

U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY
ADMINISTRATION (PHMSA)

OFFICE OF PIPELINE SAFETY

+ + + + +

GAS PIPELINE ADVISORY COMMITTEE (GPAC)

+ + + + +

MEETING

+ + + + +

WEDNESDAY

JUNE 1, 2016

+ + + + +

The Advisory Committee met in the
Gallery Ballroom, Hilton Arlington, 950 North
Stafford Street, Arlington, Virginia, at 1:00
p.m., Paula A. Gant, Chair, presiding.

PRESENT

PAULA A. GANT, U.S. Department of Energy; Chair

CHERYL F. CAMPBELL, Xcel Energy

J. ANDREW DRAKE, Spectra Energy Transmission

SUSAN L. FLECK, Maintenance & Construction

National Grid

ROBERT KIPP, Common Ground Alliance

ROBERT W. HILL, Brookings County (SD) Zoning &

Drainage

RICHARD F. PEVARSKI, Virginia Utility Protection

Services

RICHARD R. WORSINGER, City of Rocky Mount, North

Carolina

STAFF PRESENT

MARIE THERESE DOMINGUEZ, PHMSA Administrator

ALAN MAYBERRY, Designated Federal Official

JOHN GALE

MAX KIEBA

SAYLER PALABRICA

CAMERON SATTERTHWAITE

ROBERT SMITH

MELANIE STEVENS

T-A-B-L-E O-F C-O-N-T-E-N-T-S

Call to Order	
Committee & Staff Introductions	
by Alan Mayberry & Committee Chair	4
Agenda Item 1	
Briefing: Voting Protocol	
by Cameron Satterthwaite16
Committee Discussion and Q&A	
by Committee Chair21
Agenda Item 2	
Briefing: Pipeline Safety: Plastic Pipe	
by Max Kieba23
Committee Discussion and Q&A	
by Committee Chair39
Public Discussion and Q&A	
by Committee Chair68
Committee Role Call and Vote	
by Cameron Satterthwaite80
Briefing: Pipeline Safety: Plastic Pipe	
(continued)	
by Max Kieba82
Agenda Item 3	
Briefing: NAS Study on Rulemaking	
by Robert Smith.	182
Committee Discussion and Q&A	
by Committee Chair	186
Wrap-up and Adjourn	
by Alan Mayberry	186

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

2 (1:01 p.m.)

3 MR. MAYBERRY: All right. Good
4 afternoon. My name is Alan Mayberry. I'm the
5 Acting Associate Administrator for Pipeline
6 Safety. It's a pleasure to welcome you all to
7 our Gas Pipeline Advisory Committee meeting
8 today.

9 The Gas Pipeline Advisory Committee is
10 a statutorily mandated advisory committee that
11 advises PHMSA on proposed safety policies for
12 natural gas pipelines.

13 The committee was established under
14 the Federal Advisory Committee Act, or FACA. And
15 under FACA, I will serve as the Designated
16 Federal Official today. And chairing today's
17 meeting is Dr. Paula Gant from the Department of
18 Energy.

19 And I will turn it over to Paula in a
20 moment. Before that I thought I'd go over a few
21 housekeeping issues.

22 It's good to see everyone today. I

1 would like to say that, you know, the last person
2 in this position, as you well know, was Jeff
3 Wiese. I spoke with him a little while ago, and
4 he certainly sends his regards.

5 He speaks of this committee as his,
6 really his fondest memory of his days at PHMSA.
7 So it's a very effective committee, a very
8 important committee. So he certainly misses
9 working with all of you.

10 Of course, I today have that
11 opportunity to work with you. And I must say,
12 although this is the first time I've done this, I
13 do look forward to working with you while I'm
14 acting in this position. So, you know, today
15 might be a little touch and go, because I am new.
16 But we'll kind of learn this thing together.

17 So, with that, I will just go through
18 I guess some safety things here. First,
19 regarding if we have an evacuation, we have two
20 ways to get out of this room: the way you came
21 in, and down the stairs, across, to my left.

22 And then, to my right, if you go out

1 those doors that you see over there to the right,
2 it leads down to a stairwell that's a different
3 exit from over here. And that stairwell goes to
4 the outside. So those are two ways to leave the
5 building here, in case of an emergency.

6 I'd like to also take this opportunity
7 to introduce PHMSA staff. As I said, I'm Alan
8 Mayberry, the Acting Associate Administrator for
9 Pipeline Safety. And we'll just, if people from
10 PHMSA would announce their names and affiliation,
11 or department, that would be great. So, start
12 with Sayler.

13 MR. PALABRICA: I'm Sayler Palabrica.
14 I'm in OPS, Standards and Rulemaking.

15 MR. GALE: John Gale, OPS, Director of
16 Standards and Rulemaking.

17 MR. SATTERTHWAITE: Cameron
18 Satterthwaite, Standards and Rulemaking.

19 MR. KIEBA: Max Kieba, Pipeline
20 Engineering and Research.

21 MS. STEVENS: Melanie Stevens, Office
22 of the Chief Counsel.

1 MS. WHITE: Nancy White, Senior Policy
2 Advisor.

3 (Off microphone introductions.)

4 MR. MAYBERRY: And then we'll go
5 through introductions of the Committee present
6 here. Starting, we'll go right here. Andy?

7 MEMBER DRAKE: Andrew Drake with
8 Spectra Energy, representing industry for the gas
9 pipeline group.

10 MEMBER HILL: I'm Robert Hill,
11 Brookings County, South Dakota, representing the
12 public.

13 MEMBER WORSINGER: Rich Worsinger,
14 City of Rocky Mount, North Carolina, representing
15 industry.

16 MEMBER KIPP: Bob Kipp, Common Ground
17 Alliance.

18 MEMBER PEVARSKI: Rick Pevarski,
19 Virginia 811, representing the public.

20 MEMBER CAMPBELL: Cheryl Campbell,
21 Xcel Energy, representing the industry.

22 MEMBER FLECK: Sue Fleck, National

1 Grid, representing the industry.

2 MR. MAYBERRY: Okay. Thank you very
3 much. You all should have your agenda today.
4 Today is the Gas Advisory Committee Meeting.
5 Like I have mentioned, we'll go today until 4:30.

6 We have two items, one on the voting
7 protocol that should go fairly quickly upfront.
8 And then the main feature presentation will be on
9 the plastic pipe rule that we'll be seeking the
10 committee's guidance on.

11 You'll notice on the agenda that there
12 is -- we made sure to insert the part about the
13 public discussion. So at the end of the
14 committee discussion we intend to open it up for
15 public comments at that point. And we will do
16 everything we can to get you out of here at 4:30
17 p.m. today. And, you know, run it as efficiently
18 as possible.

19 Tomorrow, as you know, we'll have the
20 joint committee meeting, and the Gas and Liquid
21 Advisory Committees. And tomorrow we start at
22 8:30, and then we'll go until it's over. But

1 I'll tell you, my call is, let's end it at 4:30.

2 I know it's a pretty meaty discussion
3 on a couple of rules there. Or one main rule
4 that has a variety of topics in it related to OQ,
5 instant notification, a number of other items.
6 But it should be a nice robust discussion on that
7 tomorrow as well.

8 And there will be a vote tomorrow as
9 well. A vote today on the gas, on the plastic
10 pipe rule. And a vote tomorrow on that
11 miscellaneous, I sort of call it the
12 miscellaneous rule still.

13 And then tomorrow another major
14 feature will be just the briefing on the gas
15 transmission rule. So, we'll do that toward the
16 end of the day.

17 And then finally, on Friday, we have
18 the Liquid Advisory Committee meeting that will
19 be here as well. We have kind of a light agenda
20 for the Liquid Committee. There are no items to
21 vote on. But we do have a number of briefings
22 that cover everything from stakeholder

1 engagement, re-authorization, oil spill response
2 plans, and the like. So, the Gas Committee
3 members are certainly welcome to stick around for
4 that as well.

5 A little bit about just, you know,
6 decorum and behavior. I don't think I need to
7 remind you. But, you know, certainly as we
8 proceed we are, you know, it is a Federal
9 Advisory Committee meeting. And we're just asked
10 to preserve order and decorum, you know. So,
11 let's just be civil. And sort of, you know, make
12 sure that we maintain a sense of professionalism
13 as we discuss issues that I know, having been in
14 the industry for, gosh, over 34 years, it can
15 become quite interesting with the emotion that
16 can build up on some issues. But I ask that we
17 maintain that sense of civility.

18 And with that, John, have I covered
19 about everything? I think I have upfront.

20 It's a pleasure for me to turn it over
21 to the esteemed Dr. Paula Gant, who will chair
22 today's meeting. Paula.

1 CHAIR GANT: Thanks, Alan. Well,
2 that's a pretty big charge to remain esteemed,
3 and to end this meeting at 4:30 But I'll do my
4 best. And knowing that you've all be admonished
5 to behave yourselves, with this rowdy crew. I'm
6 looking over at the side of the table
7 particularly. So, but I'll be watching over here
8 as well.

9 A couple of things to just note for
10 the record. I appreciate the time that you all
11 are taking to be here. I recognize the
12 significant commitment of time and energy to
13 travel that it takes.

14 I personally am here because I have
15 been impressed with the value of the dialogue
16 that has been built up around this table over a
17 number of years, and what I think it contributes
18 to the public in more quality rulemakings coming
19 out.

20 And that value arises from people like
21 you coming to this table and listening intently,
22 and contributing robustly, so that the policy

1 that is made by the Department is better -- the
2 public is better served by it.

3 So, thank you for what you do, and for
4 the opportunity to be a part of this. I think
5 it's an important investment that we're all
6 making. And I think that Jeff left behind a good
7 legacy in that regard. And it's nice to be able
8 to contribute to Alan's efforts.

9 On some housekeeping notes. The
10 meeting will be recorded. A transcript will be
11 produced for the record. The transcript and all
12 the presentations will be made available on
13 PHMSA's website, and on the eGov docket at
14 www.regulations.gov. The docket number for this
15 meeting is PHMSA-2016-0032.

16 A reminder to everyone in the
17 audience, as well, to please mute your phones and
18 other electronic devices so that we are not
19 disturbed. And I'll ask everyone who speaks
20 today to make sure that you introduce yourself
21 and your affiliation so that your comments can be
22 acknowledged in the official transcript. And

1 also for others in the audience who may not be
2 familiar with you.

3 If you have a question or a comment,
4 please set your tent card up on its side, and
5 I'll do my best to pay attention to that around
6 this very big table.

7 Per the rules for the Committee, a
8 quorum is established if the majority of the
9 members are in attendance. And we do have a
10 quorum here today. So that will provide for the
11 voting that needs to take place today.

12 So, those are our opening bits of
13 guidance. Alan has gone through the agenda. And
14 we will get rolling with one more comment from
15 Alan, as well as -- is there any comment or
16 observation or question that members of the
17 Committee would like to put forward before we get
18 rolling on the agenda?

19 Okay. And as Alan noted, at the end
20 of each section I'll be turning to the public and
21 providing an opportunity for public comment on
22 each of these items before we go to a vote.

1 MR. MAYBERRY: Thanks, Paula. One
2 more item. And I didn't cover it on the agenda,
3 but tomorrow both combined groups will be
4 addressed by Marie Therese Dominguez, the PHMSA
5 Administrator. She will also be here today.
6 She'll be here somewhat after -- definitely after
7 the start. But at the appropriate time, when she
8 shows up, she'd like to say hello and a few
9 words.

10 So when Marie Therese, the
11 Administrator, shows up, we'll have a few words
12 from her tomorrow, or today. Tomorrow she will,
13 you know, give wide-ranging remarks covering, you
14 know, where we are with re-authorization,
15 probably a bit on PHMSA 2021, related to a
16 reorganization effort we have underway in
17 developing our strategic plan.

18 And, you know, with that, I just might
19 add, there is a lot going on at PHMSA now. Not,
20 you know -- of course, we know a lot of the rules
21 that you're familiar with, from the gas
22 transmission rule that we'll be talking about

1 tomorrow, hazardous liquid rule, a variety of
2 other rulemakings.

3 But we are steadily working toward a
4 direct final rule -- or interim final rule, I beg
5 your pardon, on underground storage. And so,
6 that will be coming. That's something we're not
7 really presenting to the committees. But if you
8 have any questions as we go forward, I'd be glad
9 to discuss that. But that's kind of a big issue
10 that's in play right now.

11 Other issues, like LNG, we had a
12 public meeting last week. So we're looking to
13 develop a rulemaking on that as we go forward.
14 But that's kind of a quick smattering of some of
15 the -- a couple of things that are going on that
16 make life interesting at PHMSA these days. But
17 anyway, with that I'll turn it back to the Chair.
18 Thank you.

19 CHAIR GANT: Thanks, Alan. So, we're
20 going to turn to our first agenda item, which
21 will be having Cameron Satterthwaite. Kind of
22 got that right? Okay. I'll have it right by the

1 end of the day. Thank you, Cameron. And he's
2 going to walk us through the voting protocol.

3 MR. SATTERTHWAITTE: All right.
4 Getting started. And just for the record, I'd
5 like to give a nod to Cheryl Whetsel. She was
6 unable to join us today, but she's okay. She
7 wishes she was here. Of course, a lot of you all
8 have seen a lot of the emails that she's sent.
9 She's done an awesome job, as she always does,
10 behind the scenes and, you know, doing what she
11 does.

12 This presentation is basically a
13 presentation to kind of talk about the voting
14 process. And we'll go right on in.

15 Of course, the vote at hand right now
16 is on the plastic pipe rule that was published on
17 May 21st of last year. Tomorrow, of course, will
18 be the OQ rule. And I'm going to read to you all
19 a little bit.

20 Of course, when a decision or
21 recommendation of the Committee is required, the
22 Committee Chair will request a motion for a vote.

1 So, basically, as we do this
2 presentation today, Max Kieba is going to do a
3 presentation. He's going to present an issue.
4 He's going to give background on that issue.
5 He's going to share some of the comments that we
6 received on that issue.

7 And after we step past that, there's
8 going to be some notes as far as where PHMSA
9 stands on a couple of issues and some of our
10 recommendations. And at that point there will be
11 a Committee discussion. And then at that point
12 we'll also have the public's input.

13 And then if you all want to move
14 forward with the vote, then there will be a vote
15 that can take place. That's what we have there.
16 It says, any member, including the Committee
17 Chair, may make a motion for a vote.

18 A quorum, of course, is required for
19 a vote, which is established. A majority of the
20 current members of the Committee must be present
21 at a meeting to perform the Committee's statutory
22 duties. And I think we're at that point.

1 This is some of the language,
2 Committee action. Members consider each proposed
3 rule and the Draft Regulatory Evaluation. The
4 motion should include language from the statute,
5 49 US Code 60115, to indicate the appropriate
6 committee has carried out its responsibilities.

7 Motions must originate from, and be
8 seconded by, members of the appropriate
9 committee. Today should be basic, because
10 there's only one committee voting. But when we
11 move to two committees we'll have two motions.
12 And that will be lots of fun. There will be a
13 lot of motion. Okay. Never mind.

14 Measures impacting both gas and
15 hazardous liquid pipelines must be voted on
16 separately by each committee. And this is some
17 sample language. If you were to agree, if the
18 committees were to agree on it, then this is the
19 language that we would use.

20 Where you see Technical Pipeline
21 Safety, a lot of times we'll just go with the
22 Liquid Pipeline Advisory Committee or the Gas

1 Pipeline Advisory Committee.

2 But for the sake of it, "the Technical
3 Pipeline Safety Standards Committee finds that
4 the proposed rule as published in the Federal
5 Register and the Draft Regulatory Evaluation are
6 technically feasible, reasonable, cost-effective,
7 and practicable." So that's if you were to agree
8 with what the proposal was, as proposed.

9 If you were not to be in agreement,
10 then this is the language that would be used.
11 The Technical Pipeline Safety Standards committee
12 finds that the proposed rule as published in the
13 Federal Register and the Draft Regulatory
14 Evaluation are not, or cannot be made technically
15 feasible, reasonable, cost-effective, and
16 practicable.

17 And this is the third option. And
18 this is if you were to propose a change. And
19 this is what we've seen a lot in a lot of our
20 meetings.

21 And basically the language here would
22 go, "the Technical Pipeline Standards Safety

1 Committee finds that the proposed rule as
2 published in the Federal Register and the Draft
3 Regulatory Evaluation are technically feasible,
4 reasonable, cost effective, and practicable if
5 the following amendments are made."

6 And that generally would be followed
7 by a list of the amendments agreed upon by the
8 committee, or a reference to a slide in which
9 changes were discussed.

10 Sometimes, you know, this language
11 right here might be tweaked a little bit if we're
12 voting on a specific issue. So we'll say, the
13 proposed rule regarding bubble gum and scotch
14 tape. So, you know, we'll insert that, and then
15 we'll put in the amendment after that.

16 And of course, the verbatim, this
17 meeting transcript serves as the Committee
18 report, unless another document is provided by
19 membership. But the transcript that is
20 generated, we have a court reporter here. And
21 everything is being recorded. And all the
22 transcript will be placed in the docket for the

1 public record. And that will serve as the report
2 from this Committee.

3 And that's all I have. Are there any
4 questions? I mean, later on we'll also bring up
5 the slides with the appropriate language, as we
6 get into the votes. Okay. That's all.

7 CHAIR GANT: Thanks, Cameron. Any
8 questions from the Committee on the vote? Okay,
9 great.

10 We'll move to Agenda Item Number 2,
11 which is a briefing on the proposed rulemaking on
12 pipeline safety with regard to plastic pipe. Max
13 Kieba is going to give this presentation.

14 MR. SATTERTHWAITTE: I'm going to do a
15 little intro for Max going in. Are we on? Or I
16 guess we're trying to figure out what's up with
17 the speakers.

18 Okay. One second. All right. There
19 we are. Okay. We're going to just jump right
20 into the presentation. I'm Cameron
21 Satterthwaite, Office of Pipeline Safety,
22 Standards and Rulemaking. Myself and Max Kieba

1 will be giving this presentation.

2 I'm just going to do the opening. And
3 Max Kieba, who's our subject matter expert
4 representing the team will be taking on the rest
5 of the presentation.

6 This Notice of Proposed Rulemaking was
7 published on May 21st, 2015. The Federal
8 Register citation is there. The comment period
9 closed July 31st of last year. We received
10 comments from 39 entities, including operators,
11 trade associations, manufacturers, private
12 citizens, consultants, government entities --
13 we're going to work through this. Give him a
14 second to --

15 (Technical difficulties.)

16 MR. SATTERTHWAITTE: All right. Okay.
17 And the pipeline service company. Okay. Much
18 better.

19 The focus on this rulemaking is gas.
20 That's why we're staying in Part 192. And this
21 is only a Gas Pipeline Advisory Committee
22 meeting.

1 Of course, the impacted areas, the
2 transmission, distribution, gathering lines. And
3 of course, plastic pipe. The rationale for the
4 rule, a lot of this was based on staff
5 recommendations. We received several petitions
6 from the folks listed here.

7 And here's a listing of the issues.
8 And we kind of broke it out this way. We have
9 tracking and traceability, design factor for
10 polyethylene, the expanded use of PA-11,
11 incorporation of PA-12, risers, fittings. Some
12 issues on plastic pipe installation, repairs, and
13 some general provisions.

14 The way that this presentation is
15 structured, we're going to go over pretty much
16 each issue. And when we get down to the end,
17 that's where we'll move on to other areas.

18 Now I'm going to give it over to Max,
19 and we'll start, jump right in with tracking and
20 traceability.

21 MR. KIEBA: Thanks, Cameron. Thank
22 you, Chair. Thank you, Committee. Once again,

1 I'm Max Kieba with our Engineering and Research
2 group. I'm also the plastic pipe team lead. And
3 it is truly a team. In addition to Cameron and
4 all his folks on the rulemaking staff, our
5 technical folks include -- I want to acknowledge
6 Vinnie Holohan, Engineering and Research, Harold
7 Winnie, our Central Region, also one of our
8 inspectors, and on some of our standard
9 committees.

10 Bryan Kichler is with our Training and
11 Qualifications Division in Oklahoma City. So he
12 helps train a lot of our federal and state
13 inspectors, particularly in this area. And then
14 Chris McLaren you met already here, with our
15 state programs group and our DIMP coordinator.

16 So the old adage, I guess, if you like
17 what see, you know, compliment the team. If you
18 don't like what you see, well, complain to me, or
19 I guess Alan. So that's it.

20 So yeah, let's get started. Tracking
21 and traceability I think it's fair to say was the
22 lion's share of the comments we got. But going

1 into this rule, the primary issue that we saw
2 were not all operators were having consistent
3 data to identify systemic issues.

4 So, we've had DIMP since 2009, 2010 or
5 so. Part of that is material and location. But
6 we just saw that folks just weren't quite getting
7 it. And maybe part of it is we weren't providing
8 effective guidance.

9 So, and another issue we see out there
10 is, when incidents do happen, it's really
11 difficult to find out either where else that
12 fitting or the pipe, or whoever fused that joint,
13 where else they were working that given day.

14 We've seen some incidents, I could at
15 least point back to Rancho Cordova in 2008, where
16 there was a piece of plastic that went in between
17 two joints that wasn't even a gas pipe, it was
18 yellow. But then when we asked the operator,
19 "where else was that crew working?" they couldn't
20 give us an answer.

21 More recently, East Harlem. A lot of
22 folks probably know that one. But some fusion

1 qualification issues, again, where else this
2 issue was occurring. So we definitely have a
3 history of incidents where this has occurred.

4 And I also want to point, we're trying
5 to follow a lot of the latest standards going
6 into play. So, since 2012, most of the ASTM
7 standards applying to these different materials
8 have worked into this tracking and traceability
9 standard we'll talk about here.

10 And I would say, up to now, I think
11 PHMSA should take some of the blame, right? We
12 were at 1987 and the '99 version of 2513 for the
13 longest time. Finally, last year, we got to
14 2009. Now we're trying to at least get up to the
15 2012 version for a lot of these. And we're still
16 three years behind.

17 But we're trying to get up more
18 current with the latest standards. It's
19 something we keep hearing. So this is one of the
20 initiatives to try to get there.

21 So, our proposal as part of this is to
22 maintain tracking and traceability information,

1 as defined in 193.2. We'll talk about some
2 comments we got on the definitions. And also to
3 be consistent with the definitions and
4 requirements in the applicable standards.

5 So, just to take a step back, I wanted
6 to, for those that are newer to plastic pipe,
7 just explain how pipe is generally marked today.
8 I put 2513-09a up there just because it's the
9 current version that's incorporated by reference.
10 But this particular section hasn't really changed
11 much for a number of years. And this is still
12 pretty much in the latest standard.

13 So, on your print line, and I have
14 some examples here if anyone wants to see it. We
15 have a few pictures up later as well. But you
16 have a number of information on that print line:
17 pipe size, manufacturer, et cetera.

18 There's an example at the bottom. But
19 you'll see, like in this example, it strings
20 along an entire length of pipeline. Typically,
21 you know, two to three feet distance. It
22 depends. But that's where it's gone

1 traditionally.

2 So what happened? So, in the '12
3 version. And, again, this is the version that's
4 proposed. This is 2513. But again, this is a
5 PE-only standard right now. But in this rule we
6 also propose the '12 versions of PA-11, PA-12,
7 and many others.

8 So, in the '12 version it incorporated
9 2897, this tracking and traceability standard,
10 which incorporated a lot of the same information
11 from the print line into a 16-digit code,
12 alphanumeric code. And up on the slides, out of
13 those 16 digits you have two that are component
14 manufacturer.

15 Probably the meat of what you're going
16 to get is in that manufacturer's lot code.
17 That's going to talk a lot about what the
18 material is, perhaps the temperature codes that
19 were traditionally on your print line, and other
20 aspects of the manufacturing process.

21 And then, yes, there's a material
22 component type, size, et cetera. I provide an

1 example at the bottom there. That's in the
2 standard itself.

3 But out of that 16-digit, if you're
4 looking at it straight, you're not going to know
5 what that means. But it can correlate to an, in
6 this case, an inch-and-a-half IPS PE2708
7 material.

8 So just to give you an idea, again,
9 transitioning from the longer print line into a
10 shorter format. So that's one part of the 2897.

11 The other part we got on this rule was
12 the whole permanency of these markings. So in
13 the standard itself, and this is right out of
14 2513, we pointed to the standard for the
15 permanence. And at least for pipe it gives some
16 definition or explanation of what permanence is.

17 Effectively, it can only be removed by
18 physically removing part of the pipe wall. So
19 traditionally, they've used an indent-type
20 printing that protrudes through part of the wall.
21 And yes, there's some ink that goes onto it.

22 Over time, maybe that ink will go

1 away. But you can still see that indentation.
2 So that's the permanent aspect for, at least,
3 again, in the standard itself.

4 And then, at the bottom there, people
5 seem to forget this part. But there is a part in
6 there that calls for a records piece for the
7 manufacturer that must maintain such records for
8 50 years or the service life of the pipe. Why
9 I'm bringing this up is because this also is tied
10 into a NAPSA resolution that we got for making
11 markings permanent.

12 Now, on the fitting side it should be
13 acknowledged that, yes, fittings do not have that
14 permanent language. It's really difficult to
15 indent printing on fittings themselves. Right
16 now that's all that we have in the standards for
17 fittings. Just that it should be marked on the
18 body of the hub.

19 It does have that 50-year design life
20 for the records piece, again, just on the
21 manufacturer. Nothing in there about what the
22 operator is supposed to do. And then it does

1 have a note that it only applies to fusion
2 fittings, not mechanical fittings.

3 So that's some of the comments we got
4 in, as well. We had this permanent word that was
5 tied to the standard. And it is a little bit
6 different on pipe versus fittings, at least what
7 can be done.

8 So, this next set of slides. One, I
9 want to acknowledge AGA had a tracking and
10 traceability workshop. You can go to that public
11 link. And these next set of slides are actually
12 going to be from the Plastic Pipe Institute.

13 Randy Knapp is actually here. So I
14 want to acknowledge Randy for a lot of these
15 slides. But to me, I think that this helps
16 explain at least where the industry is currently
17 going for marking, and maybe some of the
18 challenges that are coming up, particularly with
19 this permit aspect.

20 So, again, one of the most common
21 methods are the indented printing. It is
22 abrasure resistant. Most would agree it would

1 follow -- it would satisfy the permanency.

2 But it's not well-suited to that
3 barcode. So that 2897, you see an example there.
4 And again, I have examples here. But you have
5 that 16-digit at the bottom. And then you have
6 the barcode right up top. It's not very well-
7 suited for barcode to do that indent printing.
8 And it's also difficult to manage. So you see,
9 any time a date changes, you're changing at least
10 two digits, sometimes three digits here.

11 Here's another version that's probably
12 the most commercialized method. It's ink jet.
13 And here polyamide requires some surface
14 treatment as well. And then it has to adapt to
15 varying conditions, sizes, and line speeds.

16 I think we're losing the mic again.

17 Okay. Laser. So some folks are doing
18 laser etching now. It's still being
19 investigated. It has a small footprint. It does
20 protrude a little bit into that wall, to an
21 extent.

22 It is more capital intensive. So when

1 we bring up the question on costs, it is a little
2 more capital intensive on the manufacturing side.
3 Some can argue, does that really go to the
4 operator, and ultimately the customer? But it is
5 more capital intensive on the manufacturing side.

6 Some are also doing this UV-cured ink.
7 It adds a process step. Adhesion can be an
8 issue. So, again, the permanence or durability
9 of that marking. It does have faster dryer
10 times.

11 Labels. You'll probably see labels
12 more common on fittings. And I have just one
13 example here where typically you'll put a label
14 on a fitting. Some are starting to do an RFID.
15 I would say that's a newer technology. It's
16 difficult to implement on pipe.

17 But, again, this is just
18 acknowledgment that the industry has gone in a
19 number of directions to try different options.

20 So, for smaller footprints, if you
21 just don't have physical space. I mean, I
22 provided one example which is actually a pretty,

1 relatively large-sized fitting in the grand
2 scheme of things. But you can imagine your EFVs
3 or others are, get much smaller size type
4 fittings.

5 So typically for those it's really
6 difficult to get it onto the actual fitting
7 itself. So typically they'll put some kind of
8 tag. But I think most will agree, it probably
9 doesn't take all that much to rip off this tag.
10 So is that permanent or not? Those kind of
11 things.

12 Here is just an example, again, the
13 same fitting I have here. So at the top left of
14 there, and this is a fitting. The top left is
15 pretty much your standard print line through the
16 years. At the bottom is your bar code and your
17 16-digit. And you also see a QR code. Multiple
18 ways to put it on a label. So that's just what's
19 been happening from a manufacturing process.

20 So, here are the comments we got in.
21 We did get a number of comments that were overall
22 support. A few comments we got were suggesting

1 to drop it entirely. The concern there was to
2 pursue a separate tracking and traceability
3 rulemaking for all material types, not just
4 plastic.

5 A few of the commenters did claim that
6 they felt the requirements would be economically
7 significant. And that's from the overall
8 tracking and traceability part.

9 For the permanence part, we got
10 comments that markings -- when the industry and
11 the standards transitioned into this barcode,
12 this 2897 tracking and traceability, the intent
13 at the time, or overall, those markings are
14 primarily to help capture that information at
15 installation.

16 Some inspectors would probably argue
17 with that point to an extent, whereas, you know,
18 down the road, if you have an incident, or you
19 dig up the ditch, you want to find out something
20 about the pipe. And if you don't have the
21 records somewhere, what do you rely on? You rely
22 on what's printed on that pipe.

1 Others on the permanence suggested
2 that permanent records of markings could
3 potentially be considered equivalent to permanent
4 physical markings. So they provided some
5 alternative language. Instead of using the word
6 "permanent," perhaps markings must be "legible,
7 visible, and/or readable."

8 Some did throw out numbers on, hard
9 numbers on -- we had some that suggested we just
10 put out a number of 20 years, versus some generic
11 permanent. Others just said, up until the time
12 of installation.

13 So the thought there is the
14 manufacturers are required to at least make sure
15 that either the printing on the pipe or the
16 fitting lasts up until the time of installation,
17 when the operator can put it in the ground,
18 somehow capture that information, and from there
19 transition it into whatever data capturing and
20 analysis mechanism that the operators use.

21 A few did comment that it's
22 potentially burdensome to small public operators.

1 That's on the permanent piece.

2 For F2897 itself, versus the
3 definitions we proposed in 192-3, we had a number
4 of comments that noted some differences between
5 the two. So we got comments to redefine tracking
6 and traceability only to what's required in that
7 standard. And if there are any additions that
8 PHMSA feel is needed, follow the standard
9 development process.

10 From an overall timeline, the general
11 feeling from a lot of the commenters was, if we
12 can't drop this entirely, pursue a separate
13 rulemaking. There was a suggestion to recommend
14 some kind of phase-in approach. We got
15 implementation timing ranging from two to five
16 years total.

17 So, on behalf of at least the staff,
18 some possible recommendations, or possible
19 changes. Definitely for the definition itself,
20 to revise the definition to more closely match
21 what's in F2897. I think Cameron has a link
22 there of some examples.

1 On the permanence expectations, one
2 approach is to just defer to the listed
3 specifications for pipe. And then somehow we
4 have to do something for fittings themselves.

5 And for fittings, must be present and
6 recorded at the time of installation. Or, again,
7 we have to figure out, does pipe have different
8 language, or fittings have different language.

9 And then, for a compliance timeline,
10 the staff felt it is reasonable. Even though a
11 number of manufacturers are already doing
12 something that has the 16-digit code on it, a
13 number just aren't there yet, partly because
14 they're not required to do it. Certainly not
15 from the regulations.

16 There might be some operators that
17 require it in their purchase orders. But there's
18 just a number of manufacturers that just aren't
19 there yet.

20 So, from a compliance timeline, one
21 thought is to allow marking requirements, delay
22 the implementation for one year, just to give

1 manufacturers some time to figure out the marking
2 piece.

3 For the recordkeeping, for the
4 operators, give the operators two years before
5 the recordkeeping requirement would be required.
6 And certainly, as part of that, we got some
7 comments that perhaps we can do some task group
8 meetings in between.

9 Alan, do we continue on? Okay. Would
10 you like to say something? Okay. I'm just
11 making sure. If anyone doesn't know, here is our
12 Administrator.

13 CHAIR GANT: I was going to let you
14 finish, Max. But it would be very appropriate to
15 welcome Administrator Dominguez here. She was
16 able to stop by to say hello. She's going to
17 join us for an extended period tomorrow.
18 Administrator, would you like to share any
19 thoughts with the group today?

20 MS. DOMINGUEZ: I'll just say a quick
21 hello. And it's nice to see all the Advisory
22 Committee members. Thank you all for your

1 participation. And thank you all in the
2 audience. We greatly appreciate your
3 participation as well.

4 As you noted, Paula, I will be here
5 tomorrow with the joint committee meeting. I
6 look forward to sharing some comments then, at
7 that point in time. But just came in to sit in
8 for a portion of the discussion this afternoon.
9 So, thank you.

10 And a welcome to Alan as he leads
11 these advisory committees over the course of the
12 next couple of days. So, thank you.

13 MR. KIEBA: All right. So I think, if
14 I'm not mistaken -- yes. So, as Cameron said, we
15 thought it would be helpful to break this up into
16 chunks.

