER SIEBER: Tell me again why you
6 aren't adopting the later version?

7 MR. BETTLE: Well, I can't get down, since
8 I didn't do the original preparation of this revision,
9 I did take a look at what was done, and the later
10 revision doesn't pick up all the regulatory positions
11 of the original Reg Guide. And, what was in there, I
12 guess it didn't seem like it, necessarily, added a
13 whole lot, other than what was pointed out, some
14 additional, you know, I guess --

15 MEMBER SIEBER: So, you would class the
16 '86 version as --

17 MR. BETTLE: '84.

18 MEMBER SIEBER: -- as a lesser version
19 than '76?

20 MR. BETTLE: No, I would not.

21 There are probably about, either 3-1/2 or
22 four of these reg positions that could have been
23 dropped as they were picked up in the 1984 version.

24 MR. DENNIG: This is sort of a knowledge
25 preservation question. The individual who really

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1 knows the history of this has retired, he's left
2 behind some of his legacy, but not -- not, you know,
3 why this, why that, why the other.

4 CHAIR RAY: This is an increasing problem
5 that we are going to have, that we all need to
6 appreciate. I think Jack is clearly asking why
7 wouldn't we endorse the later version of the Standard.

8 MEMBER SIEBER: That's right. It seems to
9 me that there are aspects of the latest version
10 overall process, and it doesn't seem, from a consensus
11 standard standpoint, I would think that you would
12 examine very carefully the latest version of the
13 consensus standard for adoption, as opposed to

14 MEMBER SIEBER: It's brushing that aside
15 and sticking to something more archaic.

16 So, that would be my comment. But
17 otherwise --

18 CHAIR RAY: We'll ask you to address that
19 when you come back to us, too.

20 MEMBER SIEBER: -- yes, but otherwise, I
21 don't have any other comments.

22 CHAIR RAY: Thank you.

23 Sam?

24 MEMBER ARMIJO: Yes. I share Jack's view
25 that the later standard has a lot of good things in

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1 it, particularly, with this relief valve issue, and
2 the cautions that are there that are not, apparently,
3 in the Reg Guide.

4 There was a question that Charlie asked, I
5 didn't get an answer, and I know it's probably beyond
6 the scope of the Reg Guide, is why the 1.5, why is
7 that okay?

8 MEMBER SIEBER: It looks like one of
9 these, it seems big enough.

10 MR. DENNIG: We will find out where that
11 decision came from, but I'm not expecting --

12 MEMBER SIEBER: It's rounded up in 1.43.

13 MEMBER ARMIJO: I guess the reason I ask
14 the question, Sam, was that if you look at relief
15 valves, as you approach the setpoint, at least the
16 relief valves I'm familiar with, you can start getting
17 a little bit of leakage, et cetera, from them, and so
18 if you select one high enough it maintains suitable
19 forces, and you don't -- so you've got to address
20 transients or whatever. And, if you say -- you can
21 really set these two or three times, why pick one
22 that's 1.5 times, if it makes, you know, why put
23 yourself in that dilemma of making it too close.

24 And so, you know, I thought there ought to
25 be some rational, technical basis analytically, for

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1 potential transients that may momentarily make it leak
2 or something, but, obviously, somebody said, oh, 1.5
3 is -- I'm speculating, take the word "obviously" out
4 of it, that wasn't meant to be -- so, that's why I
5 said question, I had the same.-

6 MEMBER MAYNARD: Well, the relief valve is
7 going to be set based on the system requirements that
8 it's relieving, compared to the 1.5, and see if --

9 MEMBER ARMIJO: I understand that, but
10 just that it's 1.5, that's all. The point is if 1.5
11 seems to be the metric, and there's no why is that
12 applicable everywhere?

13 MR. DENNIG: I would believe the relief
14 capability of the valve for the system it's on would
15 be negated by putting it up that high. So, it's kind
16 of trying to find something in the middle.

17 CHAIR RAY: Well, in any event, a relief
18 valve setpoint is different than the vessel design
19 pressure, in my opinion, because you have margin in
20 the vessel design pressure against failure,
21 presumably. The relief valve setpoint is a relief
22 valve setpoint, period, full stop. So, they are not
23 the same thing.

24 Sam anything else?

25 MEMBER ARMIJO: No.

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1 CHAIR RAY: Dennis?

2 MEMBER BLEY: Yes. Well, it's kind of the
3 same thing, but I went back for myself and looked at
4 the GDCs again, and this idea that we have two valve
5 isolation isn't true for closed systems. That's GDC-
6 57, which requires one valve outside of containment as
7 near as possible.