17 So, the first piece is tracking and
18 traceability. So, here's the proposal from the
19 staff for some options. And then I guess I defer
20 to Cameron where we go from here.

21 I think Cameron has an example of at
22 least some language for the definition. I don't

1 know if we have language for some possible
2 changes of the permanence language based on
3 comments. But I defer to Cameron to take it from
4 here.

5 CHAIR GANT: If we could, before we go
6 to some of Cameron's suggestions, take any
7 questions or comments or suggestions from
8 Committee members? If you'll raise your tent or
9 your hands? Ms. Fleck.

10 MEMBER FLECK: Thank you. Susan Fleck
11 with National Grid, and obviously representing
12 the Gas Committee. I think most of the concerns
13 that local gas distribution companies have, have
14 been mentioned by Max. But I think it bears some
15 reinforcement.

16 And first off, I think it's important
17 for us to note -- well, for me to note, that we
18 are fully in support of the concept of tracking
19 and traceability. We think it's the right thing
20 to do. And I think there's very few people who
21 would argue that it's not important to know where
22 specific assets are and to be able to find them

1 in the event that something happens.

2 And with that said, though, I think
3 it's a little premature to be putting a rule this
4 comprehensive in place in such a short timeframe.
5 It just feels like it's a lot to get done in
6 short period of time. It feels like a more
7 significant rulemaking. Because of this,
8 companies like National Grid, we're putting in
9 500 miles of pipe a year, actually just in
10 replacement. Probably more like 600 miles a
11 year.

12 And just the sheer volume of
13 information that has to be tracked and traced, to
14 me, tells us we're going to have to build new
15 systems. We're going to have to build new
16 procedures. We're going to have to hire people.
17 We're going to have to train people. And the
18 timeframe to get that all in place seems a little
19 bit short.

20 So, my suggestion would be to pull
21 tracking and traceability out to potentially give
22 the plastic -- you know, get the plastic pipe

1 rule passed and work on that until we get some of
2 the issues understood a little bit better.

3 So that's where I'm going to start.
4 And I have some other issues. But I'll stop
5 there for now.

6 MR. KIEBA: Can I respond, or at
7 least, I don't know if you -- the process to go
8 through. I guess with the plastic pipe team, I
9 guess we were confused on this whole, "it's going
10 to cost more, it's going to be more intensive."

11 To be quite honest, I think part of
12 that was maybe some folks were thinking we're
13 requiring everyone to GPS/GIS everything, maybe
14 have barcode readers. And that certainly wasn't
15 the intent of this rule.

16 Because you have to imagine, even some
17 of your municipals, you're lucky if they have a
18 computer, let alone, they're not going to have
19 barcode readers. So the thought was, at a
20 minimum, they could at least record that 16-digit
21 number, even if it has to be the paper copies.
22 And somehow they use that as their normal record

1 keeping, what they already do for print lines.

2 So, I guess we were just confused on
3 that aspect, on where operators think it's
4 intensive. I mean, I get it. If you're adding
5 anything into your already comprehensive data
6 capturing mechanism. But again, I think that was
7 where we were confused on the whole cost and, you
8 know, the intense burden of this.

9 CHAIR GANT: Alan.

10 MR. MAYBERRY: Okay. Thanks, Sue. I
11 was curious. You had mentioned the timeframe.
12 Did you mention that with the concern over the
13 time of implementation? Was that where you were
14 coming from, as far as how it -- I guess you'd
15 mentioned timeframe.

16 MEMBER FLECK: Yeah, having it fully
17 up to speed in two years, to me, the
18 recordkeeping requirement seems, I wouldn't say
19 impossible, but highly unlikely.

20 For us, every one of our systems,
21 because we don't do anything on paper really
22 anymore. Maybe in some of our smaller areas. We

1 do it in systems, because that's what our
2 regulators expect. And our systems would have to
3 be updated.

4 And I don't know if you're ever
5 updated a system like SAP. And it doesn't happen
6 in a year. It takes multiple years, and many
7 millions of dollars. Because it's reaching back
8 to a lot of other systems. It's way more
9 complicated than it seems. It doesn't -- I just
10 don't think it's doable in two years for a
11 company like National Grid. And I don't think I
12 can keep it on paper. I really don't --

13 MR. KIEBA: How about five years?
14 Because that was one of the proposals, is
15 eventually phased implementation up to five
16 years.

17 MEMBER FLECK: I don't know. I'd love
18 to hear some other input from somebody other than
19 me. But it just feels like -- I just know if I
20 go back to my IT department and say, "you have to
21 update all our work management systems and
22 include this," they're going to laugh me out of

1 the room if I say it has to be done in two years.
2 I'm sure of that.

3 CHAIR GANT: Thanks. Rich, and then
4 over to Cheryl.

5 MEMBER WORSINGER: Hi. Rich
6 Worsinger, City of Rocky Mount. I echo Sue's
7 position on this. We also support this, feel it
8 has a lot of merit, and agree with Sue's
9 comments.

10 Would like to add another one to it,
11 though. We would like to see this made its own
12 rulemaking and set up to include steel pipe.
13 There's value to track steel pipe also. So we'd
14 like to not only see it apply to plastic, but be
15 expanded to include steel.

16 We also have concerns about cost.
17 There's a lot of American Public Gas
18 Association's small members who do not have a way
19 to track this. And having it on paper, if you
20 had a looseleaf book full of papers, I don't know
21 that that's going to help you easily find
22 something.

1 I think that if we can slow down a
2 little bit on this also, it can allow some of the
3 various vendors out there that could develop
4 something. I don't know, Sue, that many of our
5 companies use SAP. But hopefully somebody can
6 develop a poor man's way of tracking this.

7 CHAIR GANT: Thanks, Rich. Cheryl.

8 MEMBER CAMPBELL: I agree that I am
9 fully supportive of tracking and traceability,
10 having been on the wrong side of this, looking
11 for equipment. So I'm 100 percent in agreement.

12 Regarding the timeline, I agree with
13 Sue. Two years, I mean, we're right in the
14 middle right now of installing SAP.

15 Unfortunately, I'm also right in the middle of
16 upgrading of my GIS. I've been working on both
17 of those for three years. And GIS goes live in
18 ten days. And we're more than a little nervous
19 about that. And that's an upgrade, right? But
20 we have been working on it for quite some time.

21 To Sue's point, all these systems are
22 so interrelated it's very, very difficult to

1 bring them all along at the same time. And it
2 takes a lot of thought and a lot of planning.

3 So, frankly, I think five years would
4 be a -- I think it's doable in a five-year
5 timeframe. Companies can start working on it,
6 get it built into their technology plans.

7 I mean, we have a technology plan and
8 a timeline, and this is when we're going
9 different things. And it allows us to very
10 thoughtfully bring everything aligned together.
11 It also gives us plenty of time to work on
12 procedures, training our people in the field.
13 You know, there's a long list of things that have
14 to change when we do this.

15 Having said all that, I also agree
16 with Rich that I'd like to see it expanded beyond
17 plastic. This is not just a plastic pipe problem
18 with tracking and traceability. I think it's
19 something that we should be thoughtful about,
20 beyond just our plastic infrastructure.

21 MR. KIEBA: Yes, and that's a good
22 point. And if it hasn't been -- we used to have

1 a slide. But for anyone that aren't familiar
2 with that 2897 standard, it actually is a
3 standard for both plastic and metallic, other
4 components.

5 I think part of the problem is the
6 metallic folks just haven't been wanting to play
7 ball even close to what the plastic folks are
8 doing. So, I mean, again, I defer to what the
9 committee ultimately decides, and our leadership
10 certainly.

11 But there's one approach where you
12 could start here for plastic, and potentially
13 expand it for metallic if this is the go-to
14 standard. Otherwise, I don't know where to go
15 from here on realistically when we're going to
16 see another rulemaking down the road.

17 Another thing worthy of noticing,
18 noting, is on my earlier slides this is
19 integrated in so many of these other standards
20 we're proposing. So I can't see a clear way
21 where you could pull out tracking and
22 traceability and still keep the 2012 version of

1 all those standards.

2 That's effectively saying we're back
3 to 09a for a few years. And I don't what you do
4 for PA-11, PA-12, honestly, unless you say,
5 "Okay, go to 2012 except for those." I don't
6 know if that's an approach. But just keep that
7 in mind for an impact standpoint.

8 CHAIR GANT: Thoughts from the table
9 on the connection between the 2012 standards and
10 the references to this new requirement and how
11 that might be addressed?

12 MEMBER CAMPBELL: Can you say more --
13 can you provide a little more information on
14 that, Max? I mean, I'm just trying to wrap my
15 head around it more.

16 MR. KIEBA: Yeah, if you look at all
17 the PA-11/PA-12 slides, the marking, what I
18 showed you there for 2513, all of them
19 essentially have that same language, maybe
20 slightly different in some of those others.

21 But, you know, as part of this rule we
22 proposed some 15 to 20 different standards. A

1 lot of those, you know, we have the suite of the
2 new PA-11/PA-12. Part of that is to finally get
3 rid of '87 and '99 for non-PE plastics.

4 We want to get rid of that, those
5 older ones. So the thought there was go to the
6 PA-11/PA-12. And, yeah, we started with the 2012
7 version to try to bring it up to speed. But all
8 those pretty much had the same language on
9 tracking and traceability.

10 Not to mention, with some of these
11 standards, they have some 20 other applicable
12 standards within them for fittings. And a lot of
13 those are also incorporating tracking and
14 traceability.

15 So, again, it's just complicated.
16 When you point to a standard and you say you have
17 to follow the standard, but then you have so many
18 pieces on there that talk about this tracking and
19 traceability aspect of it.

20 CHAIR GANT: Max, could you give us an
21 example of how tracking and traceability is
22 referenced in the standards?

1 MR. KIEBA: Yes. So I gave you some
2 -- let's go back to this earlier slide. But,
3 again, I'll just use this example from 2513. So
4 here it is.

5 So, basically it says, in addition to
6 -- so, again, this is, I want to say -- sorry,
7 it's Section 7 of the standard, which, again,
8 this is still the same Section 7 in the 2313-12
9 version.

10 But then you have a new section that
11 says, in addition, you have to meet the 2897
12 aspects. Again, it's very similar in the 12AE-1
13 version for PE. But it's also very similar in
14 the PA-11/PA-12 standards, and so many other
15 plastic standards.

16 So, again, the standard points to, in
17 addition to -- and that's one of the reasons,
18 too, you'll see, on the example pipe I have here.
19 What folks always don't know either is -- none of
20 the standards actually require you to put the
21 version number. Most pipe will just show 2513.
22 Except there are some out there that actually, I

1 think one of these, has 11c on it, because that's
2 the version right before tracking and
3 traceability come into play.

4 So you might see some that actually
5 print those as 2513-11c, just to make it clear
6 that they don't follow tracking and traceability.

7 When you got to 2012, that's where
8 tracking and traceability came into play. And
9 typically what happens -- and help me out
10 operators. But typically a lot of operators or
11 manufacturers will say meet the latest standard,
12 in addition to clearly whatever is required in
13 the code.

14 So it has been intensive, up to now,
15 to go both with a 2012 or later version, or even
16 '11. And at least as of a couple of years ago,
17 always having to go back to 1999 version for 2513
18 that meets the code.

19 We're a little closer now between 09a
20 and 12. But I think there's just a big jump we
21 had in '12 that I think is better, and even the -
22 - and the hope is we can get over this hump of

1 these older standards. And eventually we'll get
2 into a standard update process and we won't just
3 constantly be updating to the latest standard
4 every two years.

5 But, again, if we don't go to tracking
6 and traceability now, we have to figure out what
7 we're doing for this piece. Does that mean we
8 have to go to 09a?

9 And I don't even know what it means
10 from a rulemaking part. Because we didn't
11 propose the '11 version, or anything else before
12 '12. So I just don't know what we do from there.

13 MR. MAYBERRY: Cheryl and Sue and
14 Rich, just from a practical standpoint, I was
15 curious, and really it's just to raise my level
16 of awareness on this. I presume operators are on
17 the committee, the STM Committee, so I imagine
18 there was some level, there was a level of
19 acceptance of the membership on that standard.
20 And certainly, I would also extrapolate, you
21 know, that certain level of implementation as
22 well.

1 And certainly, you know, some
2 operators are already doing this. A number of
3 operators are already doing this, I would take
4 it.

5 But what's the main issue? If it's a
6 standard I think that was developed under
7 consensus, what's the -- I mean, as a regulator,
8 I'm left to think, well, if it's an acceptable
9 standard it's really an implementation-type
10 issue, you know, the phased in, the timing that
11 we're looking for. Is that kind of the right way
12 to look at it?

13 MEMBER CAMPBELL: I think that's
14 correct. I don't think anybody's got a problem
15 with the ASTM standard that I'm aware of. I
16 think it's really just, how do you get from there
17 to implementing it and integrating it into a very
18 already complicated process?

19 I mean, it sounds easy, right? I'm
20 going to go get a coil of pipe, and I'm going to
21 put it in the ground. And I'm going to record
22 the number. And everything should work great.

1 But in practice, it's not that straightforward.

2 MEMBER FLECK: Yeah, I think when you
3 consider all the nits and gnats of how it can --
4 what we're really asking for here is more time.
5 We're not saying rewrite the rule. We're not
6 saying it is not appropriate.

7 We all agree, conceptually this is
8 absolutely the right thing to do. We even
9 recommended it should go beyond plastic and
10 should incorporate other materials. So, we're
11 not against that. It's just getting it done.

12 For me, I'm going to have to rewrite
13 a bunch of codes and standards. They go through
14 a rigorous approval process within the company.
15 I'm going to have to get people re-operator
16 qualified. Because if part of the job of
17 installing pipe is capturing this information and
18 putting it into documentation systems, that
19 becomes part of our Op Qual Program. People have
20 to know what to do and how to do it.

21 And then we have to, you know, spend
22 the money on the systems, take the time to get

1 those in place. Then we have to back to all of
2 our -- I have eight different rate plans. I've
3 got to go back to eight different commissions and
4 ask for permission and get funding.

5 It's just more than a -- we're just
6 saying it's more than a two year program. Maybe
7 for a smaller company it isn't. But for a bigger
8 company, I think it is. So, conceptually we're
9 in agreement. We think we need a little more
10 time to make it happen, I think is where we're
11 all coming from.

12 MR. KIEBA: So, I guess it goes back
13 to this last point. If we change marking, again,
14 that's what's required of the manufacturers. So
15 give the manufacturers some time.

16 And what I've been seeing, this is
17 kind of a moving target. So, if we at least
18 figure out, okay, how exactly are we going to
19 mark the pipe? And we can mark it in a year.
20 And then if we change this recordkeeping, a
21 little bit longer, does that seem a feasible
22 approach?

1 And in the meantime, again, I think
2 some comments we got is, let's form some -- well,
3 we can't call them advisory committees --
4 committees, technical committees to get together
5 to talk all aspects of how would an inspector see
6 it. I think we should bring who wrote this
7 standard, to say what is the intent of this
8 standard? If there are any issues in the
9 standard, how do we clarify or add some notes,
10 whether it's guidance in a standard, which I
11 prefer to go through the standard process. Or if
12 there's guidance PHMSA needs to come up with, I
13 think we can do that. But I think that's a
14 reasonable approach, too. Kind of in line with
15 what the AGA tracking and traceability workshop
16 did. I think that was really good to bring
17 everyone together to talk about some of these
18 nuances. So that might be one approach.

19 CHAIR GANT: Rich.

20 MEMBER WORSINGER: Rich Worsinger,
21 City of Rocky Mount. A question of Max. I don't
22 quite understand how delaying tracking and

1 traceability would jeopardize approval of PA-
2 11/PA-12. If you could elaborate on that. And
3 also, just another question related to that. If
4 we're going to expand this from two years to five
5 years, would that delay PA-11/PA-12 until the end
6 of that five-year period?

7 MR. KIEBA: So, I don't think it would
8 delay the other parts of this code that talks
9 about the -- so for PA-11 going up to six inch
10 and 250. But it would affect the standards
11 you're incorporating by reference.

12 So, I think PA-11 and PA-12 would
13 still have to follow the '99 version of 2513.
14 Because that had all material types. I don't
15 think you could say you can follow the 2012
16 version of PA-11/PA-12. So, our intent was to
17 have all the material specs by material.

18 So, again, because right now you can
19 do PA-11 up to 200 in a code. But they still
20 have to follow the 1999 version of 2513. It's a
21 really antiquated standard. And it's painful for
22 a lot of people, I think, to follow an old

1 standard with a new one.

2 So, I think that's part of the --
3 again, I don't think it will impact going to PA-
4 11 or PA-12. But it would impact the standards
5 you incorporate.

6 CHAIR GANT: Sue, do you have another
7 question?

8 MEMBER FLECK: I had a question on
9 marking. But if somebody else has comments on
10 tracking and traceability --

11 CHAIR GANT: I'm sorry, Andy, I didn't
12 see your card. Andy.

13 MEMBER DRAKE: Andy Drake, with
14 Spectra Energy. I think what we hear is kind of
15 a building consensus here that this makes sense.
16 And it does make sense. I think tracking and
17 marking makes a lot of sense.

18 I do think that the timing issue
19 seeming to make sense to me. We don't have any
20 plastic pipe. But I think it does take a lot of
21 time and energy to get these systems ramped up.
22 And you want to do that well to meet the intent

1 of what you're trying to do, not just create a
2 bunch of paper that you can't access. That
3 doesn't help anybody.

4 I do think the conversation about
5 extending it to other materials is logical. But
6 I would caution us, or at least be very
7 deliberate to vet out. The scope of this was
8 intended to be plastic pipe. And the
9 manufacturers that were involved in the
10 discussion were plastic pipe manufacturers.

11 So before we extend it to other
12 manufacturers I think we need to be cautious to
13 extend the conversation to them. Because I can
14 tell you, that's not how we mark steel pipe. I
15 mean, it just isn't how steel manufacturers mark
16 pipe. And we're going to have to be inclusive of
17 them to figure out how to do something that would
18 accommodate how they actually work.

19 So I'm not opposed to that. I just
20 offer that as a caution. I think if we're going
21 to extend it, I think that's a good thing. We
22 just need to vet it out so that we get the right

1 audience.

2 Maybe we stage it, and do plastic and
3 then steel separately, because they're two
4 different sectors that we're --

5 MR. KIEBA: Yeah, no question either.
6 I think we're all clear. If it would extend to
7 steel, that would have to be a separate
8 rulemaking either way.

9 It's the question of whether you point
10 to this one as a start, or something completely
11 different. But yeah, no question, we can't make
12 this a steel rule now.

13 CHAIR GANT: Alan.

14 MR. MAYBERRY: Yeah, just to reinforce
15 that. I would agree. I think we need to stay
16 with plastic. That's the topic at hand. And you
17 have to start somewhere. Here it's convenient.
18 There's a standard that addresses it. And so,
19 hence the -- I think we stick with that.

20 Certainly, many of you know we're
21 dealing with the whole subject of recordkeeping
22 related to all pipelines separately through our

1 Gas Transmission Rule.

2 But, you know, maybe there's the
3 opportunity down the road, as we go forward,
4 learning from this as well, to apply to other
5 materials.

6 MR. KIEBA: I'd also like to ask the
7 committee too, this whole notion of permanence,
8 permanency. Is it up to installation? Is that
9 reasonable? Do we need some time past that?

10 Because I've seen some of these demos
11 of these electronic systems. They don't even
12 work in the hotel rooms, let alone, I imagine,
13 they're not going to work in the field.

14 So, I've had some operators that say,
15 honestly, I don't trust some of those demos out
16 there. I want to rely what's on the pipe. So,
17 some of them would say, I don't just trust right
18 up to installation. I want a little bit longer
19 past that.

20 So, again, I ask that question too.
21 Unfortunately our NAPSA rep isn't on the
22 committee right now. But from the whole, where

1 it started with the NAPSA resolution. But also,
2 kind of again, what Committee members are really
3 seeing now.

4 Is up to installation reasonable? Do
5 we need some -- personally, I'm not a fan of
6 putting an arbitrary, whether it's 20 years, 50
7 years. That's meaningless to me. Because we
8 know anything could happen in the field when you
9 install, operate, et cetera.

10 So, at the same time, I hear the
11 comments that permanent is still very vague, even
12 based on what it is in the standard. So I'd like
13 some -- interested in some input on that.

14 CHAIR GANT: Sue, and then John.

15 MEMBER FLECK: That's exactly what I
16 was going to address. So that was a perfect
17 segue. Thank you, Max.

18 I think up until the time of
19 installation is the right answer. And if it goes
20 a little beyond that, and I expect it will,
21 that's great.

22 Being held accountable, because you

1 got to remember, ultimately we end up being held
2 accountable for the code, not the manufacturer.
3 So if the word "permanent" is in there, and the
4 manufacturers don't do a good job, I'm subject to
5 penalty and fine and enforcement actions down the
6 road. And that's not really fair.

7 So I think up to the time of
8 installation, we can hold ourselves accountable.
9 We will certainly get a little more than that.
10 But permanent is a very scary word for us.

11 MR. GALE: John Gale, PHMSA. I'd just
12 like to advise the Committee, or just give a
13 recommendation. You know, it's been a difficult
14 time getting some of these rules out over the
15 last few years. Plastic pipe rule was under
16 development for a long time.

17 So, regarding the issue of maybe
18 pulling back and putting this into a separate
19 rule, or trying to address both materials at the
20 same time, we have also a very heavy rulemaking
21 agenda over the next couple of years, finalizing
22 gas transmission, moving forward on valve and

1 rupture detection, finalizing hazardous liquid
2 and EFVs.

3 So it will be very difficult to get
4 this onto the agenda with our resources that we
5 have already dedicated to those rules. So, my
6 recommendation to you would be to try to come to
7 some kind of consensus on this proposal today, be
8 it maybe a delayed time period, or what have you.

9 Regarding Richard's question earlier,
10 regarding if we were to delay it, would it impact
11 the use of that standard for the other proposals?
12 If we delay the date, no. There should be no
13 impact. But if we were to drop the proposal, as
14 Max was saying, if we were actually looking at
15 pulling back on that proposal and not adopting it
16 at all, then it could have an impact. Thank you.

17 MEMBER WORSINGER: Rich Worsinger,
18 City of Rocky Mount. On the permanence of the
19 marking, also, Sue and Cheryl are with large
20 companies that can do the testing on the markings
21 that they get from various manufacturers. They
22 have the resources to do that. And they can see

1 if in fact they really are permanent.

2 For small operators, they don't have
3 the resources to take a piece of pipe and test
4 the markings to see whether they are in fact
5 permanent. But we're the ones that the buck
6 stops with us.

7 So, I like the suggestion of, once the
8 pipe's in the ground, especially if we have the
9 tracing and trackability, we'll know we bought a
10 certain piece of pipe. We know where we put it.
11 At that point we don't need to have that
12 permanent marking on the pipe.

13 CHAIR GANT: So, I'm hearing a general
14 support for the principal concept here of the
15 importance of tracking and tracing. I'm also
16 hearing what sounds like a consensus around the
17 need that it will take more time than is proposed
18 here to implement the record keeping requirement,
19 that systems and new processes for some companies
20 will need to be developed and put in place, that
21 operator training will need to occur, that this
22 will need to be implemented along with a number

1 of other requirements.

2 So, to do that effectively, we'll need
3 a little bit more time. So it seems to me that
4 the proposal on the table is to extend the
5 recordkeeping requirement from two to five years.
6 So that's one suggested change from the
7 Committee.

8 The second one would be with regard to
9 permanence. Making it at the time of
10 installation. Removing the permanent
11 requirement, and adapting it to show that it is
12 available or visible at the time of installation.

13 Are there other discrete changes that
14 Committee members would like to suggest based on
15 the discussion that's been put forward already?
16 Or other things that you'd like to raise? John.

17 MR. GALE: Thank you, Paula. If that
18 is the scope of what the changes are -- and,
19 Paula, thank you for bringing this all together
20 in our conversation -- I think it would be now a
21 good time to maybe open it up for any public
22 comments that we have to see if there's anybody

1 from the audience that would like to make
2 statements on the record.

3 CHAIR GANT: Before we do that, Rich?

4 MEMBER WORSINGER: Rich Worsinger,
5 City of Rocky Mount. Just one last comment. And
6 I'd hate to see us lose sight of this. But,
7 John, maybe put it in your to do list, that you
8 do at some point -- I know it's real long. Add
9 this to look at, to expand this. And I thought
10 Andy's comments were excellent also. Consider
11 expanding it to steel, but involve the steel pipe
12 manufacturers and those that are large users and
13 installers of steel pipe.

14 CHAIR GANT: Thanks, Rich.

15 I'll ask members of the public if you
16 have comments or questions. I believe these mics
17 are live here in the middle of the room. If you
18 could announce yourself and your affiliation,
19 please?

20 MR. MOIDEL: Yeah, Brian Moidel with
21 Dominion East Ohio Gas. One consideration that
22 you might want to think about is the outdoor

1 weatherability of plastic pipe. And that's in
2 the ASTM D2513-09a. It's three years for medium
3 density and ten years for high density. So that
4 should be considered in the permanency.

5 I understand when you install it you
6 have the ten years. So, it almost goes along
7 with the installation date. But that's something
8 that we need to keep in mind, that it's got to
9 last, you know, at least for those timeframes.
10 Because we can have it sitting outside and
11 weathering for that period of time.

12 CHAIR GANT: Thank you. Any other
13 comments?

14 MR. ERICKSON: John Erickson with
15 American Public Gas Association. I guess we
16 didn't talk about the first one up there. And
17 one of our comments was that the PHMSA proposal
18 deviated from what was barcoded in the ASTM
19 standard. And I think we'd like to see the final
20 rule limited to just those six fields that can be
21 scanned in in the barcode.

22 MR. KIEBA: Yeah, I can tell you part

1 of that one. For instance, we have temperature,
2 things like that. So, part of that was, you do
3 have your CEE code on a print line. But I
4 acknowledge, yes, it's not in the tracking and
5 traceability standard itself. I think to get
6 there you have to get to the lot code number. So
7 our thought was, inherently it's in there
8 somewhere.

9 But, again, we acknowledge that it's
10 not specifically one of the component IDs. So, I
11 think at some point we might have some language
12 up here that tried to get them more consistent.

13 MR. MAYBERRY: Okay. I would just ask
14 staff or Max, related to Brian's comment on the
15 standard.

16 MR. KIEBA: Well, UV in general, I
17 would say the desire of most inspectors is that
18 you're not having it sit out in the sun.

19 Hopefully you're covering it some kind, either
20 inside or a tarp.

21 Now, granted, I know there's some
22 painful inspectors out there that will ask you,

1 how can you guarantee, even if you tarp it? But
2 I agree, either way, the UV aspect of it. And I
3 think some manufacturers do look at that, even
4 the ink itself, how long it's going to last for
5 storage stability.

6 I would say another thing that ASTM is
7 talking about is this whole three, ten years.
8 You can technically go more. But there have been
9 discussions amongst the committee, is there a way
10 that you can put the actual UV exposure numbers
11 somehow in that print line, or somewhere else in
12 your certificate of conformance, of what it
13 really is, even if it, can be technically more
14 than three to ten years?

15 So, but no question. I think, either
16 way, whatever the answer is, I think you would --
17 I think both inspectors would be asking, how can
18 you prove it will at least last until the time of
19 installation? Even your worst case scenario, if
20 it's out there baking in the sun. And you've got
21 to assume worst case scenarios in areas of
22 Arizona versus other parts of the country.

1 Because the UV limits, I think most of
2 us know, and there's even a note in the standard.
3 It is based on artificial weathering, based on
4 some lab testing. But I think it even has a
5 caution in there to be aware of where you are in
6 the country and different parts might have more
7 UV exposure.

8 CHAIR GANT: So, on this question of
9 weathering, and the fading of the label, I'll ask
10 folks around the table if you have any
11 observations or concerns on this.

12 It strikes me that if you're
13 requirement is to have the label, the information
14 visible at the time of installation, then it
15 would be a contractual matter with you and your
16 supplier to ensure that the labeling would
17 survive whatever storage you were going to be
18 putting it in. Is there a different wrinkle on
19 that, Cheryl?

20 MEMBER CAMPBELL: Cheryl Campbell,
21 Xcel Energy. Yes. The short answer is, yes.
22 But, I mean, ultimately, it's my responsibility,

1 right, to install a pipe appropriately.

2 MEMBER FLECK: That's right.

3 MEMBER CAMPBELL: Sue said it earlier,
4 right? It's not the manufacturer. I get it.
5 So, I mean, if I send a crew out to install pipe,
6 and they grab a coil of pipe and they can't read
7 the markings, guess what, we shouldn't be
8 installing it.

9 So, we get that. And, you know,
10 that's between me and the manufacturer. Do I
11 send it back for re-grind? You know, what do I
12 do? But, yeah, that's between me and them.

13 CHAIR GANT: Last call for questions
14 from the public.

15 MS. FARAG: Alicia Farag, LocusView
16 Solutions. We're a technology provider. And we
17 developed some technology specifically for
18 capturing tracking and traceability information.
19 And we've been working with operators for several
20 years to do pilot projects and phased
21 implementations of this technology.

22 And I would just like to re-emphasize

1 the point of the level of complexity involved in
2 implementing this type of system, from the work
3 practices in the field to the integration in the
4 back office.

5 To do it right, it really is a multi-
6 year process. And especially for some of the
7 larger operators, there's a lot of implications
8 on back end systems.

9 And just capturing it on paper, I
10 mean, yeah, sure you could do that. But if you
11 really want to do it right, and put it in a
12 system of record that allows it to be easily
13 accessible when you do need to retrieve it, there
14 is a lot of moving parts involved in that. And
15 again, it is really a multi-year process to get
16 that type of thing done.

17 CHAIR GANT: Okay. I think we're
18 ready to move to a roll call and vote.

19 MR. GALE: Yeah, just real quick,
20 Paula, what we're going to do is put a slide on
21 the screen that can help the members get to a
22 motion, and possibly a vote, if they so please.

1 MR. KIEBA: And I think what I heard
2 is, even if -- so, extend it to five years. But
3 I think that second bullet is still take out that
4 "permanent." But I think what I heard was
5 readable, is readable. At installation, or until
6 installation. Is that what I heard? You got
7 that, Cam? Okay. Yeah, legible.

8 I did hear a comment asking at some
9 point -- well, I don't know if we need to see it
10 now, but in the final rule, the whole lining up
11 the definition of tracking and traceability in
12 the rule versus the standard. But I think we
13 have that somewhere else.

14 CHAIR GANT: So, these are the two
15 changes that we've discussed. And the other
16 recommendation to look at extending this to steel
17 pipe will be captured on the record separately.

18 MR. KIEBA: I would ask, this
19 compliance, is that still just the recordkeeping
20 compliance?

21 CHAIR GANT: Yes.

22 MR. KIEBA: Okay. So everyone's still

1 okay with the marking for one year -- Okay. So
2 this is recordkeeping compliance is extended.
3 Okay. Just to make sure we're clear on what
4 we're --

5 CHAIR GANT: Okay. So, I'd ask if
6 there are committee members who would like to put
7 forth -- Rich.

8 MEMBER WORSINGER: Rich Worsinger,
9 City of Rocky Mount. I would also add that we
10 limit the items to the six that are listed in the
11 ASTM: the manufacturer production date, lot
12 information, size, material, and type.

13 MR. KIEBA: Can you get to that one,
14 Cam? One second. We're just trying to find out
15 if somewhere in these slides we might have that
16 wording. I would say the definition in 192.3 is
17 limited to the categories in 2897. Yes.

18 CHAIR GANT: So, the categories on
19 slide 7. Does that capture it, Rich?

20 MEMBER WORSINGER: I think it does.

21 MR. KIEBA: I think we need the
22 traceability definition. Because there's two

1 different definitions. One is the tracking
2 definition, one is the traceability. But I think
3 we're talking the traceability, yes.

4 Because I hope everyone's clear, for
5 the tracking definition we did add the person
6 that made the joint, which isn't anywhere. But I
7 got the sense everyone kind of agreed with that
8 one anyway. But we didn't get many comments on
9 that part. But the traceability definition is
10 the one that talks about 2897.

11 CHAIR GANT: On slide 7, it doesn't
12 make that distinction. But you're saying it does
13 make it in the rule?

14 MR. KIEBA: Yes, yes.

15 CHAIR GANT: I just want to make sure
16 this addresses Rich's concern.

17 MR. KIEBA: Cam, can we go back two
18 slides? One of our slides had a hyperlink at the
19 top there. I think that would help. The second
20 bullet. Can we click on that? There you go.

21 So, on the left is I think what was
22 proposed. Yeah, so that one on the left is what

1 was proposed in the NPRM. You'll see it has
2 pressure rating, temperature rating. On the
3 right is a little more aligned to I believe
4 what's in the standard, particularly in the red
5 area.

6 And if anyone needs it, I actually
7 have the standard itself. So if anyone, you
8 know, wants to look at it.

9 MEMBER WORSINGER: I think that looks
10 correct.

11 CHAIR GANT: Okay. So can we go back
12 to the potential motion, the language for the
13 motion?

14 MEMBER HILL: Madam Chair, I'm ready
15 to make the motion.

16 CHAIR GANT: Okay. Excellent. Can we
17 go back to the slide with the language for the
18 motion, please?

19 Mr. Hill, would you like to make this
20 motion?

21 MEMBER HILL: Yes. Madam Chair, the
22 Technical Pipeline Safety Standards Committee

1 finds that, related to tracking and traceability,
2 the proposed rule as published in the Federal
3 Register and the Draft Regulatory Evaluation are
4 technically feasible, reasonable, cost-effective,
5 and practicable if the following changes are
6 made.

7 Number 1, record keeping compliance is
8 extended from two to five years.

9 Number 2, the marking is legible until
10 installed.

11 Number 3, the traceability definitions
12 in 192.3 is limited to the categories in the
13 standard (F-2897), and a list of amendments
14 agreed upon by the committee.

15 CHAIR GANT: Thank you.

16 MEMBER HILL: You're welcome.

17 CHAIR GANT: Cameron, ready for the
18 vote?

19 MR. SATTERTHWAITTE: We need a second.

20 CHAIR GANT: And I would ask, is there
21 a second for this motion?

22 MEMBER FLECK: I'll second.

1 MR. SATTERTHWAITE: All right. We're
2 going to do a roll call. And we'll start right
3 off. Paula Gant.

4 CHAIR GANT: In favor.

5 MR. SATTERTHWAITE: Cheryl Campbell.

6 MEMBER CAMPBELL: Agree.

7 MR. SATTERTHWAITE: Andy Drake.

8 MEMBER DRAKE: In favor.

9 MR. SATTERTHWAITE: Sue Fleck.

10 MEMBER FLECK: I agree.

11 MR. SATTERTHWAITE: Rich Worsinger.

12 MEMBER WORSINGER: In favor.

13 MR. SATTERTHWAITE: Bob Hill.

14 MEMBER HILL: In favor.

15 MR. SATTERTHWAITE: Bob Kipp.

16 MEMBER KIPP: Agreed.

17 MR. SATTERTHWAITE: Rich Pevarski.

18 MEMBER PEVARSKI: Agreed.

19 CHAIR GANT: Well, it looks like we
20 have a tie between the in favors and the agrees.
21 I think that means the motion passes. Okay.

22 So, in other good news, as Chair I'm

1 going to exercise the prerogative to call for a
2 break. So we're going to take a ten-minute
3 break.

4 MR. MAYBERRY: Sounds good.

5 CHAIR GANT: Excellent. Thank you.
6 We'll reconvene in ten minutes, at 2:30. Thank
7 you all.

8 (Whereupon, the above-entitled matter
9 went off the record at 2:18 p.m. and resumed at
10 2:31 p.m.)

11 CHAIR GANT: We have the second act of
12 plastic pipe up on our agenda for the afternoon.
13 So I'll turn it back over to Max to keep walking
14 us through the details.

15 MR. KIEBA: Yeah, and our current
16 pace, we're only here for another six hours. But
17 no, I think the next few will be, I hope, a
18 little easier. So the next is this is where we
19 kind of lumped in the different categories on
20 design factor, bringing in PE to the .4 design
21 factor extending PA-11 and then bringing in PA-
22 12.

1 And again, I just put on the equation
2 here, because a lot of people kind of forget how
3 plastic pipe is designed, or maybe have
4 steelheads out there that are used to steel. But
5 here's what you do for plastic. Still Barlow's
6 formula.

7 I would say the big thing is that S
8 value where steel is certainly used to an X52 or
9 something. For plastic, it goes to an HDB,
10 hydrostatic design basis reading based on PPI
11 listing.

12 Where this is important is we have one
13 comment you'll see later. But, so, you can
14 interpolate it based on 73, 100, or 120, or 140,
15 sorry. We did a couple comments on bumping that
16 up to 180, because there are some plastics, some
17 people traditionally are used to plastic can only
18 go to 140, but there are some newer materials
19 today that can go up to 180.

20 And then at the bottom you have the
21 design factor there. Traditionally it's been
22 0.31. PA-11 in a code now can go to 0.4 on 200.

1 But as part of these proposals --
2 yeah, so I'll start with PE here. The design
3 factor for PE, that's the AGA petition based on
4 some technical work by GTI to raise the maximum
5 design factor for new and replaced PE from .32 to
6 .40.

7 The pressure limitation would still
8 remain at 125 in their section E. So it would
9 still have an ultimate cap at 125. In a
10 proposal, the diameter limitation remains at 12-
11 inch if you want to go to 125, but you'll see
12 later we did get some comments to raise it to at
13 least 24-inch.

14 And we do still retain the .32 if for
15 whatever reason, you know, some operators just
16 don't want to go to .40 or they want to still
17 stick with the .32, there is still a section in
18 the proposal which you still do for the .32.
19 Essentially, just retaining that for the pipe up
20 to the effective date of the rule.

21 For PA-11, so, we proposed to raise
22 the pressure from 200 to 250, and raise the

1 diameter limitation, what's currently four-inch,
2 up to six inches.

3 For PA-12, essentially bringing into
4 the code hasn't been up to now, but it will
5 follow essentially the same limits as PA-11: .4,
6 maximum pressure of 250 psi, and maximum diameter
7 of six-inch.

8 So comments we got in, overall there
9 was broad support for all material revisions. We
10 did get a number of comments, and honestly this
11 was just an oversight. But we need to add sizes
12 for one-inch CTS.

13 For those that aren't familiar with
14 plastic, IPS is iron pipe size. CTS is copper
15 tubing size. Right around one-inch is where they
16 kind of crossover. So there were a number of
17 comments to add that. And also IPS smaller than
18 one inch, particularly for PA-11, PA-12. So
19 that's one we agreed to, certainly.

20 For PE, we got comments to raise the
21 maximum diameter. This is kind of a nuance of
22 the standards themselves. So there's a table in

1 the standard, particularly in the '12 version,
2 that still says what's commercially available.

3 Up to now, it's only been 12-inch.

4 But in the '14 version, which is a later version
5 than what's proposed, it does go up to 24-inch.

6 And I acknowledge out there, there's a number of
7 folks particularly trying to rehab a lot of your
8 larger diameter cast iron and others, they are
9 trying to install some larger diameters above 12
10 inch.

11 There was a request that the new
12 design factor apply retroactively. There was one
13 entity, it was a non-PE entity, that opposed what
14 they called a less conservative design factor in
15 2513. We did get some comments to relax the 125
16 psi limitation.

17 So, from a design standpoint, it is
18 based on essentially your standard dimension
19 ratio. It is a pretty conservative value still
20 if you consider, for instance, most common pipes
21 are 11 standard dimension ratio.

22 If you go down to a lower value, which

1 is thicker wall pipe, you can design it up to
2 150, possibly close to 200 even for PE. But
3 having said that, the reason that was put in
4 place in the code was to provide a more
5 conservative value.

6 I think we're losing mic again. How
7 are we doing? Okay? I guess I would ask can the
8 court reporter hear me okay or do we need the mic
9 to be working? Okay. So I'll just talk louder.

10 So, for PA-11, allow the design based
11 on an HDB at 180F instead of up to 140, and then
12 also permit the use of this particular
13 designation code. So, for those that are used to
14 PE, you might get a PE2406, et cetera. They're
15 based on resin.

16 On the polyamide side, you'll see a
17 designation code that looks like this. So there
18 was a request, comment, to allow that for 250
19 psi. I would say for that one there's an issue
20 there because that 32312, once you correlate it
21 down, that correlates 2 at 200. You can only go
22 to the 316 for the 250.

1 So we're still allowing both versions
2 for 200, but 250, from a design standpoint, you
3 can only go to the 316. And I think most of the
4 PA-11 manufacturers would probably say they're
5 not even manufacturing that 312 anymore. They're
6 going with the newer version.

7 For PA-12, we got comments, some
8 editorial revisions, particularly around that
9 table. And then yes, they gave us a comment just
10 to specify the material designation code there.

11 So just some possible recommendation
12 and changes is revise the tables for clarity and
13 to add one-inch CTS and IPS below one-inch. And
14 also include the material designation codes.

15 So I think the big one here, to me,
16 and I'd like some input from the Committee, is
17 particularly that first one, I guess, is around
18 the 24-inch. I acknowledge it's commercially
19 available in the code. It's just kind of a
20 nuance that the standard, at least currently,
21 doesn't cover it.

22 There is kind of an annex that talks

1 about larger. So if we go to the '12 version, we
2 are pretty close to the '14. So you know,
3 there's a possibility having said that, the way
4 the rule went out it did not promote or it did
5 not propose the 24-inch limitation.

6 So I guess it's a question from a
7 process standpoint if we can just randomly go up
8 to 24-inch if that wasn't what was proposed.

9 I think at some point we are going to
10 have to talk about that 125 that's kind of coming
11 up with some gathering operations that right now
12 are operating above 125 and still PE. They are
13 limited to that.

14 PE-11 you could still go up to 200,
15 right now, 250. So I think at some point we have
16 to look at that 125. But, again, since it's
17 what's proposed in the rule itself, in the NPRM,
18 I don't think we can go there for at least the
19 final rule, other than maybe an acknowledgment
20 that we'll look at it in the future.

21 CHAIR GANT: Comments or questions
22 from Committee members? Cheryl and then Andy.

1 MEMBER CAMPBELL: Cheryl Campbell,
2 Xcel Energy. Question. I understand what you're
3 saying about process, I think, Max. I'll just
4 characterize it with that. But I mean, I'm
5 presuming that the pipe meets all the other
6 criteria. So I'm having a hard time thinking why
7 would we exclude it.

8 Is there a way to -- and we're back to
9 the comment you made earlier about how do you
10 incorporate sort of routine standard updates,
11 right, without having to go through a rulemaking
12 process when these things come out? Because, you
13 know, it seems like if it's there and it meets
14 the criteria and it's safe, how do we get that
15 kind of stuff incorporated easily?

16 MR. KIEBA: Yeah, this is where I
17 would ask John and his group, because what was
18 proposed, as part of this we did merge the 121
19 and 123 together. So, design and limitation is
20 there.

21 But for PE, we have for PE produced
22 after the effective date of .40 may be used. If

1 the design pressure's limited to 125, the
2 material designation code is a 2708 or 4710. And
3 yes, we still have a three that the pipe has a
4 nominal size of 12 inches or less.

5 So I guess I'd ask John that question
6 of, if we really want to go to 24-inch, how do we
7 get that resolved?

8 MR. MAYBERRY: John, also want to
9 clarify that it wasn't in the proposed rule. So,
10 you know, a lot of times when we change something
11 to that extent, it may require another notice and
12 comment before that.

13 MR. GALE: We haven't proposed that.
14 We would have to definitely look at the
15 possibility that it would have to go through
16 notice and comment again. But I mean, we should
17 try to write the regulations, if there are ways -
18 - we're always looking at ways to not always
19 require regulatory changes, to be as flexible as
20 possible when it's appropriate. But if it's
21 something we haven't addressed, we probably have
22 to go through a reg change.

1 CHAIR GANT: Andy?

2 MEMBER DRAKE: Andy Drake with Spectra
3 Energy. Max, I have a question. It's in regards
4 to the same question that Cheryl had, and that
5 is, when you look at 2513-14, does it
6 specifically support pipe beyond 14 inches?

7 MR. KIEBA: Yes.

8 MEMBER DRAKE: So inside the scope of
9 that standard goes beyond?

10 MR. KIEBA: Yes. Yeah, what 2513 has
11 is a number of tables that say here's what's
12 commercially available, here's the different
13 minimum wall thickness you have, et cetera. Even
14 at the 12 version, they did not have a full on
15 minimum wall thickness table for 12-inch, or
16 sorry, above 12-inch. In the 14 version, they
17 have incorporated that.

18 MEMBER DRAKE: Okay. So I just guess
19 I got confused for a second. It sounded like you
20 felt this -- you were differentiating above 14-
21 inch was not well covered in the standard. Is
22 that --

1 MR. KIEBA: It's covered in the
2 standard. Here's a nuance where this is one of
3 our parts of our code where we, for some reason,
4 for plastic, we do have clear limits on the table
5 of 12-inch and here's your minimum wall
6 thickness, particularly if you want to go to the
7 .40 versus saying, you know, just go to the
8 standard for your minimum wall thickness for
9 larger sizes.

10 It's just kind of the way the code has
11 been written. But, again, from a technical
12 standpoint, I acknowledge the current standards
13 have a higher version -- or sorry, a larger
14 limit.

15 The problem is what we proposed was
16 the 12 version that doesn't have that. So now
17 there's a suggestion to go to a newer version.
18 And I think that's more of a nuance across the
19 board.

20 I would say we got a number of
21 comments that say, hey, you should go to the 14
22 version of this and other later versions of this,

1 and I think that's a nuance that we would just,
2 we would have to do that in a standard update
3 rule later. We just can't do it in the context
4 of this rule.

5 MEMBER DRAKE: Okay, so some sort of
6 Robert's Rules of Order. What your proposal was
7 based on was 12?

8 MR. KIEBA: Right.

9 MEMBER DRAKE: And now a new standard
10 has come out that recognizes beyond 14 and up to
11 24-inch. But the original proposal did not use
12 that version.

13 MR. KIEBA: Right.

14 MEMBER DRAKE: Okay. Well,
15 incorporating later versions is really not about
16 a significant event. I mean, that doesn't even
17 require rulemaking actually. That's an
18 incorporation of a new standard.

19 MR. KIEBA: And it could be possible.
20 I don't know, I'd have to talk to leadership.
21 But, you know, is this a case where we can do a
22 save enforcement or something for the time being.

1 I don't know.

2 You know, I know we've done that with,
3 like, the 5L when it went to different versions
4 and some manufacturers were manufacturing to the
5 new version that wasn't in the code. But again,
6 I would defer to our leadership in rulemaking on
7 those process aspects.

8 Officially, now what you would have to
9 do, you'd have to apply for a state waiver or a
10 special permit, which is always painful for
11 anyone. I would hope not to have to go that
12 route, but I don't know.

13 I would say, again, from just the
14 technical perspective, again, yes, there's
15 commercially available, much larger, heck
16 ,there's people manufacturing pipe that's, you
17 know, five foot in diameter, five foot wall
18 thickness. So much larger even than we're used
19 to.

20 MR. MAYBERRY: Yeah, also just a
21 comment. In conversing with John, we would have
22 to go through another standards update

1 rulemaking, it looks like. Even though it's an
2 updated version, we're dealing with a -- you
3 know, the version we have is what we noticed.
4 But it would be a standards update rule, which
5 would be, they do go quicker.

6 This is what we have today, but, you
7 know, perhaps the Committee could potentially
8 recommend that we move forward to consider an
9 update to the standard.

10 MEMBER WORSINGER: That adds something
11 else to John's to-do list.

12 CHAIR GANT: Apparently that's our
13 task here today. So the concept is that in
14 considering this aspect of the rule, the
15 Committee would request that a standards update
16 rulemaking occur referencing 2513-14, correct?

17 MEMBER DRAKE: I think what the
18 proposal is that we are voting on the proposal
19 that you put before us, which is 14. Which is
20 really 12, right? And then we would have to
21 approve that and then make a recommendation that
22 you consider 14 as a separate action. Is that

1 right?

2 MR. MAYBERRY: It would be a separate
3 comment, a request, a homework assignment by Rich
4 to John to follow up from that. But yes, we need
5 to vote with what we have here today. It's the
6 earlier version.

7 MEMBER CAMPBELL: Then I make a motion
8 to vote.

9 CHAIR GANT: Hold on just a second.
10 Just want to make sure there aren't any other
11 issues that the Committee wants to raise. And I
12 want to open it quickly for public comment.
13 Okay. Comment, Sue?

14 MEMBER FLECK: Quick clarification.
15 On the first point, we did fix that, the smaller
16 diameter?

17 MR. KIEBA: Yes, yes. We are fixing
18 that.

19 MEMBER FLECK: Great, thank you. That
20 was Sue Fleck, National Grid.

21 MR. KIEBA: And the one-inch CTS,
22 we're putting that in the table, as well. Yes.

1 CHAIR GANT: Comments from members of
2 the public? Please announce yourself.

3 MS. KURILLA: Sure. Hi, Erin Kurilla,
4 AGA. Just looking at the proposed rule, it seems
5 like you did not specifically incorporate the
6 standard by reference, but instead pulled the
7 table out of the 12 standard and copy and pasted
8 it in.

9 So I don't think it's just as simple
10 as updating the incorporation by reference. So
11 that's a nuance that I don't think would just get
12 addressed by a standards update rulemaking.

13 And then the other issue that wasn't
14 addressed is your -- it's the bullet on
15 retroactivity. So, as written in the proposed
16 rule, only PE pipe manufactured after the
17 effective date of the rule would be allowed for
18 the new design standard.

19 But AGA's comments suggested that
20 really any pipe that meets that standard,
21 regardless of the date of manufacture, should be
22 allowed.

1 MR. KNAPP: Yes, hi. Randy Knapp with
2 the Plastics Pipe Institute. And I just wanted
3 to make a comment on the D2513-12 version. Max
4 is correct, it does not include minimum wall
5 thickness in the tables. But it is intended to
6 apply through all sizes of that standard, which
7 is up through 24-inch. So all the requirements,
8 including the marking requirements, do apply up
9 through 24-inch.

10 That table was, I guess, inadvertently
11 left out in that version where the minimum wall
12 thickness. But everything else in there is
13 exactly the same. So even adopting it, and if
14 going up to 24-inch, those requirements would
15 still be in place.

16 But again, that minimum wall
17 thickness. So I think it can cover it. Of
18 course, the preference would be to have a later
19 version, but I think that could work too.

20 MR. KIEBA: Yeah, just a couple of
21 points. Erin is correct. Instead of just
22 IBRing, what you would have to do is also look at

1 the updates to this portion. But I think that
2 can be done, yeah.

3 The retroactivity part, that's a
4 little tough because this is officially in a non-
5 retroactive sub-part design. So just written in
6 this part of the code, it wouldn't apply
7 retroactively. I guess we'd have to look at how
8 we would apply that if all other things
9 considered.

10 Really, the pipe doesn't care, right,
11 from a design standpoint, when our rules become
12 effective. But we do from politics' side. So,
13 look at that for another example of a potential
14 permit site waiver, but I don't know.

15 CHAIR GANT: Okay, Cheryl?

16 MEMBER CAMPBELL: That's exactly what
17 I was going to say, Max, is the pipe doesn't
18 care, right? I mean, as long as the pipe meets
19 those standards, if there's a way to do that to
20 allow it to be -- but I hear you, you don't
21 necessarily want to put something retroactive in
22 the design section of the code.

1 So if there's a way to do that, then
2 that makes perfectly logical sense to me.

3 MR. KIEBA: We kind of did this with
4 rework when rework came out. And we had an FAQ
5 out there that said if you can justify,
6 demonstrate you're still meeting the 09a, even if
7 it was used before the effective date. So we've
8 looked at that in other areas. I think this is
9 where we would have to go back certainly to the
10 agency and certainly legal and others to see what
11 we can and can't do, given it's in a non-
12 retroactive sub-part.

13 MR. GALE: John Gale from PHMSA again.
14 And also we'd have to look at the fact that we
15 didn't propose it. I mean, we're not saying we
16 can't do it, but it would be a difficult thing to
17 actually adopt the final rule stage without
18 providing public full opportunity to comment.

19 CHAIR GANT: So maybe it could be
20 recorded as a request from the Committee that
21 staff explore as options?

22 MR. GALE: That we explore, yes.

1 CHAIR GANT: Okay. Cameron, can you
2 put the text up on the -- the vote text up on the
3 screen, please? And once we have a chance to
4 look at it, I would ask for a motion from the
5 floor.

6 MR. SATTERTHWAITE: Am I missing
7 anything? Or just add in the --

8 MR. KIEBA: It's the slide before that
9 talks --

10 CHAIR GANT: The PHMSA recommendations
11 you're referring to regard the one-inch CTS.

12 MR. SATTERTHWAITE: Got that.

13 MR. KIEBA: The one-inch CTS, being
14 clear on the materials designation, particularly
15 for PA-12.

16 MR. SATTERTHWAITE: Anything else?

17 CHAIR GANT: Does the Committee want
18 to reflect the request that the staff look at the
19 updated standard and explore options there? I
20 think it's important that that's recorded in the
21 vote.

22 MR. MAYBERRY: And the retroactivity

1 issue.

2 MR. SATTERTHWAITE: What was that, 14?

3 CHAIR GANT: Yes. It's harder to type
4 when everyone's watching.

5 (Laughter.)

6 MR. KIEBA: Research the retroactivity
7 of .40 design factor for PE. You just might want
8 to add .40 design factor.

9 CHAIR GANT: Thanks, Cameron. I would
10 note that the text on the slide is an abbreviated
11 version of a more complete text that will be
12 reflected in the record as provided by the court
13 reporter reflecting the conversation here and
14 recommendations of the Committee and comments
15 raised by the public.

16 Given that, I'd ask for a motion, for
17 someone to offer a motion.

18 MEMBER FLECK: Sue Fleck with National
19 Grid.

20 The Technical Pipeline Safety
21 Standards Committee finds that PE-/PA-11 and PA-
22 12, the proposed rule as published in the Federal

1 Register and the Draft Regulatory Evaluation are
2 technically feasible, reasonable, cost-effective,
3 and practicable if the following changes are
4 made.

5 PHMSA recommendations are
6 incorporated.

7 PHMSA consider the later standard
8 ASTM-D2513-14, and PHMSA research the
9 retroactivity of the design factor for PE with a
10 .40 design factor.

11 MR. SATTERTHWAITE: Okay. I'm just
12 going to run through the names. If you agree,
13 you can say aye. If you don't, you can say nay.
14 And if you want to abstain, you can say abstain.

15 All right, Paula Gant?

16 CHAIR GANT: Aye.

17 MR. SATTERTHWAITE: Cheryl Campbell?

18 MEMBER CAMPBELL: Aye.

19 MR. SATTERTHWAITE: Andy Drake?

20 MEMBER DRAKE: Aye.

21 MR. SATTERTHWAITE: Sue Fleck?

22 MEMBER FLECK: Aye.

1 MR. SATTERTHWAITE: Rich Worsinger?

2 MEMBER WORSINGER: Aye.

3 MR. SATTERTHWAITE: Chad Zamarin? Oh,
4 he's not here. Bob Hill?

5 MEMBER HILL: Aye.

6 MR. SATTERTHWAITE: Bob Kipp?

7 MEMBER KIPP: Aye.

8 MR. SATTERTHWAITE: Richard Pevarski?

9 MEMBER PEVARSKI: Aye.

10 MR. SATTERTHWAITE: All right, then
11 it's unanimous. Okay.

12 MR. KIEBA: Moving on. We're doing
13 better on time. I've got to say, though, this is
14 great for me because, heck, rework was fun,
15 talking that for a long time. But this is the
16 longest we've ever talked about plastic, so this
17 is great.

18 All right. Okay, risers. So, up
19 until now, we do not have a section on risers.
20 GPTC did petition us to permit, and there's
21 another nuance of the code where we don't allow
22 for plastic pipe to be installed above ground.

1 So GPTC did petition us to permit aboveground,
2 encased plastic pipe for particularly metering
3 and regulator stations.

4 So in the proposal, we propose to
5 require, we added a section 204 for requirements
6 for design and construction of plastic risers.
7 We're proposing to incorporate this ASTM F1973
8 for factory assembled anode-less risers. And
9 this applies to all material types.

10 Overall comments we got were broad
11 support of at least having a section on risers.
12 We did have specific issues and concerns,
13 particularly we had this prescriptive three-inch
14 base leg language. There was a request to define
15 what we meant by rigid and permit flex risers in
16 certain applications.

17 There was a number of commenters that
18 pointed out we did not incorporate a standard for
19 field-assembled risers. So the whole nuance of
20 would they be allowed or not, or do they have to
21 meet an elicited specification where every other
22 parts that say it has to meet it?

1 There was also request to clarify that
2 risers besides anode-less are allowed.

3 So the possible changes, from the
4 staff's perspective, certainly eliminate that
5 three-inch base leg requirement.

6 We would still have the rigid in
7 there. Generally speaking, from the technical
8 staff's opinion, it is important to have
9 something rigid, particularly at these metering
10 and regulator settings, particularly when you're
11 out in the field where, for those that know, when
12 you're near a house, typically you'll have a
13 bracket or something that supports it.

14 When you're out in the field, there's
15 not a whole lot you can do. Some people you ask
16 to put a stake in the ground and support it that
17 way. I guess it's a big question if that's
18 acceptable enough with all the soil subsidence
19 you might have and other changes.

20 So the general feeling of the staff
21 was to keep the rigid part of it but still have
22 some performance language that it should be

1 adequate to provide support. I guess it's
2 possible you could have a flex riser if it's
3 properly supported. But based on how the
4 language is written, you would have to still
5 justify how it's rigid supported.

6 We also suggested to, yes, specify
7 that only factory-assembled risers meet that
8 specification. So, field-assembled, basically
9 they have to meet the more general requirements
10 of the language.

11 And, Cam, if you can go to that link,
12 I think we have some alternative language. So
13 how it would apply, (a) applies to all, shall be
14 tested to ensure safe performance, other
15 anticipated external/internal loads.

16 (B), we are adding in clarification
17 that factory assembled anode-less risers shall be
18 designed and tested in accordance with F1973.

19 And we are modifying or proposing to
20 modify (c) to say all risers used to connect
21 regulator stations to plastic mains must be rigid
22 and designed to provide adequate support and

1 resist lateral movement.

2 And we still have that sentence,
3 "anode-less risers used in accordance with this
4 paragraph must have a rigid riser casing." So
5 the way that's written, again, at least (b), says
6 yes, if you have a factory assembled riser, you
7 have to meet 1973.

8 It's kind of silent on what you do
9 with field assembled, but the intent is, hey, if
10 you can justify it as safe, can handle those
11 anticipated external loads, it may be acceptable.
12 So that was the intent of how these changes were,
13 but certainly open it to thoughts from others.

14 CHAIR GANT: Comments from Committee
15 members? Sue?

16 MEMBER FLECK: Sue Fleck, National
17 Grid. I think I only had one question other than
18 the ones that you covered, and thank you for
19 covering the issues that we had some concerns
20 about.

21 There's a concern that this might be
22 considered retroactive. Is it intended to be

1 retroactive or is it intended for risers
2 installed after the date that the code goes in
3 effect?

4 MR. KIEBA: Yes, it is intended.
5 Everything in this rule is intended to apply for
6 new and replace going forward. So there might be
7 some other parts that might be in a retroactive
8 subpart, but we'll make sure we try to clarify
9 the language to say "for anything installed after
10 X" would meet this. So, yeah.

11 CHAIR GANT: Any other comments by
12 Committee members? Okay. I would ask to turn to
13 the public, ask for any questions from the
14 public, or comments? Okay.

15 Could we move to the text for a motion
16 please, Cameron?

17 I've heard from Committee members that
18 you would like to have clarification that this is
19 intended to apply on X date forward, that it's
20 not retroactive.

21 Also, do you want to reflect the
22 issues that PHMSA staff have acknowledged have

1 been raised in comments and they seek to address,
2 or they intend to address? Anything else that
3 should be added?

4 Okay, then, considering that the
5 motion will reflect the language, the
6 recommendations discussed here by PHMSA staff on
7 the intended changes, and noted here on the
8 slide, could I ask for a motion from a Committee
9 member? Cheryl?

10 MEMBER CAMPBELL: Cheryl Campbell,
11 Xcel Energy.

12 The Technical Pipeline Safety
13 Standards Committee finds that related to risers
14 the proposed rule as published in the Federal
15 Register and the Draft Regulatory Evaluation are
16 technically feasible, reasonable, cost-effective,
17 and practicable if the following changes are
18 made.

19 PHMSA clarifies that these provisions
20 are not retroactive, and incorporate PHMSA
21 recommendations.

22 CHAIR GANT: Thank you, Cheryl. Is

1 there a second?

2 MEMBER PEVARSKI: Second.

3 CHAIR GANT: Thank you, Rich.

4 Cameron, over to you for the vote.

5 MR. SATTERTHWAITE: All right. I'm
6 going to do the roll call. Remember, aye, nay,
7 abstain. Paula Gant?

8 CHAIR GANT: Aye.

9 MR. SATTERTHWAITE: Cheryl Campbell?

10 MEMBER CAMPBELL: Aye.

11 MR. SATTERTHWAITE: Andy Drake?

12 MEMBER DRAKE: Aye.

13 MR. SATTERTHWAITE: Sue Fleck?

14 MEMBER FLECK: Aye.

15 MR. SATTERTHWAITE: Rich Worsinger?

16 MEMBER WORSINGER: Aye.

17 MR. SATTERTHWAITE: Bob Hill?

18 MEMBER HILL: Aye.

19 MR. SATTERTHWAITE: Bob Kipp?

20 MEMBER KIPP: Aye.

21 MR. SATTERTHWAITE: Richard Pevarski?

22 MEMBER PEVARSKI: Aye.

1 MR. SATTERTHWAITTE: It is unanimous.

2 CHAIR GANT: Okay, great. Moving
3 right along to fittings, back to Max.

4 MR. KIEBA: Okay, fittings. So the
5 primary part of issues we've seen through
6 advisory bulletins, a number of other issues
7 where the fittings or joints have pulled out,
8 particularly soil subsidence or other issues.

9 So the proposal was all mechanical
10 fittings must be Category 1. So for those that
11 aren't familiar with the standard, that's the
12 most stringent category that provides seal plus
13 resistance. There is another category that
14 provides seal only. And there's a third category
15 that also provides seal and resistance, but based
16 on thermal changes of essentially the soil. So
17 this Category 1 would be the most stringent
18 category.

19 Overall for comments, we did get broad
20 support. There were also some concerns with
21 retroactivity. And on the fittings part in here
22 was we talked about if there's a metallic

1 fitting, it has to be cathodically protected and
2 monitored.

3 So I think we already talked about the
4 retroactivity part. There's no part of this rule
5 that's intended to be retroactive. So we will
6 clarify that.

7 For cathodic protection, we got a
8 number of comments here of either they felt
9 monitoring was too intensive based on what 455
10 requires. So there were comments to require
11 monitoring every ten years rather than ten
12 percent of the system each year. Do not require
13 it for monitoring of isolated metal fittings.

14 And there were cost concerns if you
15 applied it to every -- and you can just imagine
16 how many of these metallic fittings might be out
17 there. Do you really have to cathodically
18 protect and monitor every single one like you do,
19 you know, a full-on steel system?

20 We did get some opposition on -- some
21 suggested that we requested that these
22 requirements only apply to distribution systems.

1 We did get some requests to -- some comments that
2 requested revising to allow Category 2 or 3 on
3 larger diameter lines, particularly in cases
4 where there might not be a Category 1 joint
5 available.

6 Possible changes, from the staff's
7 perspective, there's a couple avenues we can go,
8 or based on comments received. Some removed the
9 proposed 192.455(g) completely, or at least from
10 the aspect of what's required for plastic.

11 There is a note here that current
12 regulations do require cathodic protection and
13 monitoring for isolated fittings that don't meet
14 the conditions in 455(f).

15 Cameron, is this a link to some
16 alternate language? Okay. Can you go there?

17 So a couple comments we got in, if you
18 look at (g), it's either remove that completely.
19 A couple other comments we got just say "must be
20 cathodically protected" and remove the monitoring
21 piece.

22 So what you typically do on a fitting

1 aspect, you probably put an anode in there based
2 on however long that anode would last. So you
3 know, typically they might be 20, 30 years. So
4 you know at some point you have to change the
5 anode, but you don't have to do the full on
6 monitoring aspect.

7 I don't know if we open that for
8 Committee comments at this point for corrosion.
9 I would say on the whole comment on Category 1,
10 if it's not commercially available, from a
11 technical staff standpoint, there are other
12 methods out there that you can form a joint.

13 So I don't think just because
14 something's not commercially available that means
15 you have a less safe category, in our opinion.
16 You should be able to go with some other avenue,
17 whether it's fusing or something else.

18 There's multiple options out there
19 that you could still have a strong joint even if
20 it's not a Category 1. So I think there are
21 strong feelings on the staff standpoint that it
22 should be Category 1 still across the board.

1 And if there's not something
2 commercially available, maybe the vendors need to
3 come up with something that is, but we still feel
4 strongly, there's been too many issues with
5 fittings pulling out for whatever reason that we,
6 don't feel that should happen anymore.

7 CHAIR GANT: Comments from Committee
8 members? Rich?

9 MEMBER WORSINGER: Rich Worsinger,
10 City of Rocky Mount. We support the proposed
11 changes, with the exception for the monitoring of
12 cathodic protection. We suggest that just be
13 dropped. We just think this would be very costly
14 with minimal benefit. We're not aware that
15 there's been ever any failures of these due to
16 corrosion.

17 MR. KIEBA: So would you -- sorry.
18 Cameron, can you pull up the (g) again? So is
19 your comment to leave (g) in but delete monitored
20 in accordance with this section in 465?

21 MEMBER WORSINGER: I would say leave
22 (g) in, say that they're cathodically protected

1 but not monitored. You know, typical practice is
2 you put an anode on it and anodes last decades,
3 especially when you've got such a small piece of
4 steel in the ground.