8 MEMBER SIEBER: The closure of the system
9 and --

10 MEMBER BLEY: I understand that. It
11 requires one valve, and the one thing -- it's part of
12 having some cautions here, I can't think of anything
13 right now, but if you are relying on one outside I'd
14 wonder, if I were doing the review, if there's --
15 whatever transient leads to breaking that system
16 inside containment, if somehow that could cause a
17 transient that would cause a relief valve to pop, in
18 which case it might not reseal properly.

19 So, I'm not saying you ought to add
20 something there, but with one relief valve outside
21 containment as the back-up, I'd worry about things
22 like that for sure.

23 MEMBER SIEBER: It sounds like a
24 rationalist argument.

25 MR. DENNIG: I don't believe that there

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1 would be the --

2 MEMBER BLEY: I think it's both, actually.

3 MR. DENNIG: -- a relief loop inside
4 containment is the solid loop, and the accident is the
5 presumption that something broke that line.

6 MEMBER BLEY: And, something else happens,
7 or you don't really need this isolation capability,
8 and it's that combination of the something else that
9 I'm thinking about.

10 CHAIR RAY: I will observe that the closed
11 systems are supposed to be protected against pipe-whip
12 and so on, because of that vulnerability, precisely,
13 that you are talking about.

14 So, it's recognized, I think, that the
15 closed system inside containment has to be looked at
16 with an eye toward making sure it's not vulnerable to
17 pipe-whip failure, for example.

18 But, that's because it's more vulnerable,
19 because you only have one containment isolation valve.

20 Anything else, Dennis?

21 MEMBER BLEY: No.

22 CHAIR RAY: Bill?

23 MEMBER SHACK: No, just to address your
24 comment. That 3.5 is exactly those requirements about
25 pipe-whip and that sort of thing, so those are the

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1 requirements they are imposing.

2 CHAIR RAY: Okay, thank you.

3 Anything else?

4 MEMBER SHACK: No.

5 CHAIR RAY: Otto?

6 MEMBER MAYNARD: I do think that for the
7 full Committee meeting, or when we discuss this again,
8 it would be good to have a couple of examples and a
9 diagram up there, what's the typical arrangement we're
10 seeing, and, perhaps, one, what's kind of the worst
11 case, what's the one that stretches us a little bit
12 the most on whether this is acceptable or not, I think
13 would help the discussion a lot.

14 CHAIR RAY: Anything else, Otto?

15 MEMBER MAYNARD: No.

16 MEMBER BROWN: No, I'm covered.

17 CHAIR RAY: Okay. All right. Nothing
18 more, we'll stand adjourned.

19 Otto, you are at 10:30 are you?

20 MEMBER MAYNARD: I think 10:15.

21 CHAIR RAY: 10:15.

22 (Whereupon, the above-entitled matter was
23 concluded at 9:30 a.m.)

24

25

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Regulatory Guide 1.141

Revision 1

Containment Isolation Provisions For Fluid Systems

Briefing Objectives

- Identify pertinent:
 - Regulatory requirements
 - Industry guidance
 - Additional NRC guidance
- Provide a summary of the changes made from the initial issue of RG 1.141 to Revision 1.

Regulatory Requirements

- 10 CFR Appendix A, GDC 54, 55, 56, & 57 requires licensees to provide isolation capabilities to piping systems that penetrate the primary containment to reflect the importance to safety of isolating these piping systems

Regulatory Requirements

- *Criterion 54--Piping systems penetrating containment.* Piping systems penetrating primary reactor containment shall be provided with leak detection, isolation, and containment capabilities having redundancy, reliability, and performance capabilities which reflect the importance to safety of isolating these piping systems. Such piping systems shall be designed with a capability to test periodically the operability of the isolation valves and associated apparatus and to determine if valve leakage is within acceptable limits.

Regulatory Requirements

- *Criterion 55--Reactor coolant pressure boundary penetrating containment.* Each line that is part of the reactor coolant pressure boundary and that penetrates primary reactor containment shall be provided with containment isolation valves as follows, unless it can be demonstrated that the containment isolation provisions for a specific class of lines, such as instrument lines, are acceptable on some other defined basis:
 - (1) One locked closed isolation valve inside and one locked closed isolation valve outside containment;
or

Regulatory Requirements

- *Criterion 55 (cont'd)*

- (2) One automatic isolation valve inside and one locked closed isolation valve outside containment; or
- (3) One locked closed isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment; or
- (4) One automatic isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment.

Regulatory Requirements

- *Criterion 55 (cont'd)*

Isolation valves outside containment shall be located as close to containment as practical and upon loss of actuating power, automatic isolation valves shall be designed to take the position that provides greater safety.

Other appropriate requirements to minimize the probability or consequences of an accidental rupture of these lines or of lines connected to them shall be provided as necessary to assure adequate safety. Determination of the appropriateness of these requirements, such as higher quality in design, fabrication, and testing, additional provisions for inservice inspection, protection against more severe natural phenomena, and additional isolation valves and containment, shall include consideration of the population density, use characteristics, and physical characteristics of the site environs.