5 MR. KIEBA: So that's one avenue. And
6 I think we also got just remove this (g)
7 completely, I think, other comments.

8 CHAIR GANT: Other comments from
9 Committee members on leaving (g) in and altering
10 it to remove "monitored"? Or removing (g)
11 altogether. Cheryl?

12 MEMBER CAMPBELL: Cheryl Campbell,
13 Xcel Energy. So I'm just going to kind of throw
14 this out there. Right, it's never good when you
15 just start talking, but I'm going to do it,
16 because Andy, Rich, I mean, some of the other
17 folks in the room, Sue and Max, your team, you
18 guys can throw rocks.

19 So when I think about integrity
20 management, right, and I think about knowing my
21 system and dealing with the risks appropriately,
22 I mean, it feels like if I have an area where the

1 soil is such that I have some corrosion issues,
2 then maybe I should be putting an anode in there
3 and potentially checking on it every once in a
4 while to make sure that I'm protected.

5 Otherwise, if I don't have a soil type
6 that's going to create an issue for me when
7 you've got an isolated metal fitting like this,
8 it feels like the requirement shouldn't be there.

9 So is there something that we could do
10 using the principals of integrity management to
11 say, hey, you should know your system and you
12 should understand what you're dealing with and
13 install and monitor as appropriate?

14 Again, I'm just kind of throwing that
15 out there.

16 MR. MAYBERRY: From my perspective,
17 it's kind of hard to imagine to allow, you know,
18 a fitting to be installed that's protected, but
19 that you're basically allowing it to go to
20 failure without understanding at what point would
21 that happen. You don't know unless you have an
22 idea of the soil resistivity and the tendency to

1 cause corrosion or induce corrosion. So I don't
2 know, just something to think about.

3 At what point would it, you know,
4 could it potentially down the road become an
5 issue? And how do you get comfort that it's been
6 installed and it will remain protected for the
7 life of it, the usable life? You know, just how
8 do you control that? Just a thought.

9 CHAIR GANT: Andy?

10 MEMBER DRAKE: Andy Drake with Spectra
11 Energy. I would have to agree with that. I
12 think it seems a little bit incredulous that we
13 would drop (g) completely and we would bury a
14 metal object in the dirt and not protect it.

15 And I don't hear anybody espousing
16 that. At least not at this table anyway. But I
17 agree that if we could define some criteria, that
18 would help us understand appropriate places where
19 we didn't have to put it in there.

20 I think at some point, if we err, err
21 on the side of inclusion. And I think at some
22 place we have to just decide, is the juice worth

1 the squeeze? You know, are we going to come up
2 with something that's a very onerous requirement,
3 that takes a lot of energy, to save putting in
4 anodes that are not significantly expensive.

5 But that's not really my call. I
6 think it's just a question as to -- it's just
7 really a question that we need to answer as we go
8 through this process, is it worthwhile to try to
9 do that and can we do it?

10 But I think that just saying "as
11 appropriate" will not be clear enough to be
12 practiced consistently. And we've seen that
13 historically. And I think, just as kind of a
14 caution, if we get into that place, we're
15 probably better to err back on over-installing
16 just for the point of consistency.

17 MR. KIEBA: I think it's fair to say,
18 I mean, again, this particular (g) applies to
19 electrodes are by design supposed to be isolated
20 from others. But I agree. Put any metal in the
21 ground, it's going to find a way to corrode. So
22 without having something, I agree we need

1 something. I just don't know if it's this
2 something.

3 MEMBER FLECK: Sue Fleck, National
4 Grid. I agree with that.

5 Is it not working? It's on. Nobody's
6 on.

7 (Technical difficulties.)

8 MEMBER FLECK: It's been a long day
9 already. I think we should say it must be
10 cathodically protected. I'm just not comfortable
11 with the monitoring part, because that's
12 additional record keeping and all that.

13 So I figured we would strike -- and I
14 think that's what Rich said -- we strike "and
15 monitor," then I'm more comfortable, because I
16 believe, most cases, 99.9 percent of the time,
17 we're cathodically protecting every piece of
18 metal that goes in the ground.

19 CHAIR GANT: Any other comments from
20 Committee members? I'll turn to the public and
21 ask for comments.

22 MS. SAMES: Christina Sames, AGA. To

1 get to Cheryl's point, maybe a suggestion to stop
2 after "cathodically protected." So remove the
3 monitoring, and possibly put something "as
4 appropriate" according to integrity management,
5 distribution integrity management principles.
6 Something along those lines I think would be a
7 way to get there. Or as appropriate.

8 CHAIR GANT: I'll ask Cameron to put
9 the draft recommendation up on the screen and ask
10 Committee members if they have any final thoughts
11 as we do that.

12 (Pause.)

13 MR. KIEBA: I think specifically the
14 recommendations still have that monitored. So
15 what I heard was stop it at "cathodically
16 protected" as the proposed language.

17 So it would essentially be what's
18 proposed for G, but stops, period. That's one
19 version, after cathodically protected. Then I
20 heard, from the public, do we need "as
21 appropriate" or not?

22 CHAIR GANT: Can you write it up there

1 Cameron? And then we'll ask the Committee to
2 take a look at it.

3 (Pause.)

4 CHAIR GANT: So delete the comma after
5 "protected" and delete the rest of the sentence?

6 MR. KIEBA: I heard a period or "as
7 appropriate." So let's start deleting everything
8 after the "and monitor." So the question is, do
9 you just have a period or "protected as
10 appropriate"?

11 MEMBER CAMPBELL: I think, I mean, I
12 agree with what you're saying. If you're going
13 to put the metal in the ground, it needs to be
14 protected, right. I guess the issue is, now
15 we're trying to push the whole industry --

16 CHAIR GANT: Can you speak up since
17 the mic's not working?

18 MEMBER CAMPBELL: Normally I don't get
19 asked to speak up, Paula, but absolutely I can
20 speak up. If you've got an active soil, right,
21 if it's soil where you can have active corrosion,
22 then, yeah, I mean, you should be checking it and

1 monitoring it more frequently.

2 If you have an area that doesn't,
3 that's not active, then there's nothing wrong
4 with betting an anode in because it's probably
5 going to outlast the line that it's installed on.

6 So I mean, I think that's the idea
7 that Christina and others are trying to get at,
8 is you don't want to just say don't do anything.
9 You want to encourage -- I would think you would
10 want to encourage operators to set up the right
11 program.

12 MR. MAYBERRY: I would agree, it's
13 hard to say put it in and don't worry about it.
14 I mean, the words coming to my mind, address
15 cathodic protection as deemed necessary by the
16 operator's integrity management plan, something
17 along those lines.

18 MEMBER CAMPBELL: I like that, the
19 operator's integrity management plan.

20 CHAIR GANT: That would apply to the
21 monitoring piece, not the protection. So it
22 would be comma after protected, and monitored as

1 appropriate in accordance with the operator's
2 integrity management plan.

3 MEMBER CAMPBELL: That makes sense.
4 Andy, I'm looking at you.

5 CHAIR GANT: Or maintained?

6 MEMBER CAMPBELL: Maintained? I like
7 that better.

8 MEMBER DRAKE: I think that makes more
9 sense.

10 CHAIR GANT: So we're saying in
11 accordance with the operator's integrity
12 management plan, we don't need "as appropriate."

13 MEMBER CAMPBELL: Correct.

14 CHAIR GANT: Must be cathodically
15 protected and maintained in accordance with the
16 operator's integrity management plan.

17 MEMBER CAMPBELL: I like that.

18 MR. MAYBERRY: You know, just thinking
19 outloud, maintain brings up operation and
20 maintenance.

21 CHAIR GANT: Well, but the idea is
22 that the responsibility is to maintain it. How

1 do you ensure that it's maintained, whatever,
2 monitoring or other activity you might engage in
3 to maintain the integrity.

4 MEMBER FLECK: Sue, National Grid. So
5 that gets to whether you bury it and you know it
6 lasts 30 years and you replace it in 30 years, or
7 you bury it, to Cheryl's point, and you know it's
8 in wet, corrosive soil, so you actually put in a
9 test station and monitor it every year to keep an
10 eye on it. But that's been the point and that
11 would be an operator's choice and an operator's
12 responsibility.

13 CHAIR GANT: Okay, thank you. Any
14 further comments from the Committee before we get
15 to a motion?

16 Cameron, could you paste that text
17 into the motion, please?

18 Do we need a comma after protected?

19 MEMBER FLECK: Protection choice is
20 also part of your integrity.

21 CHAIR GANT: Can I have a motion?
22 Would you like to make the motion? I've got to

1 get you out of here at 4:30.

2 MEMBER FLECK: Oh, this doesn't work.

3 The Technical Pipeline Safety
4 Standards Committee finds that, related to
5 fittings, the proposed rule as published in the
6 Federal Register and the Draft Regulatory
7 Evaluation are technically feasible, reasonable,
8 cost-effective, and practicable if the following
9 changes are made.

10 PHMSA recommendations are incorporated
11 except for the provision regarding the removal of
12 Paragraph G.

13 Revise Paragraph G as follows. G,
14 electrically isolated metal alloy fittings in
15 plastic pipelines under this section not meeting
16 the criteria contained in Paragraph F must be
17 cathodically protected and maintained in
18 accordance with the operator's integrity
19 management plan.

20 MEMBER PEVARSKI: Second.

21 CHAIR GANT: So Sue made a motion and
22 Rich seconded. Okay, thank you. Cameron?

1 MR. SATTERTHWAITE: All right. Aye,
2 nay, or abstain. I'm going to do the roll call.
3 Paula Gant.

4 CHAIR GANT: Aye.

5 MR. SATTERTHWAITE: Cheryl Campbell?

6 MEMBER CAMPBELL: Aye.

7 MR. SATTERTHWAITE: Andy Drake?

8 MEMBER DRAKE: Aye.

9 MR. SATTERTHWAITE: Sue Fleck?

10 MEMBER FLECK: Aye.

11 MR. SATTERTHWAITE: Rich Worsinger?

12 MEMBER WORSINGER: Aye.

13 MR. SATTERTHWAITE: Bob Hill?

14 MEMBER HILL: Aye.

15 MR. SATTERTHWAITE: Bob Kipp?

16 MEMBER KIPP: Aye.

17 MR. SATTERTHWAITE: Richard Pevarski?

18 MEMBER PEVARSKI: Aye.

19 MR. SATTERTHWAITE: It's unanimous.

20 CHAIR GANT: Thank you, sir. Max,
21 back to you to walk us through the plastic pipe
22 installation aspects.

1 MR. KIEBA: All right, plastic pipe
2 installation. The number covered in this
3 proposal for trenchless excavation, joint plastic
4 pipe, qualifying joiners -- sorry, qualifying
5 joint procedures, qualifying persons to make the
6 joints, bends, general installation, service line
7 connections, and maintenance.

8 We'll go through the list, but I think
9 it's fair to say we got a number of comments,
10 most on trenchless excavation and maintenance.

11 So, for installation by trenchless
12 excavation, the proposal was to require backfit
13 installations near underground structures. We
14 also have a proposal for requirements to use a
15 weak link during pull-through.

16 For joining plastic pipe, mechanical
17 fittings must be in the list of specification. I
18 mentioned the enclosed number of standards for
19 mechanical fittings.

20 We had language, the proposed language
21 clarification, particularly on the use of solvent
22 cements, to make it clear that it's restricted

1 only to PVC pipe. I think everyone knows that,
2 but the proposal doesn't clearly say that.

3 And as part of that, too, we point to
4 a specific ASTM standard that is incorporated in
5 2513, but this is the solvent you need to use,
6 because what we've seen is sometimes maybe some
7 of your folks working out there, maybe plumbers
8 working on the customer service side, something
9 else, might go to Home Depot and find some
10 solvent that might not be the appropriate one to
11 use. So we just then clarified what solvent you
12 have to actually use for PVC. And this
13 clarification that heat fusion requirements apply
14 to both.

15 Overall, for trenchless, overall
16 general support. We did get some comments that
17 it exempt services below one and a quarter inch
18 IPS if it's supported by incident history.

19 For weak link device, overall support
20 of the intent, but there was a request for
21 flexibility in the definition of a device,
22 primarily, using other methods. For instance, if

1 you don't have an actual, physical device, the
2 weak link, for instance, methods for using a less
3 strong plastic pipe which might pull through,
4 that that method allowed too as the device or
5 method.

6 Some were opposed entirely and
7 recommended holding a working group or some even
8 said a workshop. Frankly, I don't think this is
9 something we need to spend money to have a
10 workshop for, but there were comments regarding
11 to that.

12 For overall safety enhancements,
13 requiring operators to verify that the pipe is
14 undamaged after pull through. Some did suggest
15 we require use of tracer wire, which, again, it's
16 a common, very common use. But again, the code
17 does not explicitly say that.

18 We require positive identification of
19 underground structures. So even take the
20 proposal in the code to actually refer to
21 positive identification. And I will say, there
22 should be some acknowledgment, this does get

1 tricky, particularly in some places where you may
2 not be required to mark every single sewer line.

3 On underground structures, the
4 concerns in general, there was feelings the
5 operator should only be responsible for providing
6 clearance from known structures at the time of
7 installation.

8 There were some suggestions to have a
9 list of compliance actions that should be
10 provided, or drop this provision entirely. There
11 was a suggestion just written cross-bore
12 performance procedures should be sufficient.

13 Okay, that's overall (g)(1). We'll go
14 to staff organizations later, because we kind of
15 patched this all together.

16 (G)(4), joining plastic pipe, the
17 comments should overall support. We did get
18 comments in the NPRM. We proposed a limitation of
19 an inch and a quarter for socket fusions and we
20 got some comments, primarily from the APGA that
21 did say a number of their members are using
22 socket fusion above inch and a quarter, up to

1 four inch in diameter in some cases. And they
2 felt it was not economically better alternatives
3 in other options.

4 We got some requests for clarification
5 to specify. So from a fusion procedures
6 standpoint, we propose to point to this ASTM
7 F2620 kind of as a baseline guide versus the
8 generic language found in the code. But that
9 standard, it should be acknowledged, only applies
10 to PE.

11 As part of that too, there were some
12 comments we got on, for instance, an operator
13 might be using something that deviates slightly
14 from 2620. In some cases, it might be more
15 stringent, and would that still be allowed or are
16 you still cornered into this 2620?

17 There were questions on whether
18 joining requirements apply to joints in factory
19 assembled guises as well.

20 So other parts of the installation are
21 joining procedures. Our proposal was to
22 incorporate by reference current standards for

1 PE, PA-11 and 12. And again, qualifying persons
2 to make the joints, suggestions suggested ASTM
3 F2620-12 is an option for maybe operators, again,
4 to raise that minimum bar in the joining
5 procedures.

6 For bends, the minimum bend radius as
7 specified by the manufacturer.

8 For installation, we did have a
9 proposal in there to revise the minimum wall
10 thickness to 0.90, and that was kind of intended
11 with the moves to 0.40.

12 But it was pointed out by some
13 commenters that we do have other parts of the
14 code that are still at 0.062. I think the staff
15 did agree with that. We don't want to certainly
16 conflict with that other pipe standards still
17 under the other design factors.

18 A proposal to revise requirements for
19 protection of plastic pipe inserted in metal
20 casings or on bridges, we did propose backfill
21 requirements. We also proposed to permit above
22 ground termination of certain gas mains for

1 service lines. Again, we proposed the category
2 one joints across the board, particularly in the
3 service line connections to mains.

4 For equipment maintenance, plastic
5 pipe joining, we proposed minimum maintenance and
6 calibration requirements for drilling equipment.
7 And we have nuances in there on what's required
8 for equipment calibration.

9 Okay, so, comments we got in for
10 qualifying persons to make the joints, there was
11 a feeling that if you require 2620 as the sole
12 go-to, it would require re-qualification of
13 approved procedures.

14 Backfill requirements were opposed by
15 several commenters, particularly the more
16 prescriptive requirements we have in there and
17 also some of the language in there.

18 Overall, there was support for the
19 intent of recordkeeping for equipment
20 maintenance, but there was a feeling those
21 requirements were too prescriptive and
22 burdensome, particularly all the recordkeeping

1 you have to have. And this is everything from
2 calibrating your equipment, fusing, joining, and
3 other aspects.

4 So, the staff recommendation for
5 trenchless excavation, just to clarify
6 expectations, I think Cameron has a link there to
7 some proposals. I don't know if we want to go
8 step-by-step.

9 So here's the thoughts from the
10 technical staff based on the comments received.
11 Each operator shall take practicable steps to
12 provide sufficient clearance for installation and
13 maintenance activities from other underground
14 utilities and/or structures at the time of
15 installation.

16 To be quite honest, we had concerns
17 with this whole "known" because we thought that
18 would be too much of a loophole where an operator
19 can say, "Oh, we didn't know there was another
20 structure." I know that's not the intent, and I
21 know it's an issue. But from a rulemaking or a,
22 sorry, code aspect, unfortunately I can see, and

1 some more staff could see, that there is a
2 potential for someone to try to argue that. If
3 the Committee feels strongly that we should have
4 that "known," again, we're willing to accept
5 that.

6 So I think that's trenchless, at least
7 this whole -- so I don't know. This is the part
8 where you can either take it step-by-step or we
9 can go through the whole thing.

10 CHAIR GANT: Okay. I'd like to go
11 through all of them, if that's okay.

12 MR. KIEBA: Okay. So, weak link, we
13 did agree, device or method. So we agreed, you
14 know, the requirements should be performance-
15 based.

16 We agreed to remove socket fusion
17 diameter restrictions entirely, because, you
18 know, we thought inch and a quarter, because that
19 was what we felt where other operators were
20 going, but I don't even know if 4-inch is the
21 right number, so we just -- we suggested to
22 remove it entirely.

1 And, essentially, you are going to
2 refer to whatever the standard says, so that's
3 what number should be available. So the staff
4 agreed with those comments.

5 Dropping enhanced backfill
6 requirements. So looking at the code, there is
7 other parts of the code that do talk about
8 backfill, so the staff's thought is to just drop
9 those backfill requirements entirely and still
10 make it clear that you have to comply with those
11 other sections.

12 Cameron, do you want to look at --
13 sorry. I'm talking about this, but do you want
14 to look at the remove socket fusion first just so
15 people can see the language?

16 Oh, so this isn't the modified
17 language. So, how it would read is, the socket
18 fusion joint must be joined by a device, et
19 cetera. And we would delete that last sentence.

20 Backfill requirements. Is this what's
21 proposed or the new --

22 MR. SATTERTHWAITTE: That was what was

1 proposed.

2 MR. KIEBA: Oh, okay. Do we have
3 slides on the modified? Because we went back and
4 forth about some -- I'm sorry, some states had
5 this comment about deleting the rocks and size,
6 so we removed this entirely.

7 So this is what's proposed? Okay.
8 So here we got some across the board, some folks
9 thought it was onerous, particularly -- yeah, I'm
10 looking at the calibration part. I think it's
11 mostly back to maintaining records for the life
12 of the pipeline.

13 We got comments from, is it reasonable
14 to do life on the pipeline for others? And would
15 it be more reasonable to do between inspection
16 cycles or based upon the manufacture
17 recommendation? For instance, if the
18 manufacturer suggests you calibrate it every next
19 period that's what you do versus keeping all
20 these records for the entire life of the
21 pipeline.

22 And some had concerns on all the

1 equipment we listed out, particularly everything
2 from fusion equipment, et cetera.

3 So I guess this is also where we kind
4 of need Committee input on, is this reasonable,
5 should we just delete (c) and (d)? Do we have
6 the comments that came in? I feel like we had
7 some comments on deleting some of those
8 paragraphs.

9 CHAIR GANT: So while you are thinking
10 about that, let's go back up the top and open it
11 up for Committee comments, questions on
12 trenchless excavation and the suggested
13 clarification of expectations.

14 Cheryl?

15 MEMBER CAMPBELL: Cheryl Campbell,
16 Xcel Energy. So I understand what you are
17 saying, Max, that it's easy to kind of help make
18 that and I'm just looking for a solution to that.

19 Because I think -- I'm not a lawyer,
20 I don't want to be a lawyer, I know we have some
21 in the room with us -- is there something behind
22 take practicable steps, you know, from a legal

1 standpoint that suggest that, yeah, you've taken
2 those steps necessary to determine that. And
3 does that give us all a level of comfort that you
4 actually did -- you know, you don't want to use
5 the term "best efforts," and I understand that's
6 got a very serious legal connotation to it. But
7 do you know what I mean? Does that "take
8 practicable steps" have enough information behind
9 it from a legal standpoint to get us to where
10 we're comfortable that operators are going to
11 give it a good try?

12 CHAIR GANT: Rich?

13 MEMBER WORSINGER: Rich Worsinger,
14 City of Rocky Mount. Yeah, my concern is, again,
15 with that "known." I don't think you are going to
16 find bigger advocates for the "one number to
17 call" more than those in the natural gas
18 industry.

19 We take every effort to find out
20 what's in the path of where we are going to dig
21 because we want others to do the same thing.
22 There is nothing that upsets me more than when my

1 guys hit something that they should have known
2 was there.

3 With that being said, there are things
4 out there we don't know what is there. There are
5 people who do not participate in One Call, they
6 are exempt from it, and then there's others that
7 there is just unknown stuff out there.

8 We don't have a practical way to do
9 that unless we hand dig the entire way. There's
10 just -- there's no practical way to determine if
11 there is something out there where we are going
12 to be digging.

13 That's why One Call was created, to
14 get those who operate underground systems to
15 properly mark their facilities. So I would
16 request that "from other known underground
17 utilities," but for "known" be put in there,
18 recognizing that we work to comply with the One
19 Call.

20 CHAIR GANT: Sue?

21 MEMBER FLECK: Sue Fleck, National
22 Grid. You actually made a compelling argument

1 there. I'm not sure mine is anymore, but I'll
2 say what I intended to.

3 I was going to say maybe what you want
4 to do is add "take practicable steps to identify
5 and provide," you know, the rest of it can stay
6 the same.

7 So what you're basically then saying
8 is you're not expected to know everything. There
9 could be some buried swimming pool, who knows,
10 something underground, but you are responsible to
11 try your best to find and fix the stuff that's
12 there. So I'm just throwing that out as an
13 option.

14
15 MEMBER PEVARSKI: I would agree with
16 Sue. And, Rich -- Rick Pevarski, Virginia 811.
17 I would not agree with Rich. I would like to
18 see, to not have the "known" in and included in
19 the language.

20 Too often, you know, because sewer
21 laterals, water laterals, if something doesn't
22 get located within the correct amount of time,

1 technically they are not known, but there are
2 still procedures and processes you could do to
3 recognize that they are there and avoid them.

4 And you have the cross-bores, there
5 are sewer laterals, that are unmarked and there
6 are procedures that an installer could do to make
7 sure that they are not going through that.

8 The same thing with water. We had an
9 incident in Virginia not too long ago where it
10 was an unmarked water lateral and it got nicked,
11 the gas line got installed, and the pressure from
12 the minor hole did actually put a hole in the
13 plastic lining and it ignited, and there was an
14 incident from that.

15 And that was an unknown water line,
16 but the installer could have seen that new water
17 was going through that and been looking for that,
18 did a sweep with their own pipe horns and located
19 it.

20 CHAIR GANT: Any other comments?

21 Rich?

22 MEMBER WORSINGER: Rich Worsinger,

1 City of Rocky Mount. Just a follow up to Rick's
2 comments, and I can give you a couple of recent
3 examples.

4 We know who in our territories
5 participates and marks out their facilities and
6 who does not. The neighboring town from where I
7 am in Rocky Mount, we have a gas system there, I
8 won't call them by name, you can look on a map
9 and figure out who it is, but they don't mark
10 out. They don't participate in One Call, so
11 we've got to call them directly to mark out their
12 facilities. And we do that.

13 We also know when we are going down
14 the street that each house has got a water line
15 to it and each house has a sewer line to it. And
16 if it's not marked, we know that we've got to get
17 up with the water company that's responsible for
18 that area to mark that sewer line and mark that
19 water line.

20 Most recently we had a gas line being
21 installed in the development I happen to live in.
22 And in that development there is a golf course,

1 and that golf course has its own watering system
2 that draws water from a lake.

3 Well, the contractor we hired knew
4 that, and before he started he contacted the golf
5 course and said, "please mark out the water
6 line," and they did.

7 I think you're going to find that
8 industry does what we need to. We're going to be
9 responsible if we hit it, but then also to be,
10 you know, dinged for being not in compliance,
11 also, if we hit something that somebody didn't
12 mark out -- I think we need to come up with
13 another word there.

14 CHAIR GANT: So it seems like we're
15 getting to a new level of understanding in this
16 text. The "taking practicable steps" modifies
17 everything that comes after it and to me after,
18 with the two examples that you just shared and
19 how you approach it operators are taking the
20 practicable steps to understand what is there.

21 MEMBER WORSINGER: Yes.

22 CHAIR GANT: So it seems like that

1 modifies everything that comes after it. And so
2 the practical steps might eliminate the need to
3 have "known," if you read it from start to
4 finish, as an acknowledgment as that you are
5 taking those practical steps to provide
6 sufficient clearance for installation and
7 maintenance activities from underground
8 utilities.

9 Then, if you took those practical
10 steps, and it still wasn't apparent there were
11 underground utilities that you've interacted
12 with, you can still be covered, correct?

13 MEMBER FLECK: It seems like it, yes.
14 I think so, yes.

15 CHAIR GANT: While the Committee
16 considers that, I'd like to ask for comments from
17 the public on this point.

18 MEMBER FLECK: Just speak up, Andrew.

19 MR. LU: Andrew Lu, American Gas
20 Association. So, I appreciate the discussion.
21 I'm a little bit curious to know what sufficient
22 clearance actually suggests. There are a lot of

1 industry standards that are out there, including
2 CGA as a best practice, which delineates what
3 that clearance would be.

4 And it just seems like to codify
5 something like this is a really big deal. I
6 agree with Rich completely. You're basically
7 holding the utility, the gas utility, accountable
8 for knowing where everything else is underground,
9 not just the utilities, but structures in there
10 as well, old abandoned things. You'd basically
11 have to do an open excavation to show that you
12 are in compliance with that.

13 MEMBER KIPP: Yeah, just to piggyback
14 onto what Andrew said. There was an explosion in
15 South Riding in the '90s, and it was a gas line
16 in the same common trench as an electric line.
17 And the electric line had been damaged somehow
18 during installation and it arced and melted the
19 gas piping.

20 It leaked into a house in South
21 Riding, not too far from here. I think that a
22 couple people were killed and their house was

1 destroyed, and that's where you came up with the
2 best practice and said 12 inches would be your
3 separation. So there is a best practice on some
4 of those gas lines.

5 However, related to that point, we
6 should -- practicable steps -- and practicable
7 steps, you know, obey the One Call laws, call 8-
8 1-1, maybe put some words in there, because, yes,
9 I believe that 90 percent of the people do the
10 right thing, but I think you'd want to make sure
11 that the other 10 percent that might not.

12 MR. KIEBA: Yeah, and I'll just jump
13 in. I mean the practicable steps, I think this
14 is an area where be careful what you ask for. I
15 don't think you want PHMSA to identify that for
16 you, because we've had those issues where PHMSA
17 said "here is what you need to do."

18 I disagree respectfully with the
19 comment about the trench. There are technologies
20 out there. In my former R&D life I actually was
21 designing a system that could go in the ground
22 and see other utilities.

1 Granted, it's complicated, whether
2 it's smooth or not. So it's technically
3 possible, but there are a number of options. And
4 I agree, there's a number of standards out there,
5 guidance, let's look at what those are doing.

6 I know CGA does some great stuff, the
7 State of Minnesota, some other operators are very
8 open. And Southwest Gas is one great example,
9 some of their sewer lateral inspection programs.
10 So let's look at all those.

11 But this an area where, again, I'd be
12 careful of PHMSA identifying. This might be an
13 area where we get a task group together or maybe
14 provide some guidance.

15 One other thing is I am on this state
16 PHMSA plastic pipe working group, but what we did
17 was states, and it's out there on the DIMP
18 website. It just gives some ideas of what some
19 operators have done, but, again, it's not -- just
20 giving you ideas.

21 This might be an area, you know, you
22 get a task group together, but you don't want

1 PHMSA to identify for you.

2 Sufficient clearance is another area
3 where, yes, there is no clear -- I know some
4 states are doing what's the separation
5 requirement, and it's 12-inch in some cases.
6 Yes, especially if you have transmission in other
7 areas unless you can prove, you know, to keep it
8 under code.

9 Again, I think this is one area you
10 don't want PHMSA telling you what that clearance
11 is. I mean, at a minimum, yeah, when you are
12 doing that first bore hole in, you want that
13 clearance, but when you come back -- again, you
14 don't want PHMSA to identify what those are.

15 MEMBER KIPP: Yes, just the 12 inches
16 of radial separation issue was to satisfy
17 requirements from NTSB that we provide data back
18 to NTSB, and that's how that came about.

19 MEMBER WORSINGER: Rich Worsinger,
20 City of Rocky Mount. Is the word we want there
21 "practical" or "practicable?" Right now that
22 says -- we read "practical," but it says

1 "practicable." Now, I'm an engineer, not an
2 English major.

3 MR. MAYBERRY: This is Alan Mayberry.
4 You know, I'm still trying to grasp that
5 practicable, you know, we use that a lot in
6 rulemaking. You know, whatever works, and, of
7 course, it's not defined, so it's subject to the
8 guidance we develop. So, you know, you can say
9 positive steps, but, you know, practicable seems
10 like, well, do it if it's practicable, but, you
11 know, there might be some discretionary area
12 there.

13 So something like be proactive to
14 determine how to take positive action, positive
15 steps to consider, you know, clearance. I mean,
16 I think, you know, it's not perfect, how do we
17 get it as close to perfection as we can?

18 When you're trenchless excavation you
19 need to consider the clearance. You need to know
20 what you are working with and you need to know
21 your equipment and you need to know, you know,
22 the practicable steps and to look for what's out

1 there and to look for obstructions and take
2 action.

3 So, you know, does practicable get us
4 there or should it be proactive or take action?

5 MR. KIEBA: And just for
6 consideration, another commenter did just say
7 this changes completely, this saying you must
8 have cross-bore procedures, but I don't even know
9 if that -- you know, that's almost too generic,
10 right, so --

11 MEMBER WORSINGER: Rich Worsinger,
12 Rocky Mount. Question, PHMSA: what is it
13 specifically you are looking for us to do? Is it
14 to not only call the various locate services in
15 each state, depending where we are, but also to
16 have a knowledge of our system and the knowledge
17 of those who are in our area who don't
18 participate?

19 I mean, I could tell you, the thing
20 that we do hit the most are septic systems that
21 have been abandoned. And the homeowner doesn't
22 know they are there because, you know, the septic

1 system was abandoned 30 years ago, they're now
2 tied into water and sewer, water and sewer is
3 marked, and we hit a septic sometimes, and the
4 people don't have a knowledge of it.

5 MR. MAYBERRY: Yes, I think we would
6 look to -- you know, Bob mentioned best practices
7 developed by CGA that give a framework.

8 MEMBER KIPP: Yeah, Bob Kipp, CGA.
9 Just one more comment on abandoned facilities.
10 New Mexico will examine all of their gas
11 distribution damages, and New Mexico is not a big
12 state, but we looked at every single damage and
13 32 percent of their gas distribution damages were
14 due to abandoned facilities. There are a lot of
15 abandoned facilities, and it's not just gas
16 facilities, it's septic tanks, it's water, all
17 sorts of things.

18 So it's critical, I think, that you
19 look at all the best practices.

20 MR. KIEBA: And I'll just say the no-
21 brainers: the real intent is let's stop those
22 cross-bores, right? We have all this guidance

1 out there and we still have cross-bores incidents
2 where gas is melting the sewer and, again, a
3 homeowner thinks they got a sewer backup, next
4 thing you know there is gas in your house and
5 that goes boom.

6 I mean that's what's happening still.
7 It's like, so how do we fix it? So if nothing
8 else, we need something in the code to make it
9 clear: let's fix it. How we get there, I don't
10 know.

11 CHAIR GANT: So what I am hearing from
12 PHMSA staff is the intention being to avoid
13 cross-bores. What I am hearing from the
14 Committee is there is some concern that what
15 should be referenced upfront is the best
16 practice, or some reference to industry practice
17 in some way, but we don't seem to be coalescing
18 around any language to that effect.

19 MR. KIEBA: This might an idea where
20 GPTC can look at it. I know we don't directly
21 reference GPTC. But if GPTC can take it on, CGA,
22 or any others who might be able to put an FAQ out

1 there, just say, hey, here is some guidance out
2 there, and that gives you an indication of here
3 is the leading ones and basically say that's what
4 you have to follow. That might be an avenue.

5 MR. MAYBERRY: I guess the only thing
6 I could add would be to get something around as
7 to say relevant -- you know, practicable steps
8 using relevant use of the practices, or the
9 practices to prevent damage. Using relevant
10 practices.

11 Again, it's difficult, because, you
12 know, we're not defining this, we're trying to
13 get enough clarity here and then supplement this
14 with guidance.

15 CHAIR GANT: So I think that brings to
16 a point that it appears we have a difference of
17 opinion on the Committee between wanting
18 specificity versus leaving it more general,
19 because the more specific that we get the more it
20 begins to look like a rendition of a standard or
21 practices already in place or codified elsewhere.

22 So, thoughts from the Committee in

1 response to how to address that?

2 Is it possible that we're coming to a
3 language here, or to a couple of observations
4 back to PHMSA staff? Rich?

5 MEMBER WORSINGER: Rich Worsinger,
6 City of Rocky Mount. I think adding Alan's
7 modification there provides me more comfort that
8 -- and I'd be comfortable then striking that
9 "known" before underground utilities.

10 That this is -- we're not going to be
11 held accountable for the unknown facilities out
12 there as long as we take practicable steps using
13 relevant practices.

14 CHAIR GANT: Observations from other
15 Committee members? Sue?

16 MEMBER FLECK: Sue Fleck, National
17 Grid. I'm more comfortable with that language.
18 I think, to Max's point, where we were more
19 interested in a cross-bore than an active
20 utility, because that's where you have -- (Audio
21 interference) -- than an abandoned septic system
22 or something like that where you're not going to

1 really, you know, get hit by somebody running a
2 Roto-Rooter through there.

3 I could go either way. I prefer
4 having "known" in there because you are saying
5 "known utilities." It's kind of forcing you to
6 go and figure it out, but I think, yes, I am
7 comfortable with the changed language that we
8 have a little bit of flexibility.

9 We just have to think about how our
10 regulators will inspect us against this code and
11 will they feel that, you know, relevant to this
12 is okay.

13 CHAIR GANT: Okay. So for now, let's
14 use this as a placeholder on the motion text, and
15 let's move to weak link.

16 MR. KIEBA: I think I got a lot of
17 nodding heads here if we just say device or
18 method. I think that fixes it. And I think I
19 got nodding heads if we just remove the inch and
20 a quarter restriction entirely.

21 And, yes, backfill, do we want to just
22 drop that entirely? I think that's the feeling.

1 MEMBER FLECK: Yeah, it's already
2 covered.

3 MR. KIEBA: Let's go to equipment
4 maintenance, because -- yeah, pull that up for
5 me. Here was one where, if I recall, someone
6 help me out that commented, but I feel like we
7 got comments to just limit it to (a) and delete
8 everything else, (b) through (d).

9 I think (c) and (d) are the ones that
10 had the most scrutiny, but -- so essentially the
11 first part would be essentially what is required.
12 I am hearing a yes?

13 MEMBER FLECK: Yes.

14 MR. KIEBA: Okay. So I'd like
15 thoughts from the Committee, if anyone is
16 concerned if we just delete (b) through (d).
17 Anyone have concerns if we just leave it as the
18 first paragraph?

19 CHAIR GANT: Rich?

20 MEMBER WORSINGER: Rich Worsinger,
21 City of Rocky Mount. I agree, leave (a) in there
22 and strike (b), (c), and (d).

1 MEMBER FLECK: Agree.

2 CHAIR GANT: All right. I'd like to
3 ask for comments from the public on these four
4 proposed changes.

5 (Pause.)

6 CHAIR GANT: No one wants to step up
7 to the microphone that doesn't work?

8 (Laughter.)

9 CHAIR GANT: Okay, great. With that,
10 could we see that on the draft recommendation
11 text, please?

12 MR. SATTERTHWAITE: I'm going to copy
13 this information real quick and bring it to the
14 vote slide.

15 CHAIR GANT: Great. Sue?

16 MEMBER FLECK: Sue Fleck, National
17 Grid. While Cameron is doing that, can I ask one
18 clarifying thing? And I think, Max, this was in
19 your opening comments. The ASTM F2620 is an
20 option, it's not the only?

21 MR. KIEBA: Right.

22 MEMBER FLECK: Okay.

1 MR. KIEBA: And I think the intent
2 would be, first, yes, we clarify it's PE only,
3 but the thought is, you know, F2620 --

4 MEMBER FLECK: Got it.

5 MR. KIEBA: So, clearly, if a
6 manufacturer -- or, sorry, an operator was doing
7 something that's more stringent, they would
8 demonstrate how it might deviate, but that's in
9 there.

10 MEMBER FLECK: Thank you.

11 CHAIR GANT: Okay. While Cameron is
12 practicing his tremendous typing skills in front
13 of all us, I would like to ask Committee members
14 to consider the motion, the draft motion text,
15 and ask for a motion.

16 MEMBER CAMPBELL: Okay, all right,
17 I'll give it a shot, Paula.

18 CHAIR GANT: Go for it.

19 MEMBER CAMPBELL: Okay. Cheryl
20 Campbell, Xcel Energy.

21 The Technical Pipeline Safety
22 Standards Committee finds that related to plastic

1 pipe installation, the proposed rule as published
2 in the Federal Register and the Draft Regulatory
3 Evaluation are technically feasible, reasonable,
4 cost-effective, and practicable if the following
5 changes are made.

6 Trenchless excavation, clarify the
7 expectations as per the PHMSA recommendation.

8 Weak link, change to device or method,
9 remove socket fusion diameter restrictions, drop
10 enhanced backfill requirements. Operators would
11 still have to comply with the existing
12 requirements in Section 192.319(b) and
13 192.361(b).

14 In equipment maintenance, delete
15 192.756, Paragraphs (b) through (d).

16 MEMBER HILL: I'll second that.

17 CHAIR GANT: Excellent. We have a
18 motion and a second. Moving on to repairs.

19 MR. SATTERTHWAITTE: With that, your
20 aye, nay, or abstain. Let's do a quick roll
21 call. Paula Gant?

22 CHAIR GANT: Aye.

1 MR. SATTERTHWAITE: Cheryl Campbell?

2 MEMBER CAMPBELL: Aye.

3 MR. SATTERTHWAITE: Andy Drake?

4 MEMBER DRAKE: Aye.

5 MR. SATTERTHWAITE: Sue Fleck?

6 MEMBER FLECK: Aye.

7 MR. SATTERTHWAITE: Rich Worsinger?

8 MEMBER WORSINGER: Aye.

9 MR. SATTERTHWAITE: Bob Hill?

10 MEMBER HILL: Aye.

11 MR. SATTERTHWAITE: Bob Kipp?

12 MEMBER KIPP: Aye.

13 MR. SATTERTHWAITE: Richard Pevarski?

14 MEMBER PEVARSKI: Aye.

15 MR. SATTERTHWAITE: It's unanimous.

16 CHAIR GANT: Excellent. Now moving on
17 to repairs.

18 MR. KIEBA: Repairs. We felt these
19 were relatively non-controversial. Well, I would
20 say we -- I'm sorry. I think in the effort of
21 deleting some slides we deleted some content.

22 I would say the one part of repair

1 somewhere in the code or the provision we had the
2 10 percent repair criteria. I would say we did
3 get some comments whether that was appropriate,
4 if, you know, should it be 20 percent, should we
5 remove that completely based on, particularly,
6 some newer materials.

7 On prohibition, yes, another piece on
8 this on prohibiting permanent use of temporary
9 leak repair clamps. So this is an issue we have
10 seen where, you know, if there is an incident
11 someone might put on a leak clamp to stop the
12 flow, next thing you know that thing stays in the
13 ground and they never come back to repair it.

14 I know most operators do, but there is
15 a couple that we have seen not, so we have a
16 proposed part in the code that just says they are
17 not allowed for permanent -- or, sorry, temporary
18 repair.

19 So now we're on (i), a number of general
20 provisions. I would say plastic pipe material is
21 probably the biggest one there and that's where
22 we prohibited the use -- the use of -- so we

1 proposed to prohibit the use of PVC pipe in
2 components for new pipelines. And this was kind
3 of following an industry trend for a couple of
4 decades to just stop using PVC.

5 It should be noted, we still have a
6 fair amount in the ground, and I think I pulled
7 up the numbers and it's, as of at least 2014, we
8 do have 11,000 and change miles of mains still
9 out there for PVC. We still have 131,000
10 services.

11 We did propose to incorporate F20817
12 maintenance standard, but we proposed it to apply
13 to components only.

14 So for material parts we had some
15 suggestions for minor clarifications for
16 component design standards. We did get some
17 comments to adopt more recent editions of
18 standards, and I think we had that discussion
19 earlier, we just can't do that in the context of
20 this rule.

21 We certainly have them all listed and
22 I think whenever it's appropriate at the next

1 standard update rule we'll look at that.

2 There were suggestions to clarify that
3 the simple generic storing and handling
4 procedures developed by third party are
5 acceptable.

6 Restriction on PVC pipe, overall there
7 was support, but there was one trade association
8 that was strongly opposed to it. And I would say
9 there was one operator that did give us some good
10 scenarios where there are low-risk applications,
11 such as vent piping, where they are using PVC.
12 So it's a good point. It's technically part of
13 the system. Does that mean they can't use it for
14 vent piping anymore?

15 We also got comments to exempt EFVs as
16 part of the listed specifications, because we
17 just have the EFV rule, and I don't even think
18 it's final yet, but it was noted that we did not
19 incorporate the EFV standard specifically.

20 So I would suggest let's talk about
21 PVC because that's the bigger one. I would say,
22 from a staff perspective, we have considered a

1 couple angles.

2 One is just removing it completely,
3 the whole prohibition of the 192.59 materials,
4 and just let DIMP work it out. And I think
5 that's probably the easiest scenario.

6 Another option, potentially from the
7 comments, if people feel strongly we should take
8 it out, and maybe perhaps say something like
9 "except for PVC used for repairs or non-risk
10 applications such as vent piping."

11 Do we have any of that modified
12 language in there?

13 MR. SATTERTHWAITTE: No.

14 MR. KIEBA: Okay. So we went back and
15 forth on that, but I think, obviously, the
16 easiest one is let's just take out (e)
17 completely, but unless someone feels strongly
18 then we still need something in the code to
19 address PVC. Or, yeah, discuss the use of
20 certain low-risk applications.

21 So, again, do you want to add language
22 to talk about low-risk or are you just deleting

1 (e) completely?

2 And I think the staff agreed, let's
3 exempt EFVs, because we are still having the EFV
4 rule, let's not conflict with that. I think most
5 people will probably agree with that one.

6 So we'll have the language, right,
7 except for the EFVs. Except for EFVs a valve
8 must be a listed specification, but that's where
9 the staff was going with that. That's it.

10 CHAIR GANT: Questions, comments, from
11 Committee members? Rich?

12 MEMBER WORSINGER: Rich Worsinger,
13 City of Rocky Mount. Can we go back and just
14 kind of go through these in order?

15 MR. KIEBA: Sure.

16 MEMBER WORSINGER: I believe the
17 repair criteria was 10 percent with what was
18 being proposed. I believe PHMSA already requires
19 that each imperfection or damage that would
20 impair the serviceability of the plastic pipe
21 must be repaired or removed. PHMSA has not
22 offered technical support when 10 percent of the

1 wall thickness is the cut-off and above which the
2 serviceability of the plastic pipe is impaired.

3 Twenty percent is the industry
4 recommendation for manufacturers and industry
5 organizations. In addition, the only industry
6 research available on scratch or gouge is that
7 from a plastic pipe investigated scratches and
8 gouges up to 30 percent wall thickness.

9 MR. KIEBA: Yeah, I have it here. The
10 proposal was in 192.311, Repair Plastic Pipes.
11 So (a) says "each imperfection or damage that
12 would impair the serviceability of plastic pipe
13 must be repaired or removed," that was (a).

14 I think the concern was the (b) part
15 that says "all scratches or gouges exceeding 10
16 percent of the wall thickness of pipe and/or
17 component shall be repaired or removed."

18 So I think we've got a number of
19 comments. Probably the easiest one is just
20 delete (b) completely, or do we want to go to 20
21 percent, you know, what we do?

22 You know, if we just leave (a) in

1 there, do we need to push what that number is?

2 CHAIR GANT: Is there comments from
3 Committee members on removal of (b)?

4 MEMBER FLECK: Sue Fleck, National
5 Grid. I recommend removing (b) because I think
6 it's within our decision to kind of -- getting
7 back to the issue between integrity management
8 programs and everything.

9 We may choose to replace a 5 percent
10 scratch, and, you know, if you work in 10 percent
11 you're saying to us we're not going to look at
12 anything below that.

13 I think it's incumbent upon the
14 operator to understand their risks and to take
15 the appropriate steps. I don't think (b) is
16 necessary, I really don't. I think (a) puts the
17 onus on us and we could be held accountable. I'd
18 remove (b).

19 MR. KIEBA: So essentially that
20 wouldn't change anything, because the code right
21 now, let's be clear, that there is no changes
22 then to this part, so we'd just leave the code as

1 it is.

2 CHAIR GANT: By removing like the (b)
3 from the -- okay.

4 MR. KIEBA: Yes.

5 CHAIR GANT: Okay. Are there other
6 comments on repairs or other general provisions?

7 MEMBER CAMPBELL: Max, Cheryl
8 Campbell, Xcel Energy. Is there a reason that
9 PHMSA might propose (b) with a 10 percent rule?
10 I mean, what's behind it?

11 MR. KIEBA: Honestly, just trying to
12 follow what the general guidance has been. I
13 think most of our technical staff would agree
14 that 10 percent was based on more vintage piping,
15 and so even the studies that were done on the 10
16 percent. So I think the intent would just follow
17 what the guidance has been through the years,
18 particularly in cases where operators aren't
19 doing anything for scratches or gouges.

20 I know it's not these operators in our
21 room here, it's the ones out there that -- but
22 that was the intent. But I think we'd agree, you

1 know, that it could be 20 percent, it could be
2 more, so --

3 MEMBER CAMPBELL: Okay. I would agree
4 with just removing (b).

5 CHAIR GANT: Okay. Rich?

6 MEMBER WORSINGER: Rich Worsinger,
7 City of Rocky Mount. I just want to comment on
8 the leak clamps.

9 I'm in agreement that leak clamps
10 should not be used for permanent repair. I had a
11 concern though that this was added to Subpart M.
12 Subpart M, I believe, is one that is retroactive.

13 MR. KIEBA: It is.

14 MEMBER WORSINGER: And I have a
15 concern that where these clamps had been used,
16 not all operators have records of where they used
17 them, and we would not want this applied
18 retroactively.

19 MR. KIEBA: Yeah, I think we have
20 already said we intend those rules not to apply
21 retroactively, so we would have to add something
22 or anything after the effective date of rule.

1 CHAIR GANT: Okay. Any other comments
2 on general provisions or repairs? Sue?

3 MEMBER FLECK: No more comments on
4 that, but -- this is Sue Fleck, National Grid.
5 But what I think the recommendation should be, is
6 there a way to look in the future for some kind
7 of repair clamps or do some research on that to
8 see if there is something that could potentially
9 be used in the future? Because the concept isn't
10 a bad one, there is just no leak repair clamps
11 out there that really can be buried and left
12 there forever. But the concept is a good one.

13 If we could have something that you
14 could mechanically put on a pipe and repair it
15 forever and bury it, that would be a good tool to
16 have in the toolbox.

17 So it might be nice to figure out how
18 we could get something like that for in the
19 future.

20 MR. KIEBA: Yeah, and some people
21 pointed to, for instance, electrofusion jointing
22 or electrofusion fittings, could they be applied

1 both as reinforcement, as a leak repair, and I
2 think that's reasonable to look at.

3 MR. MAYBERRY: Just a point on that,
4 Sue, I think, or, Paul, years ago there was some
5 work done on that, on repair clamps, and a
6 prototype was built, but I'm not sure if it was
7 actually ever commercially used or sold.

8 MEMBER FLECK: It would be nice to
9 have. It would be nice to have, I think.

10 CHAIR GANT: Okay. I don't see any
11 other comments from the Committee. Andy?

12 MEMBER DRAKE: This is Andy Drake with
13 Spectra Energy. In fact, I think this kind of
14 recognizes the opposite. I mean, I appreciate
15 the fact that we're trying to provide discretion
16 to the operators to repair what seems to make
17 sense.

18 The fact that there doesn't seem to be
19 a standard of what the correct criteria is seems
20 like an obvious opportunity. If there is no
21 clear understanding from the technical guidance,
22 you know, 10 percent or any other number, then

1 it's incumbent on this group to make some
2 recommendation to try to fill in that space.

3 I recommend we do some research to
4 define what is appropriate repair criteria,
5 because you're never going to get consistency if
6 there is no technical standard of any kind.

7 So I don't even know what appropriate
8 means. There isn't any guidance to an operator,
9 is what I am hearing, which seems like a clear
10 opportunity from us, you know.

11 MR. KIEBA: No, you're right.

12 MEMBER DRAKE: And your point about
13 repair clamps, I mean, I think there's a
14 recognition here that needs to be made through
15 PHMSA to marshal whatever it needs to do to
16 research to try to find the appropriate repair
17 criteria to clarify that.

18 If the 10 percent is not technically
19 validated, well, what is appropriate?

20 MR. KIEBA: Yeah. And this is where
21 you might, you know, ask if EPI or others, I know
22 they have the plastic pipe manuals and what not.

1 But I think if EPI or others could go that
2 direction, I know there is a leak repair clamp
3 standard out there. That design should be out
4 for revision soon. That's another opportunity
5 for the standards, at least on a clamp size. I
6 guess, yeah, it's a question whether we have to
7 put something in the code now to push them along
8 further.

9 MEMBER DRAKE: It just seemed like an
10 opportunity. And I agree, we need to fill in the
11 space so that we can do some kind of work and
12 understand what is appropriate criteria.

13 MR. MAYBERRY: This is where I'll put
14 a plug in for our R&D forum which meets every two
15 years, and it's collaborative process where we
16 get input from stakeholders.

17 MEMBER KIPP: Yes, I agree with Andy.
18 When you look at a permanent use of repair
19 clamps, the only clamp used is for 35 years, it's
20 not permanent.

21 CHAIR GANT: Before I move to comments
22 from the public, any other comments from

1 Committee members?

2 From the public?

3 MS. SAMES: Christina Sames, AGA.

4 Just on the proposal, I want to make sure that we
5 capture the non-retroactive provisions that was
6 discussed.

7 CHAIR GANT: Okay. Moving to the
8 draft text for a motion, I'd like to ask
9 Committee members to consider making that motion.
10 I'll give us a few seconds to review this. Rich,
11 do you have a question?

12 MEMBER WORSINGER: No, I was going to
13 make a motion.

14 CHAIR GANT: Oh, awesome.

15 MEMBER WORSINGER: Rich Worsinger,
16 City of Rocky Mount.

17 The Technical Pipeline Safety
18 Standards Committee finds that related to the
19 section titled "Repairs and General Provisions"
20 the proposed rule as published in the Federal
21 Register and the Draft Regulatory Evaluation are
22 technically feasible, reasonable, cost-effective,

1 and practicable if the following changes are
2 made.

3 Clarify that provisions regarding leak
4 clamps are not retroactive.

5 Remove 192.311(b). However, the
6 Committee should support research for development
7 of industry-wide standards for repair criteria.
8 PHMSA should research use of permanent leak
9 repair clamps.

10 MEMBER KIPP: I'll second that.

11 CHAIR GANT: Excellent. Cameron, over
12 to you.

13 MR. SATTERTHWAITE: All right, we'll
14 start through the roll call. Of course, you
15 know, your aye, nay, abstain. Paula Gant?

16 CHAIR GANT: Aye.

17 MR. SATTERTHWAITE: Cheryl Campbell?

18 MEMBER CAMPBELL: Aye.

19 MR. SATTERTHWAITE: Andy Drake?

20 MEMBER DRAKE: Aye.

21 MR. SATTERTHWAITE: Sue Fleck?

22 MEMBER FLECK: Aye.

1 MR. SATTERTHWAITE: Richard Worsinger.

2 MEMBER WORSINGER: Aye.

3 MR. SATTERTHWAITE: Bob Hill?

4 MEMBER HILL: Aye.

5 MR. SATTERTHWAITE: Bob Kipp?

6 MEMBER KIPP: Aye.

7 MR. SATTERTHWAITE: Richard Pevarski?

8 MEMBER PEVARSKI: Aye.

9 MR. SATTERTHWAITE: It's unanimous.

10 CHAIR GANT: Okay.

11 MR. GALE: Thanks, Paula. We have one
12 slide to make sure we captured all that. We have
13 one final motion to be heard from the Committee.
14 We have one final slide. We wanted make sure we
15 captured everything accordingly. If we could get
16 a motion we would appreciate it, Madam Chair.

17 MEMBER HILL: The Technical Pipelines
18 Safety Standards Committee finds that the
19 proposed rule as published in the Federal
20 Register and the Draft Regulatory Evaluation are
21 technically feasible, reasonable, cost-effective,
22 and practicable if the amendments agreed upon

1 during this meeting are made.

2 MEMBER WORSINGER: Second.

3 CHAIR GANT: Seconded,, excellent,
4 okay.

5 MR. SATTERTHWAITE: Okay, we'll do a
6 quick roll call. Aye, nay, abstain. Paula Gant?

7 CHAIR GANT: Aye.

8 MR. SATTERTHWAITE: Cheryl Campbell?

9 MEMBER CAMPBELL: Aye.

10 MR. SATTERTHWAITE: Andy Drake?

11 MEMBER DRAKE: Aye.

12 MR. SATTERTHWAITE: Sue Fleck?

13 MEMBER FLECK: Aye.

14 MR. SATTERTHWAITE: Richard Worsinger?

15 MEMBER WORSINGER: Aye.

16 MR. SATTERTHWAITE: Bob Hill?

17 MEMBER HILL: Aye.

18 MR. SATTERTHWAITE: Bob Kipp?

19 MEMBER KIPP: Aye.

20 MR. SATTERTHWAITE: Richard Pevarski?

21 MEMBER PEVARSKI: Aye.

22 MR. SATTERTHWAITE: It's unanimous.

1 CHAIR GANT: Excellent, thank you.

2 Okay, our final item on the agenda for
3 this afternoon is to receive a briefing from
4 Robert Smith on the National Academy of Sciences
5 study on rulemaking.

6 MR. SMITH: Yes. Well, thanks, Paula
7 and Alan and the Committee, for the opportunity
8 to give you a summary of the study.

9 I'm Robert Smith, I am just the
10 Project Manager on this particular one. At the
11 time, Jeff Wiese was the subject matter expert
12 and really providing, you know, the kind of time
13 in on this study. I know it's now going to be
14 Alan, so he's got some shoes to fill with that
15 role.

16 Let me begin to try to attempt to
17 convey why Jeff Wiese wanted to do this study.
18 As you may know, he commonly hires contractors
19 for produced knowledge, general knowledge,
20 whether it be the Academy or any other means.

21 And sometimes, as you know, we deal
22 with many stakeholders and so it's important if

1 we want to pursue an activity or an agenda, we'd
2 like to see, you know, how can we raise up the
3 knowledge level of everybody so we're working for
4 a more common reference point.

5 That's been done time and time again
6 over the years for our office, whether it be
7 integrity management, whether it be in damage
8 prevention, research, and everything else, so we
9 are just kind of following that type of approach.

10 So really what this study is, you
11 know, we've done a lot with the Academy over the
12 years, many of those have been congressionally-
13 mandated. This is not a congressionally-mandated
14 study. It's a 21-month study awarded last
15 September, and it goes to May of 2017. So we
16 still have some time in it.

17 This is, you know, a National Academy
18 of Sciences study which follows their procedures
19 and protocols. They've spent a number of months
20 just organizing the committee. They've had one
21 public meeting so far and there will be several
22 more as they begin to hear from subject matter

1 experts.

2 So what's the study going to do?

3 Well, it's going to look abroad, look
4 domestically, look at other industries, and
5 really kind of understanding advantages and
6 disadvantages of utilizing descriptive versus
7 performance-based regulation.

8 Trying to understand where there is
9 more opportunity to expand upon performance
10 regulation and try to understand where there are
11 constraints preventing the expansion of that.

12 The committee, as shown on the
13 handout, and I'm sorry there is now a slides for
14 this, but the Committee made up a subject matter
15 --

16 MR. GALE: Sorry, Bob, we provided
17 handouts on that.

18 MR. SMITH: Oh, okay. And I think
19 everything is going to be put on the docket
20 afterwards, as I recall, so this should be for
21 everybody in the public as well.

22 The Committee is made up of a lot of

1 different subject matter experts. We're going to
2 have subject matter experts from all the trade
3 organizations I do believe, so thank you for all
4 the pipeline trade organizations, the liquid, gas
5 transmission and distributions, both public and
6 private, are participating with the study, I do
7 believe.

8 Some of us will be presenting at the
9 next meeting on the 12th. You can go look at the
10 website for that information and you'll see all
11 these meetings.

12 There are some meetings that are
13 public and some meetings are internal. We're
14 going to be hearing from other modes of
15 transportation, offshore versus onshore.

16 We have Brian Salerno, the Director of
17 BSEE, the Bureau of Safety and Environmental
18 Enforcement, also participating. So, once again,
19 it's kind of early in its stages, there is a few
20 more meetings to go, and we'd love to have the
21 committee here to present more detail perhaps at
22 the next Advisory Committee meeting.

1 And, with that, that's really all I
2 can say right now.

3 CHAIR GANT: Thanks, Robert. I will
4 just say that I know when Jeff was speaking about
5 this with Director Salerno, that we had some
6 conversations about this, and I think this is an
7 important exercise to get us the beyond this sort
8 of eternal conversation we are in which
9 technology meets regulation and how those
10 regulations keep up with technology and
11 innovation and as advances in operational
12 practice.

13 And then we talk about that being a
14 performance-based regulation, but we don't have a
15 robust discussion about how do you develop that
16 in an effective way to ensure the regulatory
17 outcomes you want.

18 And this was a way to develop a richer
19 conversation about how we develop performance-
20 based regulation. So I encourage people to
21 participate in this. Alan?

22 MR. MAYBERRY: I would just like to

1 add that, yeah, this is a very important study.

2 You know, we found, and certainly it's
3 an area of common interest between PHMSA and our
4 federal partners, and BSEE and Brian Salerno is
5 extremely invested in this, as well as our
6 Canadian partners at the National Energy Board,
7 who also is involved.

8 As Bob said, it's in the early stages,
9 but I think you'll find, and we found, and
10 perhaps you have noticed, too, that, you know,
11 the aftermath of some of the high consequence,
12 low probability events, we've begun to question
13 the efficacy of performance-based regulations.

14 As you know, our code is a set of
15 interdependent standards really of performance-
16 based regulations and prescriptive regulations,
17 and in the aftermath oftentimes there is a call
18 for more prescription.

19 So the purpose of this study, among
20 other things, is just to look at performance-
21 based regulations, and we have a very credible
22 source, I might add, in the National Academy. So,

1 stay tuned.

2 CHAIR GANT: Thank you, Alan. Any
3 items that Committee members would like to put on
4 the table before we adjourn?

5 Are there any instructions for us for
6 tomorrow morning? No yelling tonight, we want
7 you to have strong voices tomorrow in case the
8 mics don't work. We'll see you bright and early
9 tomorrow. Thanks, everyone.

10 (Whereupon, the above-entitled matter
11 went off the record at 4:27 p.m.)

12

13

14

15

16

17

18

19

20

21

22

A

- abandoned** 149:10
154:21 155:1,9,14,15
158:21
- abbreviated** 103:10
- able** 12:7 39:16 41:22
116:16 156:22
- above-entitled** 82:8
188:10
- aboveground** 106:1
- abrasure** 31:22
- abroad** 184:3
- absolutely** 56:8 124:19
- abstain** 104:14,14
112:7 129:2 163:20
179:15 181:6
- Academy** 182:4,20
183:11,17 187:22
- accept** 138:4
- acceptable** 55:8 107:18
109:11 167:5
- acceptance** 54:19
- access** 61:2
- accessible** 75:13
- accommodate** 61:18
- accountable** 64:22 65:2
65:8 149:7 158:11
171:17
- acknowledge** 24:5 31:9
31:14 71:4,9 86:6
88:18 93:12
- acknowledged** 12:22
30:13 110:22 134:9
- acknowledgment** 33:18
89:19 132:22 148:4
- act** 4:14 82:11
- acting** 4:5 5:14 6:8
- action** 18:2 96:22
153:14 154:2,4
- actions** 65:5 133:9
- active** 124:20,21 125:3
158:19
- activities** 137:13 148:7
- activity** 127:2 183:1
- actual** 34:6 72:10 132:1
- adage** 24:16
- adapt** 32:14
- adapting** 68:11
- add** 14:19 46:10 58:9
69:8 77:9 78:5 85:11
85:17 88:13 102:7
103:8 144:4 157:6
168:21 173:21 187:1
187:22
- added** 106:5 111:3
173:11
- adding** 44:4 108:16
158:6
- addition** 24:3 52:5,11
52:17 53:12 170:5
- additional** 122:12
- additions** 37:7
- address** 64:16 65:19
111:1,2 125:14 158:1
168:19
- addressed** 14:4 50:11
91:21 98:12,14
- addresses** 62:18 78:16
- adds** 33:7 96:10
- adequate** 108:1,22
- Adhesion** 33:7
- adjourn** 3:20 188:4
- ADMINISTRATION** 1:2
- Administrator** 2:11 4:5
6:8 14:5,11 39:12,15
39:18
- admonished** 11:4
- adopt** 101:17 166:17
- adopting** 66:15 99:13
- advances** 186:11
- advantages** 184:5
- advise** 65:12
- advises** 4:11
- Advisor** 7:2
- advisory** 1:5,19 4:7,9
4:10,14 8:4,21 9:18
10:9 18:22 19:1 22:21
39:21 40:11 58:3
113:6 185:22
- advocates** 142:16
- affect** 59:10
- affiliation** 6:10 12:21
69:18
- aftermath** 187:11,17
- afternoon** 4:4 40:8
82:12 182:3
- AGA** 31:9 58:15 84:3
98:4 122:22 178:3
- AGA's** 98:19
- agency** 101:10
- agenda** 3:4,7,16 8:3,11
9:19 13:13,18 14:2
15:20 21:10 65:21
66:4 82:12 182:2
183:1
- ago** 5:3 53:16 145:9
155:1 175:4
- agree** 18:17,18 19:7
31:22 34:8 46:8 47:8
47:12 48:15 56:7
62:15 72:2 81:6,10
104:12 120:11,17
121:20,22 122:4
124:12 125:12 135:15
138:13 144:15,17
149:6 151:4 160:21
- 161:1 169:5 172:13
172:22 173:3 177:10
177:17
- agreed** 20:7 78:7 80:14
81:16,18 85:19
138:13,16 139:4
169:2 180:22
- agreement** 19:9 47:11
57:9 173:9
- agrees** 81:20
- Alan** 2:12 3:3,21 4:4 6:7
11:1 13:13,15,19
15:19 24:19 39:9
40:10 44:9 62:13
153:3 182:7,14
186:21 188:2
- Alan's** 12:8 158:6
- Alicia** 74:15
- aligned** 48:10 79:3
- Alliance** 2:4 7:17
- allow** 38:21 47:2 87:10
87:18 100:20 105:21
115:2 119:17
- allowed** 98:17,22
106:20 107:2 132:4
134:15 165:17
- allowing** 88:1 119:19
- allows** 48:9 75:12
- alloy** 128:14
- alphanumeric** 28:12
- altering** 118:9
- alternate** 115:16
- alternative** 36:5 108:12
- alternatives** 134:2
- altogether** 118:11
- amendment** 20:15
- amendments** 20:5,7
80:13 180:22
- American** 46:17 70:15
148:19
- amount** 144:22 166:6
- analysis** 36:20
- and/or** 36:7 137:14
170:16
- Andrew** 2:3 7:7 148:18
148:19 149:14
- Andy** 7:6 60:11,12,13
81:7 89:22 92:1,2
104:19 112:11 118:16
120:9,10 126:4 129:7
164:3 175:11,12
177:17 179:19 181:10
- Andy's** 69:10
- angles** 168:1
- annex** 88:22
- announce** 6:10 69:18
98:2
- anode** 116:1,2,5 118:2
119:2 125:4
- anode-less** 106:8 107:2
108:17 109:3
- anodes** 118:2 121:4
- answer** 25:20 64:19
72:16 73:21 121:7
- anticipated** 108:15
109:11
- antiquated** 59:21
- anybody** 61:3 68:22
120:15
- anybody's** 55:14
- anymore** 44:22 88:5
117:6 144:1 167:14
- anyway** 15:17 78:8
120:16
- APGA** 133:20
- apparent** 148:10
- Apparently** 96:12
- appears** 157:16
- applicable** 27:4 51:11
- applications** 106:16
167:10 168:10,20
- applied** 114:15 173:17
174:22
- applies** 31:1 106:9
108:13 121:18 134:9
- apply** 46:14 63:4 86:12
95:9 99:6,8 100:6,8
108:13 110:5,19
114:22 125:20 131:13
134:18 166:12 173:20
- applying** 26:7
- appreciate** 11:10 40:2
148:20 175:14 180:16
- approach** 37:14 38:2
49:11 50:6 57:22
58:14,18 147:19
183:9
- appropriate** 14:7 18:5,8
21:5 39:14 56:6 91:20
119:13 120:18 121:11
123:4,7,21 124:7,10
126:1,12 131:10
165:3 166:22 171:15
176:4,7,16,19 177:12
- appropriately** 74:1
118:21
- approval** 56:14 59:1
- approve** 96:21
- approved** 136:13
- arbitrary** 64:6
- arced** 149:18
- area** 24:13 79:5 118:22
125:2 146:18 150:14
151:11,13,21 152:2,9
153:11 154:17 187:3
- areas** 23:1,17 44:22