Regulatory Requirements

- *Criterion 56--Primary containment isolation.* Each line that connects directly to the containment atmosphere and penetrates primary reactor containment shall be provided with containment isolation valves as follows, unless it can be demonstrated that the containment isolation provisions for a specific class of lines, such as instrument lines, are acceptable on some other defined basis:
 - (1) One locked closed isolation valve inside and one locked closed isolation valve outside containment; or
 - (2) One automatic isolation valve inside and one locked closed isolation valve outside containment; or

Regulatory Requirements

- *Criterion 56 (cont'd)*

- (3) One locked closed isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment; or
- (4) One automatic isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment.

Isolation valves outside containment shall be located as close to the containment as practical and upon loss of actuating power, automatic isolation valves shall be designed to take the position that provides greater safety.

Regulatory Requirements

- *Criterion 57--Closed system isolation valves.* Each line that penetrates primary reactor containment and is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere shall have at least one containment isolation valve which shall be either automatic, or locked closed, or capable of remote manual operation. This valve shall be outside containment and located as close to the containment as practical. A simple check valve may not be used as the automatic isolation valve.

Industry Guidance

- The ANS assigned a Working Group (ANS-56.2) which in April, 1973 initiated preparation of a standard to cover in one document the requirements for containment isolation provisions for fluid systems. The American National Standards Institute, Inc. approved that standard June 28, 1976 as N271-1976, Containment Isolation Provisions for Fluid Systems.

Industry Guidance

- Reg Guide 1.141, April 1978 (original issue) endorsed N271-1976 as being generally acceptable subject to 6 regulatory positions.
- The ANS-56.2 working group responsible for ANS N271-1976 disbanded in the mid-1980's.

Additional NRC Guidance

- The Three Mile Island accident occurred in March of 1979.
- NUREG-0737, Clarification of TMI Action Plan Requirements, was published in November, 1980. Clarification Item II.E.4.2, Containment Isolation Dependability, identified 7 recommended positions on containment isolation system designs, including 3 not previously established. These were incorporated into Section 6.2.4, Containment Isolation System, of the July, 1981, reissue of the Standard Review Plan as NUREG-0800.

Additional NRC Guidance

- NUREG-0800, Standard Review Plan, Section 6.2.4, Containment Isolation System, Revision 3 was issued in March, 2007.

Regulatory Guide 1.141, Revision 1

- The substance and regulatory positions identified are essentially intact from the existing version of RG 1.141.
- Includes improved regulatory guidance as a result of the NRC staff's review of the lessons learned from the accident at Three Mile Island Nuclear Generating Station, Unit 2
- Provides updated NRC guidance on acceptable design, testing, and maintenance requirements that licensees may use to comply with GDC 54, 55, 56, & 57 of Appendix A to 10 CFR Part 50 for the isolation of fluid systems that penetrate the primary containment of light-water-cooled reactors.

Regulatory Guide 1.141, Revision 1

- Similar to the original issue in April, 1978, RG 1.141, Revision 1 endorses the provisions of industry standard ANSI N271-1976, “Containment Isolation Provisions for Fluid Systems” subject to certain regulatory positions.

Regulatory Guide 1.141, Revision 1

- Regulatory Positions:
 1. Carry-over from original Reg Guide issue.
 2. Brought in from SRP 6.2.4. Modifies provision of N271-1976 by specifying that relief valves used as containment isolation valves have a set point of at least 1.5 times containment design pressure.

Regulatory Guide 1.141, Revision 1

- Regulatory Positions (cont'd)
 3. Brought in from Generic Letter 96-06, Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions. Provision for accident related thermally induced overpressure protection for containment penetration piping if that pressure would exceed the design pressure of the containment barriers and piping.

Regulatory Guide 1.141, Revision 1

- Regulatory Positions (cont'd)
 4. Carry-over from original Reg Guide issue.
 5. Brought in from SRP 6.2.4. Deliberate operator action required to open each containment isolation valve after safety injection or containment isolation signal reset or override.
 6. Carry-over from original Reg Guide issue with expanded detail.

Regulatory Guide 1.141, Revision 1

■ Regulatory Positions (cont'd)

7. Brought in from SRP 6.2.4. Added stipulation that a containment isolation signal should automatically isolate all nonessential systems.
8. Carry-over from original Reg Guide issue.
9. Carry-over from original Reg Guide issue with expanded detail.
10. Carry-over from original Reg Guide issue.

Regulatory Guide 1.141, Revision 1

- No public comments received.
- No reduction in or lessening of regulatory positions.
- No back-fit intended in connection with issuance of Revision 1.