72:21 101:8 152:7
argue 33:3 35:16 41:21
 138:2
argument 143:22
arises 11:20
Arizona 72:22
Arlington 1:20,21
artificial 73:3
asked 10:9 25:18
 124:19
asking 56:4 72:17 76:8
aspect 30:2 31:19 44:3
 51:19 72:2 96:14
 115:10 116:1,6
 137:22
aspects 28:20 52:12
 58:5 95:7 129:22
 137:3
assembled 106:8
 108:17 109:6,9
 134:19
assets 41:22
assignment 97:3
Associate 4:5 6:8
association 70:15
 148:20 167:7
Association's 46:18
associations 22:11
assume 72:21
ASTM 26:6 55:15 70:2
 70:18 72:6 77:11
 106:7 131:4 134:6
 135:2 161:19
ASTM-D2513-14 104:8
attempt 182:16
attendance 13:9
attention 13:5
audience 12:17 13:1
 40:2 62:1 69:1
Audio 158:20
available 12:12 68:12
 86:2 88:19 92:12
 95:15 115:5 116:10
 116:14 117:2 139:3
 170:6
avenue 116:16 118:5
 157:4
avenues 115:7
avoid 145:3 156:12
awarded 183:14
aware 55:15 73:5
 117:14
awareness 54:16
awesome 16:9 178:14
aye 104:13,16,18,20,22
 105:2,5,7,9 112:6,8
 112:10,12,14,16,18
 112:20,22 129:1,4,6,8

129:10,12,14,16,18
 163:20,22 164:2,4,6,8
 164:10,12,14 179:15
 179:16,18,20,22
 180:2,4,6,8 181:6,7,9
 181:11,13,15,17,19
 181:21

B

b 108:16 109:5 160:8,16
 160:22 163:15 170:14
 170:20 171:3,5,15,18
 172:2,9 173:4
back 15:17 25:15 27:5
 45:7,20 50:2 52:2
 53:17 57:1,3,12 65:18
 66:15 74:11 75:4,8
 78:17 79:11,17 82:13
 90:8 101:9 113:3
 121:15 129:21 140:3
 140:11 141:10 152:13
 152:17 158:4 165:13
 168:14 169:13 171:7
backfill 135:20 136:14
 139:5,8,9,20 159:21
 163:10
backfit 130:12
background 17:4
backup 156:3
bad 174:10
baking 72:20
ball 49:7
Ballroom 1:20
bar 34:16 135:4
barcode 32:3,6,7 35:11
 43:14,19 70:21
barcoded 70:18
Barlow's 83:5
base 106:14 107:5
based 23:4 41:2 64:12
 68:14 73:3,3 83:10,14
 84:3 86:18 87:10,15
 94:7 108:3 113:15
 114:9 115:8 116:1
 137:10 138:15 140:16
 165:5 172:14 186:20
 187:16,21
baseline 134:7
basic 18:9
basically 16:12 17:1
 19:21 52:5 108:8
 119:19 144:7 149:6
 149:10 157:3
basis 83:10
bears 41:14
beg 15:4
begins 157:20
begun 187:12

behalf 37:17
behave 11:5
behavior 10:6
believe 69:16 79:3
 122:16 150:9 169:16
 169:18 173:12 185:3
 185:7
bend 135:6
bends 130:6 135:6
benefit 117:14
best 11:4 13:5 142:5
 144:11 149:2 150:2,3
 155:6,19 156:15
better 12:1,2 22:18 43:2
 53:21 105:13 121:15
 126:7 134:2
betting 125:4
beyond 48:16,20 56:9
 64:20 92:6,9 94:10
 186:7
big 11:2 13:6 15:9
 53:20 83:7 88:15
 107:17 149:5 155:11
bigger 57:7 142:16
 167:21
biggest 165:21
bit 10:5 14:15 16:19
 20:11 31:5 32:20
 42:19 43:2 47:2 57:21
 63:18 68:3 120:12
 148:21 159:8
bits 13:12
blame 26:11
board 93:19 116:22
 136:2 140:8 187:6
Bob 7:16 81:13,15
 105:4,6 112:17,19
 129:13,15 155:6,8
 164:9,11 180:3,5
 181:16,18 184:16
 187:8
body 30:18
book 46:20
boom 156:5
bore 152:12
bottom 27:18 29:1 30:4
 32:5 34:16 83:20
bought 67:9
bracket 107:13
brainers 155:21
break 40:15 82:2,3
Brian 69:20 185:16
 187:4
Brian's 71:14
bridges 135:20
briefing 3:4,8,14,16
 9:14 21:11 182:3
briefings 9:21

bright 188:8
bring 21:4 33:1 48:1,10
 51:7 58:6,16 161:13
bringing 30:9 68:19
 82:20,21 85:3
brings 126:19 157:15
broad 85:9 106:10
 113:19
broke 23:8
Brookings 2:5 7:11
Bryan 24:10
BSEE 185:17 187:4
bubble 20:13
buck 67:5
build 10:16 42:14,15
building 6:5 60:15
built 11:16 48:6 175:6
bullet 76:3 78:20 98:14
bulletins 113:6
bumping 83:15
bunch 56:13 61:2
burden 44:8
burdensome 36:22
 136:22
Bureau 185:17
buried 144:9 174:11
bury 120:13 127:5,7
 174:15

C

c 108:20 141:5 160:9,22
C-O-N-T-E-N-T-S 3:1
calibrate 140:18
calibrating 137:2
calibration 136:6,8
 140:10
call 3:2,12 9:1,11 58:3
 74:13 75:18 81:2 82:1
 112:6 121:5 129:2
 142:17 143:5,13,19
 146:8,10,11 150:7,7
 154:14 163:21 179:14
 181:6 187:17
called 86:14
calls 30:6
Cam 76:7 77:14 78:17
 108:11
CAMPPELL 124:18
Cameron 2:16 3:5,13
 6:17 15:21 16:1 21:7
 21:20 23:21 24:3
 37:21 40:14,20,21
 41:3 80:17 102:1
 103:9 110:16 112:4
 115:15 117:18 123:8
 124:1 127:16 128:22
 137:6 139:12 161:17
 162:11 179:11

- Cameron's** 41:6
Campbell 2:2 7:20,20
 47:8 50:12 55:13
 73:20,20 74:3 81:5,6
 90:1,1 97:7 100:16
 104:17,18 111:10,10
 112:9,10 118:12,12
 124:11 125:18 126:3
 126:6,13,17 129:5,6
 141:15,15 162:16,19
 162:20 164:1,2 172:7
 172:8 173:3 179:17
 179:18 181:8,9
Canadian 187:6
cap 84:9
capital 32:22 33:2,5
capture 35:14 36:18
 77:19 178:5
captured 76:17 180:12
 180:15
capturing 36:19 44:6
 56:17 74:18 75:9
card 13:4 60:12
care 100:10,18
careful 150:14 151:12
Carolina 2:7 7:14
carried 18:6
case 6:5 29:6 72:19,21
 94:21 188:7
cases 115:3 122:16
 134:1,14 152:5
 172:18
casing 109:4
casings 135:20
cast 86:8
categories 77:17,18
 80:12 82:19
category 113:10,12,13
 113:14,17,18 115:2,4
 116:9,15,20,22 136:1
catholic 114:7 115:12
 117:12 125:15
cathodically 114:1,17
 115:20 117:22 122:10
 122:17 123:2,15,19
 126:14 128:17
cause 120:1
caution 61:6,20 73:5
 121:14
cautious 61:12
CEE 71:3
cements 130:22
Central 24:7
certain 54:21 67:10
 106:16 135:22 168:20
certainly 5:4,8 10:3,7
 38:14 39:6 43:14
 49:10 54:20 55:1
 62:20 65:9 83:8 85:19
 101:9,10 107:4
 109:13 135:15 166:21
 187:2
certificate 72:12
cetera 27:17 28:22 64:9
 87:14 92:13 139:19
 141:2
CGA 149:2 151:6 155:7
 155:8 156:21
Chad 105:3
chair 1:22 2:2 3:3,6,10
 3:11,18 10:21 11:1
 15:17,19 16:22 17:17
 21:7 23:22 39:13 41:5
 44:9 46:3 47:7 50:8
 51:20 58:19 60:6,11
 62:13 64:14 67:13
 69:3,14 70:12 73:8
 74:13 75:17 76:14,21
 77:5,18 78:11,15
 79:11,14,16,21 80:15
 80:17,20 81:4,19,22
 82:5,11 89:21 92:1
 96:12 97:9 98:1
 100:15 101:19 102:1
 102:10,17 103:3,9
 104:16 109:14 110:11
 111:22 112:3,8 113:2
 117:7 118:8 120:9
 122:19 123:8,22
 124:4,16 125:20
 126:5,10,14,21
 127:13,21 128:21
 129:4,20 138:10
 141:9 142:12 143:20
 145:20 147:14,22
 148:15 156:11 157:15
 158:14 159:13 160:19
 161:2,6,9,15 162:11
 162:18 163:17,22
 164:16 169:10 171:2
 172:2,5 173:5 174:1
 175:10 177:21 178:7
 178:14 179:11,16
 180:10,16 181:3,7
 182:1 186:3 188:2
chairing 4:16
challenges 31:18
chance 102:3
change 19:18 48:14
 57:13,20 68:6 91:10
 91:22 116:4 163:8
 166:8 171:20
changed 27:10 159:7
changes 20:9 32:9
 37:19 41:2 68:13,18
 76:15 80:5 88:12
 91:19 104:3 107:3,19
 109:12 111:7,17
 113:16 115:6 117:11
 128:9 154:7 161:4
 163:5 171:21 179:1
changing 32:9
characterize 90:4
charge 11:2
checking 119:3 124:22
Cheryl 2:2 7:20 16:5
 46:4 47:7 54:13 66:19
 73:19,20 81:5 89:22
 90:1 92:4 100:15
 104:17 111:9,10,22
 112:9 118:11,12
 129:5 141:14,15
 162:19 164:1 172:7
 179:17 181:8
Cheryl's 123:1 127:7
Chief 6:22
choice 127:11,19
choose 171:9
Chris 24:14
Christina 122:22 125:7
 178:3
chunks 40:16
citation 22:8
citizens 22:12
City 2:7 7:14 24:11 46:6
 58:21 66:18 69:5 77:9
 117:10 142:14 146:1
 152:20 158:6 160:21
 169:13 173:7 178:16
civil 10:11
civility 10:17
claim 35:5
clamp 165:11 177:2,5
 177:19
clamps 165:9 173:8,9
 173:15 174:7,10
 175:5 176:13 177:19
 179:4,9
clarification 97:14
 108:16 110:18 130:21
 131:13 134:4 141:13
clarifications 166:15
clarified 131:11
clarifies 111:19
clarify 58:9 91:9 107:1
 110:8 114:6 137:5
 162:2 163:6 167:2
 176:17 179:3
clarifying 161:18
clarity 88:12 157:13
clear 49:20 53:5 62:6
 77:3 78:4 93:4 102:14
 121:11 130:22 139:10
 152:3 156:9 171:21
 175:21 176:9
clearance 133:6 137:12
 148:6,22 149:3 152:2
 152:10,13 153:15,19
clearly 53:12 131:2
 162:5
click 78:20
close 49:7 87:2 89:2
 153:17
closed 22:9
closely 37:20
closer 53:19
coalescing 156:17
code 18:5 28:11,12,16
 34:16,17 38:12 53:13
 53:18 59:8,19 65:2
 71:3,6 83:22 85:4
 87:4,13,17 88:10,19
 91:2 93:3,10 95:5
 100:6,22 105:21
 110:2 132:16,20
 134:8 135:14 137:22
 139:6,7 152:8 156:8
 159:10 165:1,16
 168:18 171:20,22
 177:7 187:14
codes 28:18 56:13
 88:14
codified 157:21
codify 149:4
coil 55:20 74:6
collaborative 177:15
combined 14:3
come 53:3 58:12 66:6
 90:12 94:10 117:3
 121:1 147:12 152:13
 165:13
comes 147:17 148:1
comfort 120:5 142:3
 158:7
comfortable 122:10,15
 142:10 158:8,17
 159:7
coming 11:18,21 15:6
 31:18 44:14 57:11
 89:10 125:14 158:2
comma 124:4 125:22
 127:18
comment 13:3,14,15,21
 22:8 36:21 69:5 71:14
 76:8 83:13 87:18 88:9
 90:9 91:12,16 95:21
 97:3,12,13 99:3
 101:18 116:9 117:19
 140:5 150:19 155:9
 173:7
commented 160:6
commenter 154:6

- commenters** 35:5
37:11 106:17 135:13
136:15
- comments** 8:15 12:21
17:5 22:10 24:22 27:2
31:3 34:20,21,22
35:10 37:4,5 39:7
40:6 41:3,7 46:9 58:2
60:9 64:11 68:22
69:10,16 70:13,17
78:8 83:15 84:12 85:8
85:10,17,20 86:15
88:7 89:21 93:21 98:1
98:19 103:14 106:10
109:14 110:11,14
111:1 113:19 114:8
114:10 115:1,8,17,19
116:8 117:7 118:7,8
122:19,21 127:14
130:9 131:16 132:10
133:17,18,20 134:12
136:9 137:10 139:4
140:13 141:6,7,11
145:20 146:2 148:16
160:7 161:3,19 165:3
166:17 167:15 168:7
169:10 170:19 171:2
172:6 174:1,3 175:11
177:21,22
- commercialized** 32:12
- commercially** 86:2
88:18 92:12 95:15
116:10,14 117:2
175:7
- commissions** 57:3
- commitment** 11:12
- committee** 1:5,19 3:2,3
3:6,6,9,10,11,12,18
3:18 4:7,9,10,13,14
5:5,7,8 7:5 8:4,14,20
9:18,20 10:2,9 13:7
13:17 16:21,22 17:11
17:16,20 18:2,6,9,10
18:16,22 19:1,3,11
20:1,8,17 21:2,8
22:21 23:22 39:22
40:5 41:8,12 49:9
54:17,17 63:7,22 64:2
65:12 68:7,14 72:9
77:6 79:22 80:14
88:16 89:22 96:7,15
97:11 101:20 102:17
103:14,21 109:14
110:12,17 111:8,13
116:8 117:7 118:9
122:20 123:10 124:1
127:14 128:4 138:3
141:4,11 148:15
- 156:14 157:17,22
158:15 160:15 162:13
162:22 169:11 171:3
175:11 178:1,9,18
179:6 180:13,18
182:7 183:20 184:12
184:14,22 185:21,22
188:3
- committee's** 8:10 17:21
- committees** 8:21 15:7
18:11,18 24:9 40:11
58:3,4,4
- common** 2:4 7:16 31:20
33:12 86:20 132:16
132:16 149:16 183:4
187:3
- commonly** 182:18
- companies** 41:13 42:8
47:5 48:5 66:20 67:19
- company** 22:17 45:11
56:14 57:7,8 146:17
- compelling** 143:22
- complain** 24:18
- complete** 103:11
- completely** 62:10 115:9
115:18 118:7 120:13
149:6 154:7 165:5
168:2,17 169:1
170:20
- complexity** 75:1
- compliance** 38:9,20
76:19,20 77:2 80:7
133:9 147:10 149:12
- complicated** 45:9 51:15
55:18 151:1
- compliment** 24:17
- comply** 139:10 143:18
163:11
- component** 28:13,22
71:10 166:16 170:17
- components** 49:4
166:2,13
- comprehensive** 42:4
44:5
- computer** 43:18
- concept** 41:18 67:14
96:13 174:9,12
- conceptually** 56:7 57:8
- concern** 35:1 44:12
78:16 109:21 142:14
156:14 170:14 173:11
173:15
- concerned** 160:16
- concerns** 41:12 46:16
73:11 106:12 109:19
113:20 114:14 133:4
137:16 140:22 160:17
- conditions** 32:15
- 115:14
- conflict** 135:16 169:4
- conformance** 72:12
- confused** 43:9 44:2,7
92:19
- congressionally-**
183:12
- congressionally-man...**
183:13
- connect** 108:20
- connection** 50:9
- connections** 130:7
136:3
- notation** 142:6
- consensus** 55:7 60:15
66:7 67:16
- consequence** 187:11
- conservative** 86:14,19
87:5
- consider** 18:2 56:3
69:10 86:20 96:8,22
104:7 153:15,19
162:14 178:9
- consideration** 69:21
154:6
- considered** 36:3 70:4
100:9 109:22 167:22
- considering** 96:14
111:4
- considers** 148:16
- consistency** 121:16
176:5
- consistent** 25:2 27:3
71:12
- consistently** 121:12
- constantly** 54:3
- constraints** 184:11
- construction** 2:3 106:6
- consultants** 22:12
- contacted** 147:4
- contained** 128:16
- content** 164:21
- context** 94:3 166:19
- continue** 39:9
- continued** 3:14
- contractor** 147:3
- contractors** 182:18
- contractual** 73:15
- contribute** 12:8
- contributes** 11:17
- contributing** 11:22
- control** 120:8
- convenient** 62:17
- conversation** 61:4,13
68:20 103:13 186:8
186:19
- conversations** 186:6
- conversing** 95:21
- convey** 182:17
- coordinator** 24:15
- copies** 43:21
- copper** 85:14
- copy** 98:7 161:12
- Cordova** 25:15
- cornered** 134:16
- correct** 55:14 79:10
96:16 99:4,21 126:13
144:22 148:12 175:19
- correlate** 29:5 87:20
- correlates** 87:21
- corrode** 121:21
- corrosion** 116:8 117:16
119:1 120:1,1 124:21
- corrosive** 127:8
- cost** 20:4 43:10 44:7
46:16 114:14
- cost-effective** 19:6,15
80:4 104:2 111:16
128:8 163:4 178:22
180:21
- costly** 117:13
- costs** 33:1
- Counsel** 6:22
- country** 72:22 73:6
- County** 2:5 7:11
- couple** 9:3 11:9 15:15
17:9 40:12 53:16
65:21 83:15 99:20
115:7,17,19 146:2
149:22 158:3 165:15
166:3 168:1
- course** 5:10 14:20 16:7
16:15,17,20 17:18
20:16 23:1,3 40:11
99:18 146:22 147:1,5
153:7 179:14
- court** 20:20 87:8 103:12
- cover** 9:22 14:2 88:21
99:17
- covered** 10:18 92:21
93:1 109:18 130:2
148:12 160:2
- covering** 14:13 71:19
109:19
- create** 61:1 119:6
- created** 143:13
- credible** 187:21
- crew** 11:5 25:19 74:5
- criteria** 90:6,14 120:17
128:16 165:2 169:17
175:19 176:4,17
177:12 179:7
- critical** 155:18
- cross-bore** 133:11
154:8 158:19
- cross-bores** 145:4

155:22 156:1,13
crossover 85:16
CTS 85:12,14 88:13
 97:21 102:11,13
curious 44:11 54:15
 148:21
current 17:20 26:18
 27:9 82:15 93:12
 115:11 134:22
currently 31:16 85:1
 88:20
customer 33:4 131:8
cut-off 170:1
cycles 140:16

D

d 141:5 160:8,9,16,22
 163:15
D2513-09a 70:2
D2513-12 99:3
Dakota 7:11
damage 155:12 157:9
 169:19 170:11 183:7
damaged 149:17
damages 155:11,13
data 25:3 36:19 44:5
 152:17
date 32:9 66:12 70:7
 77:11 84:20 90:22
 98:17,21 101:7 110:2
 110:19 173:22
day 9:16 16:1 25:13
 122:8
days 5:6 15:16 40:12
 47:18
deal 149:5 182:21
dealing 62:21 96:2
 118:21 119:12
decades 118:2 166:4
decide 120:22
decides 49:9
decision 16:20 171:6
decorum 10:6,10
dedicated 66:5
deemed 125:15
defer 38:2 40:19 41:3
 49:8 95:6
define 106:14 120:17
 176:4
defined 27:1 153:7
defining 157:12
definitely 14:6 26:2
 37:19 91:14
definition 29:16 37:19
 37:20 40:22 76:11
 77:16,22 78:2,5,9
 131:21
definitions 27:2,3 37:3

78:1 80:11
delay 38:21 59:5,8
 66:10,12
delayed 66:8
delaying 58:22
delete 117:19 124:4,5
 139:19 141:5 160:7
 160:16 163:14 170:20
deleted 164:21
deleting 124:7 140:5
 141:7 164:21 168:22
deliberate 61:7
delineates 149:2
demonstrate 101:6
 162:8
demos 63:10,15
density 70:3,3
department 1:1 2:2
 4:17 6:11 12:1 45:20
depending 154:15
depends 27:22
Depot 131:9
descriptive 184:6
design 23:9 30:19
 82:20,20 83:10,21
 84:2,5 86:12,14,17
 87:1,10 88:2 90:19
 91:1 98:18 100:5,11
 100:22 103:7,8 104:9
 104:10 106:6 121:19
 135:17 166:16 177:3
Designated 2:12 4:15
designation 87:13,17
 88:10,14 91:2 102:14
designed 83:3 108:18
 108:22
designing 150:21
desire 71:17
destroyed 150:1
detail 185:21
details 82:14
detection 66:1
determine 142:2 143:10
 153:14
develop 15:13 47:3,6
 153:8 186:15,18,19
developed 55:6 67:20
 74:17 155:7 167:4
developing 14:17
development 37:9
 65:16 146:21,22
 179:6
deviate 162:8
deviated 70:18
deviates 134:13
device 131:19,21 132:1
 132:4 138:13 139:18
 159:17 163:8

devices 12:18
dialogue 11:15
diameter 84:10 85:1,6
 85:21 86:8 95:17
 97:16 115:3 134:1
 138:17 163:9
diameters 86:9
difference 157:16
differences 37:4
different 6:2 26:7 31:6
 33:19 38:7,8 48:9
 50:20,22 57:2,3 62:4
 62:11 73:6,18 78:1
 82:19 92:12 95:3
 185:1
differentiating 92:20
difficult 25:11 30:14
 32:8 33:16 34:6 47:22
 65:13 66:3 101:16
 157:11
difficulties 22:15 122:7
dig 35:19 142:20 143:9
digging 143:12
digits 28:13 32:10,10
dimension 86:18,21
DIMP 24:15 25:4 151:17
 168:4
dinged 147:10
direct 15:4
direction 177:2
directions 33:19
directly 146:11 156:20
Director 6:15 185:16
 186:5
dirt 120:14
disadvantages 184:6
disagree 150:18
discrete 68:13
discretion 175:15
discretionary 153:11
discuss 10:13 15:9
 168:19
discussed 20:9 76:15
 111:6 178:6
discussion 3:6,9,11,18
 8:13,14 9:2,6 17:11
 40:8 61:10 68:15
 148:20 166:18 186:15
discussions 72:9
distance 27:21
distinction 78:12
distribution 23:2 41:13
 114:22 123:5 155:11
 155:13
distributions 185:5
disturbed 12:19
ditch 35:19
Division 24:11

doable 45:10 48:4
docket 12:13,14 20:22
 184:19
document 20:18
documentation 56:18
doing 16:10 32:17 33:6
 38:11 49:8 54:7 55:2
 55:3 87:7 105:12
 151:5 152:4,12
 161:17 162:6 172:19
dollars 45:7
domestically 184:4
Dominguez 2:11 14:4
 39:15,20
Dominion 69:21
doors 6:1
Dr 4:17 10:21
draft 18:3 19:5,13 20:2
 80:3 104:1 111:15
 123:9 128:6 161:10
 162:14 163:2 178:8
 178:21 180:20
Drainage 2:5
Drake 2:3 7:7,7 60:13
 60:13 81:7,8 92:2,2,8
 92:18 94:5,9,14 96:17
 104:19,20 112:11,12
 120:10,10 126:8
 129:7,8 164:3,4
 175:12,12 176:12
 177:9 179:19,20
 181:10,11
draws 147:2
drilling 136:6
drop 35:1 37:12 66:13
 120:13 133:10 139:8
 159:22 163:9
dropped 117:13
Dropping 139:5
dryer 33:9
due 117:15 155:14
durability 33:8
duties 17:22

E

e 84:8 168:16 169:1
earlier 49:18 52:2 66:9
 74:3 90:9 97:6 166:19
early 185:19 187:8
 188:8
easier 82:18
easiest 168:5,16 170:19
easily 46:21 75:12
 90:15
East 25:21 69:21
easy 55:19 141:17
echo 46:6
economically 35:6

134:2
editions 166:17
editorial 88:8
effect 110:3 156:18
effective 5:7 20:4 25:8
 84:20 90:22 98:17
 100:12 101:7 173:22
 186:16
effectively 29:17 50:2
 68:2
efficacy 187:13
efficiently 8:17
effort 14:16 142:19
 164:20
efforts 12:8 142:5
EFV 167:17,19 169:3
EFVs 34:2 66:2 167:15
 169:3,7,7
eGov 12:13
eight 57:2,3
either 25:11 36:15
 52:19 62:5,8 71:19
 72:2,15 114:8 115:18
 138:8 159:3
elaborate 59:2
electric 149:16,17
electrically 128:14
electrodes 121:19
electrofusion 174:21
 174:22
electronic 12:18 63:11
elicit 106:21
eliminate 107:4 148:2
emails 16:8
emergency 6:5
emotion 10:15
encased 106:2
enclosed 130:18
encourage 125:9,10
 186:20
energy 2:2,2,3 4:18 7:8
 7:21 11:12 60:14,21
 73:21 90:2 92:3
 111:11 118:13 120:11
 121:3 141:16 162:20
 172:8 175:13 187:6
enforcement 65:5
 94:22 185:18
engage 127:2
engagement 10:1
engineer 153:1
Engineering 6:20 24:1
 24:6
English 153:2
enhanced 139:5 163:10
enhancements 132:12
ensure 73:16 108:14
 127:1 186:16

entire 27:20 140:20
 143:9
entirely 35:1 37:12
 132:6 133:10 138:17
 138:22 139:9 140:6
 159:20,22
entities 22:10,12
entity 86:13,13
Environmental 185:17
EPI 176:21 177:1
equation 83:1
equipment 47:11 136:4
 136:6,8,19 137:2
 141:1,2 153:21 160:3
 163:14
equivalent 36:3
Erickson 70:14,14
Erin 98:3 99:21
err 120:20,20 121:15
especially 67:8 75:6
 118:3 152:6
espousing 120:15
essentially 50:19 84:19
 85:3,5 86:18 113:16
 123:17 139:1 160:10
 160:11 171:19
established 4:13 13:8
 17:19
esteemed 10:21 11:2
et 27:17 28:22 64:9
 87:14 92:13 139:18
 141:2
etching 32:18
eternal 186:8
evacuation 5:19
Evaluation 18:3 19:5,14
 20:3 80:3 104:1
 111:15 128:7 163:3
 178:21 180:20
event 42:1 94:16
events 187:12
eventually 45:15 54:1
everybody 183:3
 184:21
everyone's 76:22 78:4
 103:4
exactly 57:18 64:15
 99:13 100:16
examine 155:10
example 27:18,19 29:1
 32:3 33:13,22 34:12
 40:21 51:21 52:3,18
 100:13 151:8
examples 27:14 32:4
 37:22 146:3 147:18
excavation 130:3,10,12
 137:5 141:12 149:11
 153:18 163:6

exceeding 170:15
excellent 69:10 79:16
 82:5 163:17 164:16
 179:11 181:3 182:1
exception 117:11
exclude 90:7
exempt 131:17 143:6
 167:15 169:3
exercise 82:1 186:7
existing 163:11
exit 6:3
expand 49:13 59:4 69:9
 184:9
expanded 23:10 46:15
 48:16
expanding 69:11
expansion 184:11
expect 45:2 64:20
expectations 38:1
 137:6 141:13 163:7
expected 144:8
expensive 121:4
expert 22:3 182:11
experts 184:1 185:1,2
explain 27:7 31:16
explanation 29:16
explicitly 132:17
explore 101:21,22
 102:19
explosion 149:14
exposure 72:10 73:7
extend 61:11,13,21
 62:6 68:4 76:2
extended 39:17 77:2
 80:8
extending 61:5 76:16
 82:21
extent 32:21 35:17
 91:11
external 109:11
external/internal
 108:15
extrapolate 54:20
extremely 187:5
eye 127:10

F

F 2:2,6 128:16
F-2897 80:13
F1973 106:7 108:18
F20817 166:11
F2620 134:7 161:19
 162:3
F2620-12 135:3
F2897 37:2,21
FOIA 4:14,15
facilities 143:15 146:5
 146:12 155:9,14,15

155:16 158:11
fact 67:1,4 101:14
 175:13,15,18
factor 23:9 82:20,21
 83:21 84:3,5 86:12,14
 103:7,8 104:9,10
factors 135:17
factory 106:8 108:17
 109:6 134:18
factory-assembled
 108:7
fading 73:9
failure 119:20
failures 117:15
fair 24:21 65:6 121:17
 130:9 166:6
fairly 8:7
familiar 13:2 14:21 49:1
 85:13 113:11
fan 64:5
FAQ 101:4 156:22
far 17:8 44:14 149:21
 183:21
Faraq 74:15,15
faster 33:9
favor 81:4,8,12,14
favours 81:20
feasible 19:6,15 20:3
 57:21 80:4 104:2
 111:16 128:7 163:3
 178:22 180:21
feature 8:8 9:14
federal 2:12 4:14,16
 10:8 19:4,13 20:2
 22:7 24:12 80:2
 103:22 111:14 128:6
 163:2 178:20 180:19
 187:4
feel 37:8 46:7 117:3,6
 141:6 159:11 160:6
 168:7
feeling 37:11 107:20
 136:11,20 159:22
feelings 116:21 133:4
feels 42:5,6 45:19
 118:22 119:8 138:3
 168:17
feet 27:21
felt 35:6 38:10 92:20
 114:8 134:2 138:19
 164:18
field 48:12 63:13 64:8
 75:3 107:11,14 109:9
field-assembled 106:19
 108:8
fields 70:20
figure 21:16 38:7 39:1
 54:6 57:18 61:17

146:9 159:6 174:17
figured 122:13
fill 176:2 177:10 182:14
final 15:4,4 70:19 76:10
 89:19 101:17 123:10
 167:18 180:13,14
 182:2
finalizing 65:21 66:1
finally 9:17 26:13 51:2
find 25:11 35:19 41:22
 46:21 77:14 121:21
 131:9 142:16,19
 144:11 147:7 176:16
 187:9
finds 19:3,12 20:1 80:1
 103:21 111:13 128:4
 162:22 178:18 180:18
fine 65:5
finish 39:14 148:4
first 5:12,18 15:20
 40:17 41:16 70:16
 88:17 97:15 139:14
 152:12 160:11,18
 162:2
fitting 25:12 30:12
 33:14 34:1,6,13,14
 36:16 114:1 115:22
 119:7,18
 fittings 23:11 30:13,15
 30:17 31:2,2,6 33:12
 34:4 38:4,5,8 51:12
 113:3,4,7,10,21
 114:13,16 115:13
 117:5 128:5,14
 130:17,19 174:22
five 37:15 45:13,15 48:3
 59:4 68:5 76:2 80:8
 95:17,17
five-year 48:4 59:6
fix 97:15 144:11 156:7,9
fixes 159:18
fixing 97:17
Fleck 2:3 7:22,22 41:9
 41:10,10 44:16 45:17
 56:2 60:8 64:15 74:2
 80:22 81:9,10 97:14
 97:19,20 103:18,18
 104:21,22 109:16,16
 112:13,14 122:3,3,8
 127:4,19 128:2 129:9
 129:10 143:21,21
 148:13,18 158:16,16
 160:1,13 161:1,16,16
 161:22 162:4,10
 164:5,6 171:4,4 174:3
 174:4 175:8 179:21
 179:22 181:12,13
flex 106:15 108:2

flexibility 131:21 159:8
flexible 91:19
floor 102:5
flow 165:12
focus 22:19
folks 23:6 24:4,5 25:6
 25:22 32:17 43:12
 49:6,7 52:19 73:10
 86:7 118:17 131:7
 140:8
follow 26:5 32:1 37:8
 51:17 53:6 59:13,15
 59:20,22 85:5 97:4
 146:1 157:4 172:12
 172:16
followed 20:6
following 20:5 80:5
 104:3 111:17 128:8
 163:4 166:3 179:1
 183:9
follows 128:13 183:18
fondest 5:6
foot 95:17,17
footprint 32:19
footprints 33:20
forcing 159:5
forever 174:12,15
forget 30:5 83:2
form 58:2 116:12
format 29:10
former 150:20
formula 83:6
forth 77:7 140:4 168:15
forum 177:14
forward 5:13 13:17 15:8
 15:13 17:14 40:6 63:3
 65:22 68:15 96:8
 110:6,19
found 134:8 187:2,9
four 134:1 161:3
four-inch 85:1
framework 155:7
frankly 48:3 132:8
frequently 125:1
Friday 9:17
front 162:12
full 46:20 92:14 101:18
 116:5
full-on 114:19
fully 41:18 44:16 47:9
fun 18:12 105:14
funding 57:4
further 127:14 177:8
fused 25:12
fusing 116:17 137:2
fusion 25:22 31:1
 131:13 133:22 134:5
 138:16 139:14,18

141:2 163:9
fusions 133:19
future 89:20 174:6,9,19

G

g 115:18 117:18,19,22
 118:6,9,10 120:13
 121:18 123:18 128:12
 128:13,13 133:13,16
Gale 2:13 6:15,15 65:11
 65:11 68:17 75:19
 91:13 101:13,13,22
 180:11 184:16
Gallery 1:20
Gant 1:22 2:2 4:17
 10:21 11:1 15:19 21:7
 39:13 41:5 44:9 46:3
 47:7 50:8 51:20 58:19
 60:6,11 62:13 64:14
 67:13 69:3,14 70:12
 73:8 74:13 75:17
 76:14,21 77:5,18
 78:11,15 79:11,16
 80:15,17,20 81:3,4,19
 82:5,11 89:21 92:1
 96:12 97:9 98:1
 100:15 101:19 102:1
 102:10,17 103:3,9
 104:15,16 109:14
 110:11 111:22 112:3
 112:7,8 113:2 117:7
 118:8 120:9 122:19
 123:8,22 124:4,16
 125:20 126:5,10,14
 126:21 127:13,21
 128:21 129:3,4,20
 138:10 141:9 142:12
 143:20 145:20 147:14
 147:22 148:15 156:11
 157:15 158:14 159:13
 160:19 161:2,6,9,15
 162:11,18 163:17,21
 163:22 164:16 169:10
 171:2 172:2,5 173:5
 174:1 175:10 177:21
 178:7,14 179:11,15
 179:16 180:10 181:3
 181:6,7 182:1 186:3
 188:2
gas 1:5 4:7,9,12 7:8 8:4
 8:20 9:9,14 10:2
 14:21 18:14,22 22:19
 22:21 25:17 41:12,13
 46:17 63:1 65:22
 69:21 70:15 135:22
 142:17 145:11 146:7
 146:20 148:19 149:7
 149:15,19 150:4

151:8 155:10,13,15
 156:2,4 185:4
gathering 23:2 89:11
general 23:13 37:10
 67:13 71:16 107:20
 108:9 130:6 131:16
 133:4 157:18 165:19
 172:6,12 174:2
 178:19 182:19
generally 20:6 27:7
 107:7
generated 20:20
generic 36:10 134:8
 154:9 167:3
getting 16:4 25:6 56:11
 65:14 147:15 171:6
GIS 47:16,17
give 14:13 16:5 17:4
 21:13 22:13 23:18
 25:20 29:8 38:22 39:4
 42:21 51:20 57:15
 65:12 142:3,11 146:2
 155:7 162:17 167:9
 178:10 182:8
given 25:13 101:11
 103:16
gives 29:15 48:11
 151:18 157:2
giving 22:1 151:20
glad 15:8
gnats 56:3
go 4:20 5:15,17,22 7:4
 7:6 8:5,7,22 13:22
 15:8,13 16:14 18:21
 19:22 23:15 29:22
 31:10 33:3 40:20 41:5
 43:7 45:20 49:14 50:5
 51:5 52:2 53:15,17
 54:5,8 55:20 56:9,13
 57:3 58:11 63:3 72:8
 78:17,20 79:11,17
 83:18,19,22 84:11,16
 86:5,22 87:21 88:3
 89:1,7,14,18 90:11
 91:6,15,22 93:6,7,17
 93:21 95:11,22 96:5
 101:9 108:11 115:7
 115:16 116:16 119:19
 121:7 130:8 131:9
 133:13 137:7 138:9
 138:10 141:10 150:21
 159:3,6 160:3 162:18
 169:13,14 170:20
 177:1 185:9,20
go-to 49:13 136:12
goes 6:3 29:21 47:17
 57:12 64:19 70:6 83:9
 92:9 110:2 122:18

156:5 183:15
going 14:19 15:15,20
 16:2,18 17:2,3,4,5,8
 21:13,14,15,19 22:2
 22:13 23:15,18 24:22
 26:5 28:15,17 29:4
 31:12,17 39:13,16
 42:14,15,16,17 43:3,9
 43:10,18 45:22 46:21
 48:8 49:15 55:20,20
 55:21 56:12,15 57:18
 59:4,9 60:3 61:16,20
 63:13 64:16 72:4
 73:17 75:20 81:2 82:1
 82:2 88:6 89:9 99:14
 100:17 104:12 110:6
 112:6 118:13,15
 119:6 121:1,21
 124:12 125:5 129:2
 138:20 139:1 142:10
 142:15,20 143:11
 144:3 145:7,17
 146:13 147:7,8
 158:10,22 161:12
 169:9 171:11 176:5
 178:12 182:13 184:2
 184:3,19 185:1,14
golf 146:22 147:1,4
good 4:3,22 12:6 48:21
 58:16 61:21 65:4
 68:21 81:22 82:4
 118:14 142:11 167:9
 167:12 174:12,15
gosh 10:14
gouge 170:6
gouges 170:8,15
 172:19
government 22:12
GPAC 1:5
GPS/GIS 43:13
GPTC 105:20 106:1
 156:20,21,21
grab 74:6
grand 34:1
granted 71:21 151:1
grasp 153:4
great 6:11 21:9 55:22
 64:21 97:19 105:14
 105:17 113:2 151:6,8
 161:9,15
greatly 40:2
Grid 2:4 8:1 41:11 42:8
 45:11 97:20 103:19
 109:17 122:4 127:4
 143:22 158:17 161:17
 171:5 174:4
ground 2:4 7:16 36:17
 55:21 67:8 105:22

107:16 118:4 121:21
 122:18 124:13 135:22
 150:21 165:13 166:6
group 7:9 24:2,15 39:7
 39:19 90:17 132:7
 151:13,16,22 176:1
groups 14:3
GTI 84:4
guarantee 72:1
guess 5:18 21:16 24:16
 24:19 40:19 43:8,9
 44:2,14 57:12 70:15
 74:7 87:7 88:17 89:6
 91:5 92:18 99:10
 100:7 107:17 108:1
 124:14 141:3 157:5
 177:6
guidance 8:10 13:13
 25:8 58:10,12 151:5
 151:14 153:8 155:22
 157:1,14 172:12,17
 175:21 176:8
guide 134:7
guises 134:19
gum 20:13
guys 118:18 143:1

H

hand 16:15 62:16 143:9
handle 109:10
handling 167:3
handout 184:13
handouts 184:17
hands 41:9
happen 25:10 45:5
 57:10 64:8 117:6
 119:21 146:21
happened 28:2
happening 34:19 156:6
happens 42:1 53:9
hard 36:8 90:6 119:17
 125:13
harder 103:3
Harlem 25:21
Harold 24:6
hate 69:6
hazardous 1:2 15:1
 18:15 66:1
HDB 83:9 87:11
head 50:15
heads 159:17,19
hear 45:18 60:14 64:10
 76:8 87:8 100:20
 120:15 183:22
heard 76:1,4,6 110:17
 123:15,20 124:6
 180:13
hearing 26:19 67:13,16

156:11,13 160:12
 176:9 185:14
heat 131:13
heavy 65:20
heck 95:15 105:14
held 64:22 65:1 158:11
 171:17
hello 14:8 39:16,21
help 35:14 46:21 53:9
 61:3 75:21 78:19
 120:18 141:17 160:6
helpful 40:15
helps 24:12 31:15
hey 93:21 109:9 119:11
 157:1
hi 46:5 98:3 99:1
high 70:3 187:11
higher 93:13
highly 44:19
Hill 2:5 7:10,10 79:14
 79:19,21 80:16 81:13
 81:14 105:4,5 112:17
 112:18 129:13,14
 163:16 164:9,10
 180:3,4,17 181:16,17
Hilton 1:20
hire 42:16
hired 147:3
hires 182:18
historically 121:13
history 26:3 131:18
hit 143:1 147:9,11
 154:20 155:3 159:1
hold 65:8 97:9
holding 132:7 149:7
hole 145:12,12 152:12
Holohan 24:6
Home 131:9
homeowner 154:21
 156:3
homework 97:3
honest 43:11 137:16
honestly 50:4 63:15
 85:10 172:11
hope 53:22 78:4 82:17
 95:11
hopefully 47:5 71:19
horns 145:18
hotel 63:12
hours 82:16
house 107:12 146:14
 146:15 149:20,22
 156:4
housekeeping 4:21
 12:9
hub 30:18
hump 53:22
hydrostatic 83:10

hyperlink 78:18

I

IBRing 99:22
idea 29:8 119:22 125:6
 126:21 156:19
ideas 151:18,20
identification 132:18
 132:21
identify 25:3 144:4
 150:15 152:1,14
identifying 151:12
IDs 71:10
ignited 145:13
imagine 34:2 43:16
 54:17 63:12 114:15
 119:17
impact 50:7 60:3,4
 66:10,13,16
impacted 23:1
impacting 18:14
impair 169:20 170:12
impaired 170:2
imperfection 169:19
 170:11
implement 33:16 67:18
implementation 37:15
 38:22 44:13 45:15
 54:21
implementation-type
 55:9
implementations 74:21
implemented 67:22
implementing 55:17
 75:2
implications 75:7
importance 67:15
important 5:8 12:5
 41:16,21 83:12
 102:20 107:8 182:22
 186:7 187:1
impossible 44:19
impressed 11:15
inadvertently 99:10
inch 59:9 84:11 85:18
 86:10 92:21 131:17
 133:19,22 134:1
 138:18 159:19
inch-and-a-half 29:6
inches 85:2 91:4 92:6
 150:2 152:15
incident 35:18 131:18
 145:9,14 165:10
incidents 25:10,14 26:3
 156:1
include 18:4 24:5 45:22
 46:12,15 88:14 99:4
included 144:18

including 17:16 22:10
 99:8 149:1
inclusion 120:21
inclusive 61:16
incorporate 56:10 60:5
 90:10 98:5 106:7,18
 111:20 134:22 166:11
 167:19
incorporated 27:9 28:8
 28:10 90:15 92:17
 104:6 128:10 131:4
incorporating 51:13
 59:11 94:15
incorporation 23:11
 94:18 98:10
incredulous 120:12
incumbent 171:13
 176:1
indent 30:15 32:7
indent-type 29:19
indentation 30:1
indented 31:21
indicate 18:5
indication 157:2
induce 120:1
industries 184:4
industry 7:8,15,21 8:1
 10:14 31:16 33:18
 35:10 124:15 142:18
 147:8 149:1 156:16
 166:3 170:3,4,5
industry-wide 179:7
information 26:22
 27:16 28:10 35:14
 36:18 42:13 50:13
 56:17 73:13 74:18
 77:12 142:8 161:13
 185:10
infrastructure 48:20
inherently 71:7
initiatives 26:20
ink 29:21,22 32:12 33:6
 72:4
innovation 186:11
input 17:12 45:18 64:13
 88:16 141:4 177:16
insert 8:12 20:14
inserted 135:19
inside 71:20 92:8
inspect 159:10
inspection 140:15
 151:9
inspector 58:5
inspectors 24:8,13
 35:16 71:17,22 72:17
install 64:9 70:5 74:1,5
 86:9 119:13
installation 23:12 35:15

36:12,16 38:6 63:8,18
 64:4,19 65:8 68:10,12
 70:7 72:19 73:14 76:5
 76:6 129:22 130:2,6
 130:11 133:7 134:20
 135:8 137:12,15
 148:6 149:18 163:1
installations 130:13
installed 80:10 105:22
 110:2,9 119:18 120:6
 125:5 145:11 146:21
installer 145:6,16
installers 69:13
installing 47:14 56:17
 74:8
instance 71:1 86:20
 131:22 132:2 134:12
 140:17 174:21
instant 9:5
Institute 31:12 99:2
instructions 188:5
integrated 49:19
integrating 55:17
integration 75:3
integrity 118:19 119:10
 123:4,5 125:16,19
 126:2,11,16 127:3,20
 128:18 171:7 183:7
intend 8:14 111:2
 173:20
intended 61:8 99:5
 109:22 110:1,4,5,19
 111:7 114:5 135:10
 144:2
intense 44:8
intensive 32:22 33:2,5
 43:10 44:4 53:14
 114:9
intent 35:12 43:15 58:7
 59:16 60:22 109:9,12
 131:20 136:19 137:20
 155:21 162:1 172:16
 172:22
intention 156:12
intently 11:21
interacted 148:11
interdependent 187:15
interest 187:3
interested 64:13 158:19
interesting 10:15 15:16
interference 158:21
interim 15:4
internal 185:13
interpolate 83:14
interrelated 47:22
intro 21:15
introduce 6:7 12:20
introductions 3:2 7:3,5

invested 187:5
investigated 32:19
 170:7
investment 12:5
involve 69:11
involved 61:9 75:1,14
 187:7
IPS 29:6 85:14,17 88:13
 131:18
iron 85:14 86:8
isolated 114:13 115:13
 119:7 121:19 128:14
issue 15:9 17:3,4,6
 20:12 23:16 25:1,9
 26:2 33:8 55:5,10
 60:18 65:17 87:19
 98:13 103:1 119:6
 120:5 124:14 137:21
 152:16 165:9 171:7
issues 4:21 10:13,16
 15:11 17:9 23:7,12
 25:3 26:1 43:2,4 58:8
 97:11 106:12 109:19
 110:22 113:5,6,8
 117:4 119:1 150:16
item 3:4,7,16 14:2
 15:20 21:10 182:2
items 8:6 9:5,20 13:22
 77:10 188:3

J

J 2:3
Jeff 5:2 12:6 182:11,17
 186:4
jeopardize 59:1
jet 32:12
job 16:9 56:16 65:4
John 2:13 6:15 10:18
 64:14 65:11 68:16
 69:7 70:14 90:17 91:5
 91:8 95:21 97:4
 101:13
John's 96:11
join 16:6 39:17
joined 139:18
joiners 130:4
joining 130:16 133:16
 134:18,21 135:4
 136:5 137:2
joint 8:20 25:12 40:5
 78:6 115:4 116:12,19
 130:3,5 139:18
jointing 174:21
joints 25:17 113:7
 130:6 134:18 135:2
 136:2,10
juice 120:22
July 22:9

jump 21:19 23:19 53:20
 150:12
JUNE 1:14
justify 101:5 108:5
 109:10

K

keep 26:19 45:12 49:22
 50:6 70:8 82:13
 107:21 127:9 152:7
 186:10
keeping 44:1 67:18
 80:7 122:12 140:19
Kichler 24:10
Kieba 2:14 3:8,15 6:19
 6:19 17:2 21:13,22
 22:3 23:21 24:1 40:13
 43:6 45:13 48:21
 50:16 52:1 57:12 59:7
 62:5 63:6 70:22 71:16
 76:1,18,22 77:13,21
 78:14,17 82:15 90:16
 92:7,10 93:1 94:8,13
 94:19 97:17,21 99:20
 101:3 102:8,13 103:6
 105:12 110:4 113:4
 117:17 118:5 121:17
 123:13 124:6 130:1
 138:12 140:2 150:12
 154:5 155:20 156:19
 159:16 160:3,14
 161:21 162:1,5
 164:18 168:14 169:15
 170:9 171:19 172:4
 172:11 173:13,19
 174:20 176:11,20
killed 149:22
kind 5:16 9:19 15:9,14
 15:21 16:13 23:8 34:7
 34:10 37:14 55:11
 57:17 58:14 60:14
 64:2 66:7 71:19 78:7
 82:19 83:2 85:16,21
 88:19,22 89:10 90:15
 93:10 101:3 109:8
 118:13 119:14,17
 121:13 133:14 134:7
 135:10 141:3,17
 159:5 166:2 169:14
 171:6 174:6 175:13
 176:6 177:11 182:12
 183:9 184:5 185:19
Kipp 2:4 7:16,16 81:15
 81:16 105:6,7 112:19
 112:20 129:15,16
 149:13 152:15 155:8
 155:8 164:11,12
 177:17 179:10 180:5

180:6 181:18,19
Knapp 31:13 99:1,1
knew 147:3
know 5:1,2,14 8:17,19
 9:2 10:5,7,8,10,11,13
 14:13,14,18,20,20
 16:10 20:10,14 24:17
 25:22 27:21 29:4
 35:17 39:11 41:1,21
 42:22 43:7 44:8 45:4
 45:17,19 46:20 47:4
 48:13 49:14 50:6,21
 51:1 52:19 54:9,12,21
 55:1,10 56:20,21
 62:20 63:2 64:8 65:13
 67:9,10 69:8 70:9
 71:21 73:2 74:9,11
 76:9 79:8 84:15 89:2
 90:13 91:10 93:7
 94:20,21 95:1,2,2,12
 95:17 96:3,7 100:14
 107:11 114:19 116:3
 116:4,7 118:1 119:11
 119:17,21 120:2,3,7
 121:1 122:1 126:18
 127:5,7 137:7,19,20
 137:21 138:7,14,18
 138:20 141:20,22
 142:4,7 143:4 144:5,8
 144:20 146:4,13,16
 147:10 148:21 150:7
 151:6,21 152:3,7
 153:4,5,6,8,9,11,15
 153:16,19,20,21,21
 154:3,8,9,22,22 155:6
 156:4,10,20 157:7,12
 159:1,11 162:3 165:4
 165:10,12,14 170:21
 170:22 171:10 172:20
 173:1 175:22 176:7
 176:10,21,21 177:2
 179:15 182:12,13,18
 182:21 183:2,11,17
 186:4 187:2,10,14
knowing 11:4 118:20
 149:8
knowledge 154:16,16
 155:4 182:19,19
 183:3
known 133:6 137:17
 138:4 142:15 143:1
 143:16,17 144:18
 145:1 148:3 158:9
 159:4,5
knows 131:1 144:9
Kurilla 98:3,3

L

L 2:3
lab 73:4
label 33:13 34:18 73:9
 73:13
labeling 73:16
labels 33:11,11
lake 147:2
language 18:1,4,17,19
 19:10,21 20:10 21:5
 30:14 36:5 38:8,8
 40:22 41:1,2 50:19
 51:8 71:11 79:12,17
 106:14 107:22 108:4
 108:10,12 110:9
 111:5 115:16 123:16
 130:20,20 134:8
 136:17 139:15,17
 144:19 156:18 158:3
 158:17 159:7 168:12
 168:21 169:6
large 66:19 69:12
large-sized 34:1
larger 75:7 86:8,9 89:1
 93:9,13 95:15,18
 115:3
laser 32:17,18
lasts 36:16 127:6
lateral 109:1 145:10
 151:9
laterals 144:21,21
 145:5
latest 26:5,18 27:12
 53:11 54:3
laugh 45:22
Laughter 103:5 161:8
laws 150:7
lawyer 141:19,20
lead 24:2
leadership 49:9 94:20
 95:6
leading 157:3
leads 6:2 40:10
leak 165:9,11 173:8,9
 174:10 175:1 177:2
 179:3,8
leaked 149:20
learn 5:16
learning 63:4
leave 6:4 117:19,21
 160:17,21 170:22
 171:22
leaving 118:9 157:18
left 5:21 12:6 34:13,14
 55:8 78:21,22 99:11
 174:11
leg 106:14 107:5
legacy 12:7
legal 101:10 141:22

142:6,9
legible 36:6 76:7 80:9
length 27:20
let's 9:1 10:11 24:20
 52:2 58:2 124:7
 141:10 151:5,10
 155:21 156:9 159:13
 159:15 160:3 163:20
 167:20 168:16 169:2
 169:4 171:21
level 54:15,18,18,21
 75:1 142:3 147:15
 183:3
life 15:16 30:8,19 120:7
 120:7 140:11,14,20
 150:20
light 9:19
limit 77:10 93:14 160:7
limitation 84:7,10 85:1
 86:16 89:5 90:19
 133:18
limited 70:20 77:17
 80:12 89:13 91:1
limits 73:1 85:5 93:4
line 27:13,16 28:11,19
 29:9 32:15 34:15
 58:14 71:3 72:11
 125:5 130:6 133:2
 136:3 145:11,15
 146:14,15,18,19,20
 147:6 149:15,16,17
lines 23:2 44:1 115:3
 123:6 125:17 136:1
 150:4
lining 76:10 145:13
link 31:11 37:21 108:11
 115:15 130:15 131:19
 132:2 137:6 138:12
 159:15 163:8
lion's 24:22
liquid 8:20 9:18,20 15:1
 18:15,22 66:1 185:4
list 20:7 48:13 69:7
 80:13 96:11 130:8,17
 133:9
listed 23:6 38:2 77:10
 141:1 166:21 167:16
 169:8
listening 11:21
listing 23:7 83:11
little 5:3,15 10:5 16:19
 20:11 21:15 31:5
 32:20 33:1 42:3,18
 43:2 47:2,18 50:13
 53:19 57:9,21 63:18
 64:20 65:9 68:3 79:3
 82:18 100:4 120:12
 148:21 159:8

live 47:17 69:17 146:21
LNG 15:11
loads 108:15 109:11
local 41:13
locate 154:14
located 144:22 145:18
location 25:5
LocusView 74:15
logical 61:5 101:2
long 48:13 65:16 69:8
 72:4 100:18 105:15
 116:2 122:8 145:9
 158:12
longer 29:9 57:21 63:18
longest 26:13 105:16
look 5:13 40:6 50:16
 55:12 69:9 72:3 76:16
 79:8 89:16,20 91:14
 92:5 99:22 100:7,13
 101:14 102:4,18
 115:18 124:2 139:12
 139:14 146:8 151:5
 151:10 153:22 154:1
 155:6,19 156:20
 157:20 167:1 171:11
 174:6 175:2 177:18
 184:3,3,4 185:9
 187:20
looked 101:8 155:12
looking 11:6 15:12 29:4
 47:10 55:11 66:14
 91:18 98:4 126:4
 139:6 140:10 141:18
 145:17 154:13
looks 79:9 81:19 87:17
 96:1
loophole 137:18
looseleaf 46:20
lose 69:6
losing 32:16 87:6
lot 14:19,20 16:7,8
 18:13,21 19:19,19
 23:4 24:12 25:21 26:5
 26:15 28:10,16,17
 31:14 37:11 42:5 45:8
 46:8,17 48:2,2 51:1
 51:12 53:10 59:22
 60:17,20 71:6 75:7,14
 77:11 83:2 86:7 91:10
 107:15 121:3 148:22
 153:5 155:14 159:16
 183:11 184:22
lots 18:12
louder 87:9
love 45:17 185:20
low 187:12
low-risk 167:10 168:20
 168:22

lower 86:22
Lu 148:19,19
lucky 43:17
lumped 82:19

M

M 173:11,12
Madam 79:14,21
 180:16
main 8:8 9:3 55:5
mains 108:21 135:22
 136:3 166:8
maintain 10:12,17
 26:22 30:7 126:19,22
 127:3
maintained 126:5,6,15
 127:1 128:17
maintaining 140:11
maintenance 2:3
 126:20 130:7,10
 136:4,5,20 137:13
 148:7 160:4 163:14
 166:12
major 9:13 153:2
majority 13:8 17:19
making 12:6 30:10
 39:11 68:9 178:9
man's 47:6
manage 32:8
management 45:21
 118:20 119:10 123:4
 123:5 125:16,19
 126:2,12,16 128:19
 171:7 183:7
Manager 182:10
mandated 4:10 183:13
manuals 176:22
manufacture 98:21
 140:16
manufactured 98:16
manufacturer 27:17
 28:14 30:7,21 65:2
 74:4,10 77:11 135:7
 140:18 162:6
manufacturer's 28:16
manufacturers 22:11
 36:14 38:11,18 39:1
 53:11 57:14,15 61:9
 61:10,12,15 65:4
 66:21 69:12 72:3 88:4
 95:4 170:4
manufacturing 28:20
 33:2,5 34:19 88:5
 95:4,16
map 146:8
Marie 2:11 14:4,10
mark 57:19,19 61:14,15
 133:2 143:15 146:9

146:11,18,18 147:5
 147:12
marked 27:7 30:17
 146:16 155:3
marking 31:17 33:9
 38:21 39:1 50:17
 57:13 60:9,17 66:19
 67:12 77:1 80:9 99:8
markings 29:12 30:11
 35:10,13 36:2,4,6
 66:20 67:4 74:7
marks 146:5
marshal 176:15
match 37:20
material 25:5 28:18,21
 29:7 35:3 59:14,17,17
 77:12 85:9 88:10,14
 91:2 106:9 165:20
 166:14
materials 1:2 26:7
 56:10 61:5 63:5 65:19
 83:18 102:14 165:6
 168:3
matter 22:3 73:15 82:8
 182:11 183:22 184:14
 185:1,2 188:10
Max 2:14 3:8,15 6:19
 17:2 21:12,15,22 22:3
 23:18 24:1 39:14
 41:14 50:14 51:20
 58:21 64:17 66:14
 71:14 82:13 90:3 92:3
 99:3 100:17 113:3
 118:17 129:20 141:17
 161:18 172:7
Max's 158:18
maximum 84:4 85:6,6
 85:21
Mayberry 2:12 3:3,21
 4:3,4 6:8 7:4 8:2 14:1
 44:10 54:13 62:14
 71:13 82:4 91:8 95:20
 97:2 102:22 119:16
 125:12 126:18 153:3
 153:3 155:5 157:5
 175:3 177:13 186:22
McLaren 24:14
mean 21:4 33:21 44:4
 47:13 48:7 49:8 50:14
 54:7 55:7,19 61:15
 73:22 74:5 75:10 90:4
 91:16 94:16 100:18
 101:15 118:16,22
 121:18 124:11,22
 125:6,14 142:7
 150:13 152:11 153:15
 154:19 156:6 167:13
 172:10 175:14 176:13

meaningless 64:7
means 29:5 54:9 81:21
 116:14 176:8 182:20
meant 106:15
Measures 18:14
meat 28:15
meaty 9:2
mechanical 31:2 113:9
 130:16,19
mechanically 174:14
mechanism 36:20 44:6
medium 70:2
meet 52:11 53:11 60:22
 106:21,22 108:7,9
 109:7 110:10 115:13
meeting 1:9 4:7,17 8:4
 8:20 9:18 10:9,22
 11:3 12:10,15 15:12
 17:21 20:17 22:22
 40:5 101:6 128:15
 181:1 183:21 185:9
 185:22
meetings 19:20 39:8
 185:11,12,13,20
meets 53:18 90:5,13
 98:20 100:18 177:14
 186:9
Melanie 2:18 6:21
melted 149:18
melting 156:2
member 7:7,10,13,16
 7:18,20,22 17:16
 41:10 44:16 45:17
 46:5 47:8 50:12 55:13
 56:2 58:20 60:8,13
 64:15 66:17 69:4
 73:20 74:2,3 77:8,20
 79:9,14,21 80:16,22
 81:6,8,10,12,14,16,18
 90:1 92:2,8,18 94:5,9
 94:14 96:10,17 97:7
 97:14,19 100:16
 103:18 104:18,20,22
 105:2,5,7,9 109:16
 111:9,10 112:2,10,12
 112:14,16,18,20,22
 117:9,21 118:12
 120:10 122:3,8
 124:11,18 125:18
 126:3,6,8,13,17 127:4
 127:19 128:2,20
 129:6,8,10,12,14,16
 129:18 141:15 142:13
 143:21 144:15 145:22
 147:21 148:13,18
 149:13 152:15,19
 154:11 155:8 158:5
 158:16 160:1,13,20

161:1,16,22 162:4,10
 162:16,19 163:16
 164:2,4,6,8,10,12,14
 169:12,16 171:4
 172:7 173:3,6,14
 174:3 175:8,12
 176:12 177:9,17
 178:12,15 179:10,18
 179:20,22 180:2,4,6,8
 180:17 181:2,9,11,13
 181:15,17,19,21
members 10:3 13:9,16
 17:20 18:2,8 39:22
 41:8 46:18 64:2 68:14
 69:15 75:21 77:6
 89:22 98:1 109:15
 110:12,17 117:8
 118:9 122:20 123:10
 133:21 158:15 162:13
 169:11 171:3 178:1,9
 188:3
membership 20:19
 54:19
memory 5:6
mention 44:12 51:10
mentioned 8:5 41:14
 44:11,15 130:18
 155:6
merge 90:18
merit 46:8
met 1:19 24:14
metal 114:13 119:7
 120:14 121:20 122:18
 124:13 128:14 135:19
metallic 49:3,6,13
 113:22 114:16
metering 106:2 107:9
method 32:12 132:4,5
 138:13 159:18 163:8
methods 31:21 116:12
 131:22 132:2
Mexico 155:10,11
mic 32:16 87:6,8
mic's 124:17
microphone 7:3 161:7
mics 69:16 188:8
middle 47:14,15 69:17
miles 42:9,10 166:8
millions 45:7
mind 18:13 50:7 70:8
 125:14
mine 144:1
minimal 117:14
minimum 43:20 92:13
 92:15 93:5,8 99:4,11
 99:16 135:4,6,9 136:5
 152:11
Minnesota 151:7

minor 145:12 166:15
minutes 82:6
miscellaneous 9:11,12
misses 5:8
missing 102:6
mistaken 40:14
modes 185:14
modification 158:7
modified 139:16 140:3
 168:11
modifies 147:16 148:1
modify 108:20
modifying 108:19
Moidel 69:20,20
moment 4:20
money 56:22 132:9
monitor 114:18 119:13
 122:15 124:8 127:9
monitored 114:2
 117:19 118:1,10
 123:14 125:22
monitoring 114:9,11,13
 115:13,20 116:6
 117:11 122:11 123:3
 125:1,21 127:2
months 183:19
morning 188:6
motion 16:22 17:17
 18:4,13 75:22 79:12
 79:13,15,18,20 80:21
 81:21 97:7 102:4
 103:16,17 110:15
 111:5,8 127:15,17,21
 127:22 128:21 159:14
 162:14,14,15 163:18
 178:8,9,13 180:13,16
motions 18:7,11
Mount 2:7 7:14 46:6
 58:21 66:18 69:5 77:9
 117:10 142:14 146:1
 146:7 152:20 154:12
 158:6 160:21 169:13
 173:7 178:16
move 17:13 18:11
 21:10 23:17 75:18
 96:8 110:15 159:15
 177:21
movement 109:1
moves 135:11
moving 57:17 65:22
 75:14 105:12 113:2
 163:18 164:16 178:7
multi- 75:5
multi-year 75:15
multiple 34:17 45:6
 116:18
municipals 43:17
mute 12:17

N

name 4:4 146:8
names 6:10 104:12
Nancy 7:1
NAPSA 30:10 63:21
 64:1
NAS 3:16
National 2:4 7:22 41:11
 42:8 45:11 97:20
 103:18 109:16 122:3
 127:4 143:21 158:16
 161:16 171:4 174:4
 182:4 183:17 187:6
 187:22
natural 4:12 142:17
nay 104:13 112:6 129:2
 163:20 179:15 181:6
near 107:12 130:13
necessarily 100:21
necessary 125:15
 142:2 171:16
need 10:6 57:9 61:12
 61:22 62:15 63:9 64:5
 67:11,17,20,21,22
 68:2 70:8 75:13 76:9
 77:21 80:19 85:11
 87:8 97:4 117:2 121:7
 121:22 123:20 126:12
 127:18 131:5 132:9
 141:4 147:8,12 148:2
 150:17 153:19,19,20
 153:21 156:8 168:18
 171:1 177:10
needed 37:8
needs 13:11 58:12 79:6
 124:13 176:14,15
neighboring 146:6
nervous 47:18
never 18:13 118:14
 165:13 176:5
new 5:15 42:14,15
 50:10 51:2 52:10 60:1
 67:19 84:5 86:11 94:9
 94:18 95:5 98:18
 110:6 139:21 145:16
 147:15 155:10,11
 166:2
newer 27:6 33:15 83:18
 88:6 93:17 165:6
news 81:22
nice 9:6 12:7 39:21
 174:17 175:8,9
nicked 145:10
nits 56:3
no- 155:20
Nobody's 122:5
nod 16:5
nodding 159:17,19

nominal 91:4
non- 100:4 101:11
non-controversial
 164:19
non-PE 51:3 86:13
non-retroactive 178:5
non-risk 168:9
normal 43:22
Normally 124:18
North 1:20 2:7 7:14
note 11:9 31:1 41:17,17
 73:2 103:10 115:11
noted 13:19 37:4 40:4
 111:7 166:5 167:18
notes 12:9 17:8 58:9
notice 8:11 22:6 91:11
 91:16
noticed 96:3 187:10
noticing 49:17
notification 9:5
noting 49:18
notion 63:7
NPRM 79:1 89:17
 133:18
NTSB 152:17,18
nuance 85:21 88:20
 93:2,18 94:1 98:11
 105:21 106:19
nuances 58:18 136:7
number 9:5,21 11:17
 12:14 21:10 27:11,16
 33:19 34:21 36:10
 37:3 38:11,13,18
 43:21 52:21 55:2,22
 67:22 71:6 80:7,9,11
 85:10,16 86:6 92:11
 93:20 106:17 113:6
 114:8 130:2,9,18
 133:21 138:21 139:3
 142:16 151:3,4
 165:19 170:18 171:1
 175:22 183:19
numbers 36:8,9 72:10
 166:7

O

O-F 3:1
obey 150:7
object 120:14
observation 13:16
observations 73:11
 158:3,14
obstructions 154:1
obvious 175:20
obviously 41:11 168:15
occur 67:21 96:16
occurred 26:3
occurring 26:2

offer 61:20 103:17
offered 169:22
office 1:3 6:21 21:21
 75:4 183:6
official 2:12 4:16 12:22
officially 95:8 100:4
offshore 185:15
oftentimes 187:17
Oh 105:3 128:2 137:19
 139:16 140:2 178:14
 184:18
Ohio 69:21
oil 10:1
okay 8:2 13:19 15:22
 16:6 18:13 21:6,8,18
 21:19 22:16,17 32:17
 39:9,10 44:10 50:5
 57:18 71:13 75:17
 76:7,22 77:1,1,3,5
 79:11,16 81:21 87:7,8
 87:9 92:18 94:5,14
 97:13 100:15 102:1
 104:11 105:11,18
 110:12,14 111:4
 113:2,4 115:16
 127:13 128:22 133:13
 136:9 138:10,11,12
 140:2,7 159:12,13
 160:14 161:9,22
 162:11,16,19 168:14
 172:3,5 173:3,5 174:1
 175:10 178:7 180:10
 181:4,5 182:2 184:18
Oklahoma 24:11
old 24:16 59:22 149:10
older 51:5 54:1
once 23:22 67:7 87:20
 102:3 119:3 185:18
one-inch 85:12,15
 88:13,13 97:21
 102:11,13
onerous 121:2 140:9
ones 51:5 67:5 109:18
 157:3 160:9 172:21
onshore 185:15
onus 171:17
Op 56:19
open 8:14 68:21 97:12
 109:13 116:7 141:10
 149:11 151:8
opening 13:12 22:2
 161:19
operate 64:9 143:14
operating 89:12
operation 126:19
operational 186:11
operations 89:11
operator 25:18 30:22

33:4 36:17 67:21
 133:5 134:12 137:11
 137:18 162:6 167:9
 171:14 176:8
operator's 125:16,19
 126:1,11,16 127:11
 127:11 128:18
operators 22:10 25:2
 36:20,22 38:16 39:4,4
 44:3 53:10,10 54:16
 55:2,3 63:14 67:2
 74:19 75:7 84:15
 125:10 132:13 135:3
 138:19 142:10 147:19
 151:7,19 163:10
 165:14 172:18,20
 173:16 175:16
opinion 107:8 116:15
 157:17
opportunity 5:11 6:6
 12:4 13:21 63:3
 101:18 175:20 176:10
 177:4,10 182:7 184:9
opposed 61:19 86:13
 132:6 136:14 167:8
opposite 175:14
opposition 114:20
OPS 6:14,15
option 19:17 135:3
 144:13 161:20 168:6
options 33:19 40:19
 101:21 102:19 116:18
 134:3 151:3
OQ 9:4 16:18
order 3:2 10:10 94:6
 169:14
orders 38:17
organizations 133:14
 170:5 185:3,4
organizing 183:20
original 94:11
originate 18:7
outcomes 186:17
outdoor 69:22
outlast 125:5
outloud 126:19
outside 6:4 70:10
over-installing 121:15
overall 34:21 35:7,13
 37:10 85:8 106:10
 113:19 131:15,15,19
 132:12 133:13,17
 136:18 167:6
oversight 85:11

P

P-R-O-C-E-E-D-I-N-G-S
 4:1

p.m 1:22 4:2 8:17 82:9
 82:10 188:11
PA- 59:1 60:3 82:21
 103:21
PA-11 23:10 28:6 50:4
 59:9,12,19 82:21
 83:22 84:21 85:5,18
 87:10 88:4 135:1
PA-11/PA-12 50:17
 51:2,6 52:14 59:5,16
PA-12 23:11 28:6 50:4
 59:12 60:4 85:3,18
 88:7 102:15
pace 82:16
painful 59:21 71:22
 95:10
Palabrica 2:15 6:13,13
paper 43:21 44:21
 45:12 46:19 61:2 75:9
papers 46:20
paragraph 109:4
 128:12,13,16 160:18
paragraphs 141:8
 163:15
pardon 15:5
part 8:12 12:4 22:20
 25:5,7 26:21 29:10,11
 29:18,20 30:5,5 35:8
 35:9 39:6 43:11 49:5
 50:21 51:2 54:10
 56:16,19 60:2 70:22
 71:2 78:9 84:1 90:18
 100:3,6 107:21 113:5
 113:21 114:4,4
 122:11 127:20 131:3
 134:11 138:7 140:10
 160:11 164:22 165:16
 167:12,16 170:14
 171:22
participate 143:5
 146:10 154:18 186:21
participates 146:5
participating 185:6,18
participation 40:1,3
particular 27:10 87:12
 121:18 182:10
particularly 11:7 24:13
 31:18 79:4 85:18 86:1
 86:7 88:8,17 93:6
 102:14 106:2,13
 107:9,10 113:8 115:3
 130:21 133:1 136:2
 136:15,22 140:9
 141:1 165:5 172:18
partly 38:13
partners 187:4,6
parts 59:8 72:22 73:6
 75:14 93:3 106:22

110:7 134:20 135:13
 139:7 166:14
party 167:4
passed 43:1
passes 81:21
paste 127:16
pasted 98:7
patched 133:15
path 142:20
Paul 175:4
Paula 1:22 2:2 4:17,19
 10:21,22 14:1 40:4
 68:17,19 75:20 81:3
 104:15 112:7 124:19
 129:3 162:17 163:21
 179:15 180:11 181:6
 182:6
Pause 123:12 124:3
 161:5
pay 13:5
PE 52:13 82:20 84:2,3,5
 85:20 87:2,14 89:12
 90:21,21 98:16 103:7
 104:9 134:10 135:1
 162:2
PE-/PA-11 103:21
PE-11 89:14
PE-only 28:5
PE2406 87:14
PE2708 29:6
penalty 65:5
people 6:9 11:20 30:4
 41:20 42:16,17 48:12
 56:15,19 59:22 83:2
 83:17 95:16 107:15
 139:15 143:5 149:22
 150:9 155:4 168:7
 169:5 174:20 186:20
percent 47:11 114:12
 122:16 150:9,11
 155:13 165:2,4
 169:17,22 170:3,8,16
 170:21 171:9,10
 172:9,14,16 173:1
 175:22 176:18
perfect 64:16 153:16
perfection 153:17
perfectly 101:2
perform 17:21
performance 107:22
 108:14 133:12 184:9
performance- 138:14
 186:19 187:15,20
performance-based
 184:7 186:14 187:13
period 22:8 39:17 42:6
 59:6 66:8 70:11
 123:18 124:6,9

140:19
permanence 29:15,16
 33:8 35:9 36:1 38:1
 41:2 63:7 66:18 68:9
permanency 29:12 32:1
 63:8 70:4
permanent 30:2,11,14
 31:4 34:10 36:2,3,6
 36:11 37:1 64:11 65:3
 65:10 67:1,5,12 68:10
 76:4 165:8,17 173:10
 177:18,20 179:8
permission 57:4
permit 31:19 87:12
 95:10 100:14 105:20
 106:1,15 135:21
person 5:1 78:5
personally 11:14 64:5
persons 130:5 135:1
 136:10
perspective 95:14
 107:4 115:7 119:16
 167:22
petition 84:3 105:20
 106:1
petitions 23:5
Pevarski 2:6 7:18,18
 81:17,18 105:8,9
 112:2,21,22 128:20
 129:17,18 144:15,16
 164:13,14 180:7,8
 181:20,21
phase-in 37:14
phased 45:15 55:10
 74:20
PHMSA 1:2 2:11 4:11
 5:6 6:7,10 14:4,15,19
 15:16 17:8 26:11 37:8
 58:12 65:11 70:17
 101:13 102:10 104:5
 104:7,8 110:22 111:6
 111:19,20 128:10
 150:15,16 151:12,16
 152:1,10,14 154:12
 156:12 158:4 163:7
 169:18,21 172:9
 176:15 179:8 187:3
PHMSA's 12:13
PHMSA-2016-0032
 12:15
phones 12:17
physical 33:21 36:4
 132:1
physically 29:18
pictures 27:15
piece 25:16 30:6,20
 37:1 39:2 40:17 54:7
 67:3,10 115:21 118:3

122:17 125:21 165:7
pieces 51:18
piggyback 149:13
pilot 74:20
pipe 3:8,14 8:9 9:10
 16:16 21:12 23:3,12
 24:2 25:12,17 27:6,7
 27:17 29:15,18 30:8
 31:6,12 33:16 35:20
 35:22 36:15 38:3,7
 42:9,22 43:8 46:12,13
 48:17 52:18,21 55:20
 56:17 57:19 60:20
 61:8,10,14,16 63:16
 65:15 67:3,10,12
 69:11,13 70:1 74:1,5
 74:6 76:17 82:12 83:3
 84:19 85:14 87:1 90:5
 91:3 92:6 95:16 98:16
 98:20 99:2 100:10,17
 100:18 105:22 106:2
 129:21 130:1,4,16
 131:1 132:3,13
 133:16 135:16,19
 136:5 145:18 151:16
 163:1 165:20 166:1
 167:6 169:20 170:2,7
 170:12,16 174:14
 176:22
pipe's 67:8
pipeline 1:2,3,5 3:8,14
 4:5,7,9 6:9,19 7:9
 18:20,22 19:1,3,11,22
 21:12,21 22:17,21
 27:20 79:22 103:20
 111:12 128:3 140:12
 140:14,21 162:21
 178:17 185:4
pipelines 4:12 18:15
 62:22 128:15 166:2
 180:17
pipes 86:20 170:10
piping 149:19 167:11
 167:14 168:10 172:14
place 13:11 17:15 42:4
 42:18 57:1 67:20 87:4
 99:15 120:22 121:14
 157:21
placed 20:22
placeholder 159:14
places 120:18 133:1
plan 14:17 48:7 125:16
 125:19 126:2,12,16
 128:19
planning 48:2
plans 10:2 48:6 57:2
plastic 3:8,14 8:9 9:9
 16:16 21:12 23:3,12

24:2 25:16 27:6 31:12
 35:4 42:22,22 43:8
 46:14 48:17,17,20
 49:3,7,12 52:15 56:9
 60:20 61:8,10 62:2,16
 65:15 70:1 82:12 83:3
 83:5,9,17 85:14 93:4
 105:16,22 106:2,6
 108:21 115:10 128:15
 129:21 130:1,3,16
 132:3 133:16 135:19
 136:4 145:13 151:16
 162:22 165:20 169:20
 170:2,7,10,12 176:22
plastics 51:3 83:16
 99:2
play 15:10 26:6 49:6
 53:3,8
please 12:17 13:4 69:19
 75:22 79:18 98:2
 102:3 110:16 127:17
 147:5 161:11
pleasure 4:6 10:20
plenty 48:11
plug 177:14
plumbers 131:7
plus 113:12
point 8:15 17:10,11,22
 25:15 26:4 35:17 40:7
 47:21 48:22 51:16
 57:13 62:9 67:11 69:8
 71:11 75:1 76:9 89:9
 89:15 97:15 116:4,8
 119:20 120:3,20
 121:16 123:1 127:7
 127:10 131:3 134:6
 148:17 150:5 157:16
 158:18 167:12 175:3
 176:12 183:4
pointed 29:14 106:18
 135:12 174:21
points 52:16 99:21
policies 4:11
policy 7:1 11:22
politics' 100:12
polyamide 32:13 87:16
polyethylene 23:10
pool 144:9
poor 47:6
portion 40:8 100:1
position 5:2,14 46:7
positive 132:18,21
 153:9,14,14
possibility 89:3 91:15
possible 8:18 37:18,18
 41:1 88:11 91:20
 94:19 107:3 108:2
 115:6 151:3 158:2

possibly 75:22 87:2
 123:3
potential 79:12 100:13
 138:2
potentially 36:3,22
 42:21 49:12 96:7
 119:3 120:4 168:6
 174:8
PPI 83:10
practicable 19:7,16
 20:4 80:5 104:3
 111:17 128:8 137:11
 141:22 142:8 144:4
 147:16,20 150:6,6,13
 152:21 153:1,5,9,10
 153:22 154:3 157:7
 158:12 163:4 179:1
 180:22
practical 54:14 143:8
 143:10 148:2,5,9
 152:21,22
practice 56:1 118:1
 149:2 150:2,3 156:16
 156:16 186:12
practiced 121:12
practices 75:3 155:6,19
 157:8,9,10,21 158:13
practicing 162:12
prefer 58:11 159:3
preference 99:18
premature 42:3
prerogative 82:1
prescription 187:18
prescriptive 106:13
 136:16,21 187:16
present 2:1,9 7:5 17:3
 17:20 38:5 185:21
presentation 8:8 16:12
 16:13 17:2,3 21:13,20
 22:1,5 23:14
presentations 12:12
presenting 15:7 185:8
preserve 10:10
presiding 1:22
pressure 79:2 84:7,22
 85:6 145:11
pressure's 91:1
presume 54:16
presuming 90:5
pretty 9:2 11:2 23:15
 27:12 33:22 34:15
 51:8 86:19 89:2
prevent 157:9
preventing 184:11
prevention 183:8
primarily 35:14 131:22
 133:20
primary 25:1 113:5

principal 67:14
principals 119:10
principles 123:5
print 27:13,16 28:11,19
 29:9 34:15 44:1 53:5
 71:3 72:11
printed 35:22
printing 29:20 30:15
 31:21 32:7 36:15
private 22:11 185:6
proactive 153:13 154:4
probability 187:12
probably 14:15 25:22
 28:15 32:11 33:11
 34:8 35:16 42:10 88:4
 91:21 116:1 121:15
 125:4 165:21 168:5
 169:5 170:19
problem 48:17 49:5
 55:14 93:15
procedures 42:16
 48:12 130:5 133:12
 134:5,21 135:5
 136:13 145:2,6 154:8
 167:4 183:18
proceed 10:8
process 16:14 28:20
 33:7 34:19 37:9 43:7
 54:2 55:18 56:14
 58:11 75:6,15 89:7
 90:3,12 95:7 121:8
 177:15
processes 67:19 145:2
produced 12:11 90:21
 182:19
production 77:11
professionalism 10:12
program 56:19 57:6
 125:11
programs 24:15 151:9
 171:8
prohibit 166:1
prohibited 165:22
prohibiting 165:8
prohibition 165:7 168:3
Project 182:10
projects 74:20
promote 89:4
properly 108:3 143:15
proposal 19:8 26:21
 40:18 66:7,13,15 68:4
 70:17 84:10,18 94:6
 94:11 96:18,18 106:4
 113:9 130:3,12,14
 131:2 132:20 134:21
 135:9,18 170:10
 178:4
proposals 45:14 66:11

84:1 137:7
propose 19:18 28:6
 54:11 89:5 101:15
 106:4 134:6 135:20
 166:11 172:9
proposed 4:11 18:2
 19:4,8,12 20:1,13
 21:11 22:6 28:4 37:3
 50:22 67:17 78:22
 79:1 80:2 84:21 86:5
 89:8,17 90:18 91:9,13
 93:15 98:4,15 103:22
 111:14 115:9 117:10
 123:16,18 128:5
 130:20 133:18 135:21
 136:1,5 139:21 140:1
 140:7 161:4 163:1
 165:16 166:1,12
 169:18 178:20 180:19
proposing 49:20 106:7
 108:19
protect 114:18 120:14
protected 114:1 115:20
 117:22 119:4,18
 120:6 122:10 123:2
 123:16,19 124:5,9,14
 125:22 126:15 127:18
 128:17
protecting 122:17
protection 2:6 114:7
 115:12 117:12 125:15
 125:21 127:19 135:19
protocol 3:4 8:7 16:2
protocols 183:19
prototype 175:6
protrude 32:20
protrudes 29:20
prove 72:18 152:7
provide 13:10 28:22
 50:13 87:4 108:1,22
 137:12 144:5 148:5
 151:14 152:17 175:15
provided 20:18 33:22
 36:4 103:12 133:10
 184:16
provider 74:16
provides 113:12,14,15
 158:7
providing 13:21 25:7
 101:18 133:5 182:12
provision 128:11
 133:10 165:1
provisions 23:13
 111:19 165:20 172:6
 174:2 178:5,19 179:3
psi 85:6 86:16 87:19
public 3:11 7:12,19
 8:13,15 11:18 12:2

13:20,21 15:12 21:1
 31:10 36:22 46:17
 68:21 69:15 70:15
 74:14 97:12 98:2
 101:18 103:15 110:13
 110:14 122:20 123:20
 148:17 161:3 177:22
 178:2 183:21 184:21
 185:5,13
public's 17:12
published 16:16 19:4
 19:12 20:2 22:7 80:2
 103:22 111:14 128:5
 163:1 178:20 180:19
pull 42:20 49:21 117:18
 132:3,14 160:4
pull-through 130:15
pulled 98:6 113:7 166:6
pulling 65:18 66:15
 117:5
purchase 38:17
purpose 187:19
pursue 35:2 37:12
 183:1
push 124:15 171:1
 177:7
put 13:17 20:15 27:8
 33:13 34:7,18 36:10
 36:17 52:20 55:21
 67:10,20 68:15 69:7
 72:10 75:11,20 77:6
 83:1 87:3 96:19
 100:21 102:2 107:16
 116:1 118:2 120:19
 121:20 123:3,8
 124:13 125:13 127:8
 143:17 145:12 150:8
 156:22 165:11 174:14
 177:7,13 184:19
 188:3
puts 171:16
putting 42:3,8 56:18
 64:6 65:18 73:18
 97:22 119:2 121:3
PVC 131:1,12 166:1,4,9
 167:6,11,21 168:9,19

Q

Q&A 3:6,9,11,18
QR 34:17
Qual 56:19
qualification 26:1
Qualifications 24:11
qualified 56:16
qualifying 130:4,4,5
 135:1 136:10
quality 11:18
quarter 131:17 133:19

133:22 138:18 159:20
question 13:3,16 33:1
 58:21 59:3 60:7,8
 62:5,9,11 63:20 66:9
 72:15 73:8 89:6 90:2
 91:5 92:3,4 107:17
 109:17 121:6,7 124:8
 154:12 177:6 178:11
 187:12
questions 15:8 21:4,8
 41:7 69:16 74:13
 89:21 110:13 134:17
 141:11 169:10
quick 15:14 39:20
 75:19 97:14 161:13
 163:20 181:6
quicker 96:5
quickly 8:7 97:12
quite 10:15 25:6 43:11
 47:20 58:22 137:16
quorum 13:8,10 17:18

R

R 2:7
R&D 150:20 177:14
radial 152:16
radius 135:6
raise 41:8 54:15 68:16
 84:4,12,21,22 85:20
 97:11 135:4 183:2
raised 103:15 111:1
ramped 60:21
Rancho 25:15
randomly 89:7
Randy 31:13,14 99:1
ranging 37:15
rate 57:2
rating 79:2,2
ratio 86:19,21
rationale 23:3
re-authorization 10:1
 14:14
re-emphasize 74:22
re-grind 74:11
re-operator 56:15
re-qualification 136:12
reaching 45:7
read 16:18 74:6 139:17
 148:3 152:22
readable 36:7 76:5,5
readers 43:14,19
reading 83:10
ready 75:18 79:14
 80:17
real 69:8 75:19 155:21
 161:13
realistically 49:15
really 5:6 15:7 25:10
 27:10 30:14 33:3 34:5
 44:21 45:12 54:15
 55:9,16 56:4 58:16
 59:21 64:2 65:6 67:1
 72:13 75:5,11,15 91:6
 94:15 96:20 98:20
 100:10 114:17 121:5
 121:7 149:5 159:1
 171:16 174:11 182:12
 183:10 184:5 186:1
 187:15
reason 84:15 87:3 93:3
 117:5 172:8
reasonable 19:6,15
 20:4 38:10 58:14 63:9
 64:4 80:4 104:2
 111:16 128:7 140:13
 140:15 141:4 163:3
 175:2 178:22 180:21
reasons 52:17
recall 160:5 184:20
receive 182:3
received 17:6 22:9 23:5
 115:8 137:10
recognition 176:14
recognize 11:11 145:3
recognizes 94:10
 175:14
recognizing 143:18
recommend 37:13 96:8
 171:5 176:3
recommendation 16:21
 65:13 66:6 76:16
 88:11 96:21 123:9
 137:4 140:17 161:10
 163:7 170:4 174:5
 176:2
recommendations
 17:10 23:5 37:18
 102:10 103:14 104:5
 111:6,21 123:14
 128:10
recommended 56:9
 132:7
reconvene 82:6
record 11:10 12:11 16:4
 21:1 43:20,22 55:21
 67:18 69:2 75:12
 76:17 80:7 82:9
 103:12 122:12 188:11
recorded 12:10 20:21
 38:6 101:20 102:20
recordkeeping 39:3,5
 44:18 57:20 62:21
 68:5 76:19 77:2
 136:19,22
records 30:6,7,20 35:21
 36:2 140:11,20

173:16
red 79:4
redefine 37:5
refer 132:20 139:2
reference 20:8 27:9
 59:11 98:6,10 134:22
 156:16,21 183:4
referenced 51:22
 156:15
references 50:10
referencing 96:16
referring 102:11
reflect 102:18 110:21
 111:5
reflected 103:12
reflecting 103:13
reg 91:22
regard 12:7 21:12 68:8
 102:11
regarding 5:19 20:13
 47:12 65:17 66:9,10
 128:11 132:10 179:3
regardless 98:21
regards 5:4 92:3
Region 24:7
Register 19:5,13 20:2
 22:8 80:3 104:1
 111:15 128:6 163:2
 178:21 180:20
regulation 184:7,10
 186:9,14,20
regulations 38:15
 91:17 115:12 186:10
 187:13,16,16,21
regulator 55:7 106:3
 107:10 108:21
regulators 45:2 159:10
regulatory 18:3 19:5,13
 20:3 80:3 91:19 104:1
 111:15 128:6 163:2
 178:21 180:20 186:16
rehab 86:7
reinforce 62:14
reinforcement 41:15
 175:1
related 9:4 14:15 59:3
 62:22 71:14 80:1
 111:13 128:4 150:5
 162:22 178:18
relatively 34:1 164:19
relax 86:15
relevant 157:7,8,9
 158:13 159:11
rely 35:21,21 63:16
remain 11:2 84:8 120:6
remains 84:10
remarks 14:13
remember 65:1 112:6

remind 10:7
reminder 12:16
removal 128:11 171:3
remove 115:18,20
 118:6,10 123:2
 138:16,22 139:14
 159:19 163:9 165:5
 171:18 179:5
removed 29:17 115:8
 140:6 169:21 170:13
 170:17
removing 29:18 68:10
 118:10 168:2 171:5
 172:2 173:4
renewal 157:20
reorganization 14:16
rep 63:21
repair 164:22 165:2,9
 165:13,18 169:17
 170:10 173:10 174:7
 174:10,14 175:1,5,16
 176:4,13,16 177:2,18
 179:7,9
repaired 169:21 170:13
 170:17
repairs 23:12 163:18
 164:17,18 168:9
 172:6 174:2 178:19
replace 110:6 127:6
 171:9
replaced 84:5
replacement 42:10
report 20:18 21:1
reporter 20:20 87:8
 103:13
representing 7:8,11,14
 7:19,21 8:1 22:4
 41:11
request 16:22 86:11
 87:18 96:15 97:3
 101:20 102:18 106:14
 107:1 131:20 143:16
requested 114:21 115:2
requests 115:1 134:4
require 38:17 52:20
 91:11,19 94:17 106:5
 114:10,12 115:12
 130:12 132:15,18
 136:11,12
required 16:21 17:18
 36:14 37:6 38:14 39:5
 53:12 57:14 115:10
 133:2 136:7 160:11
requirement 39:5 44:18
 50:10 67:18 68:5,11
 73:13 107:5 119:8
 121:2 152:5
requirements 27:4 35:6

38:21 68:1 99:7,8,14
 106:5 108:9 114:22
 130:14 131:13 134:18
 135:18,21 136:6,14
 136:16,21 138:14
 139:6,9,20 152:17
 163:10,12
requires 32:13 114:10
 169:18
requiring 43:13 132:13
research 6:20 24:1,6
 103:6 104:8 170:6
 174:7 176:3,16 179:6
 179:8 183:8
resin 87:15
resist 109:1
resistance 113:13,15
resistant 31:22
resistivity 119:22
resolution 30:10 64:1
resolved 91:7
resources 66:4,22 67:3
respectfully 150:18
respond 43:6
response 10:1 158:1
responsibilities 18:6
responsibility 73:22
 126:22 127:12
responsible 133:5
 144:10 146:17 147:9
rest 22:4 124:5 144:5
restricted 130:22
restriction 159:20
 167:6
restrictions 138:17
 163:9
resumed 82:9
retain 84:14
retaining 84:19
retrieve 75:13
retroactive 100:5,21
 101:12 109:22 110:1
 110:7,20 111:20
 114:5 173:12 179:4
retroactively 86:12
 100:7 173:18,21
retroactivity 98:15
 100:3 102:22 103:6
 104:9 113:21 114:4
review 178:10
revise 37:20 88:12
 128:13 135:9,18
revising 115:2
revision 177:4
revisions 85:9 88:8
rework 101:4,4 105:14
rewrite 56:5,12
RFID 33:14

Rich 7:13 46:3,5 47:7
 48:16 54:14 58:19,20
 66:17 69:3,4,14 77:7
 77:8,19 81:11,17 97:3
 105:1 112:3,15 117:8
 117:9 118:16 122:14
 128:22 129:11 142:12
 142:13 144:16,17
 145:21,22 149:6
 152:19 154:11 158:4
 158:5 160:19,20
 164:7 169:11,12
 173:5,6 178:10,15
Rich's 78:16
Richard 2:6,7 105:8
 112:21 129:17 164:13
 180:1,7 181:14,20
Richard's 66:9
richer 186:18
Rick 7:18 144:16
Rick's 146:1
rid 51:3,4
Riding 149:15,21
right 4:3 5:22 6:1 7:6
 15:10,22,22 16:3,14
 16:15 20:11 21:18,19
 22:16 23:19 26:11
 28:5 29:13 30:15 32:6
 40:13 41:19 47:13,14
 47:15,19 53:2 55:11
 55:19 56:8 59:18
 61:22 63:17,22 64:19
 74:1,2,4 75:5,11 79:3
 81:1,2 85:15 89:11,15
 90:11 94:8,13 96:20
 97:1 100:10,18
 104:15 105:10,18
 112:5 113:3 118:14
 118:20 124:14,20
 125:10 129:1 130:1
 138:21 150:10 152:21
 154:10 155:22 161:2
 161:21 162:16 169:6
 171:20 176:11 179:13
 186:2
rigid 106:15 107:6,9,21
 108:5,21 109:4
rigorous 56:14
rip 34:9
riser 108:2 109:4,6
risers 23:11 105:18,19
 106:6,8,11,15,19
 107:2 108:7,17,20
 109:3 110:1 111:13
risks 118:21 171:14
road 35:18 49:16 63:3
 65:6 120:4
Robert 2:4,5,17 3:17

7:10 182:4,9 186:3
Robert's 94:6
robust 9:6 186:15
robustly 11:22
rocks 118:18 140:5
Rocky 2:7 7:14 46:6
 58:21 66:18 69:5 77:9
 117:10 142:14 146:1
 146:7 152:20 154:12
 158:6 160:21 169:13
 173:7 178:16
role 3:12 182:15
roll 75:18 81:2 112:6
 129:2 163:20 179:14
 181:6
rolling 13:14,18
room 5:20 46:1 69:17
 118:17 141:21 172:21
rooms 63:12
Roto-Rooter 159:2
route 95:12
routine 90:10
rowdy 11:5
rule 8:9 9:3,10,12,15
 14:22 15:1,4,4 16:16
 16:18 18:3 19:4,12
 20:1,13 23:4 25:1
 28:5 29:11 42:3 43:1
 43:15 50:21 56:5
 62:12 63:1 65:15,19
 70:20 76:10,12 78:13
 80:2 84:20 89:4,17,19
 91:9 94:3,4 96:4,14
 98:4,16,17 101:17
 103:22 110:5 111:14
 114:4 128:5 163:1
 166:20 167:1,17
 169:4 172:9 173:22
 178:20 180:19
rulemaking 3:16 6:14
 6:16,18 15:13 21:11
 21:22 22:6,19 24:4
 35:3 37:13 42:7 46:12
 49:16 54:10 62:8
 65:20 90:11 94:17
 95:6 96:1,16 98:12
 137:21 153:6 182:5
rulemakings 11:18 15:2
rules 9:3 13:7 14:20
 65:14 66:5 94:6
 100:11 173:20
run 8:17 104:12
running 159:1
rupture 66:1

S

S 83:7
safe 90:14 108:14

109:10 116:15
safety 1:2,3 3:8,14 4:6
 4:11 5:18 6:9 18:21
 19:3,11,22 21:12,21
 79:22 103:20 111:12
 128:3 132:12 162:21
 178:17 180:18 185:17
sake 19:2
Salerno 185:16 186:5
 187:4
Sames 122:22,22 178:3
 178:3
sample 18:17
SAP 45:5 47:5,14
satisfy 32:1 152:16
Satterthwaite 2:16 3:5
 3:13 6:17,18 15:21
 16:3 21:14,21 22:16
 80:19 81:1,5,7,9,11
 81:13,15,17 102:6,12
 102:16 103:2 104:11
 104:17,19,21 105:1,3
 105:6,8,10 112:5,9,11
 112:13,15,17,19,21
 113:1 129:1,5,7,9,11
 129:13,15,17,19
 139:22 161:12 163:19
 164:1,3,5,7,9,11,13
 164:15 168:13 179:13
 179:17,19,21 180:1,3
 180:5,7,9 181:5,8,10
 181:12,14,16,18,20
 181:22
save 94:22 121:3
saw 25:1,6
saying 50:2 56:5,6 57:6
 66:14 78:12 90:3 93:7
 101:15 121:10 124:12
 126:10 141:17 144:7
 154:7 159:4 171:11
Saylor 2:15 6:12,13
says 17:16 52:5,11 86:2
 109:5 139:2 152:22
 152:22 165:16 170:11
 170:15
scanned 70:21
scary 65:10
scenario 72:19 168:5
scenarios 72:21 167:10
scenes 16:10
scheme 34:2
Sciences 182:4 183:18
scope 61:7 68:18 92:8
scotch 20:13
scratch 170:6 171:10
scratches 170:7,15
 172:19
screen 75:21 102:3

123:9
scrutiny 160:10
SD 2:5
seal 113:12,14,15
second 21:18 22:14
 68:8 76:3 77:14 78:19
 80:19,21,22 82:11
 92:19 97:9 112:1,2
 128:20 163:16,18
 179:10 181:2
seconded 18:8 128:22
 181:3
seconds 178:10
section 13:20 27:10
 52:7,8,10 84:8,17
 100:22 105:19 106:5
 106:11 117:20 128:15
 163:12 178:19
sections 139:11
sectors 62:4
see 4:22 6:1 18:20
 24:17,18 25:9 27:14
 27:19 30:1 32:3,8
 33:11 34:17 39:21
 46:11,14 48:16 49:16
 49:20 52:18 53:4 58:5
 60:12 66:22 67:4
 68:22 69:6 70:19 76:9
 79:1 83:13 84:11
 87:16 101:10 137:22
 138:1 139:15 144:18
 150:22 161:10 174:8
 175:10 183:2 185:10
 188:8
seeing 57:16 64:3
seek 111:1
seeking 8:9
seen 16:8 19:19 25:14
 63:10 113:5 121:12
 131:6 145:16 165:10
 165:15
segue 64:17
send 74:5,11
sends 5:4
Senior 7:1
sense 10:12,17 60:15
 60:16,17,19 78:7
 101:2 126:3,9 175:17
sent 16:8
sentence 109:2 124:5
 139:19
separate 35:2 37:12
 62:7 65:18 96:22 97:2
separately 18:16 62:3
 62:22 76:17
separation 150:3 152:4
 152:16
September 183:15

septic 154:20,22 155:3
 155:16 158:21
serious 142:6
serve 4:15 21:1
served 12:2
serves 20:17
service 22:17 30:8
 130:6 131:8 136:1,3
serviceability 169:20
 170:2,12
services 2:6 131:17
 154:14 166:10
set 13:4 31:8,11 46:12
 125:10 187:14
settings 107:10
sewer 133:2 144:20
 145:5 146:15,18
 151:9 155:2,2 156:2,3
share 17:5 24:22 39:18
shared 147:18
sharing 40:6
she'd 14:8
She'll 14:6
sheer 42:12
shoes 182:14
short 42:4,6,19 73:21
shorter 29:10
shot 162:17
show 52:21 68:11
 149:11
showed 50:18
shown 184:12
shows 14:8,11
side 11:6 13:4 30:12
 33:2,5 47:10 87:16
 100:12 120:21 131:8
sight 69:6
significant 11:12 35:7
 42:7 94:16
significantly 121:4
silent 109:8
similar 52:12,13
simple 98:9 167:3
single 114:18 133:2
 155:12
sir 129:20
sit 40:7 71:18
site 100:14
sitting 70:10
six 59:9 70:20 77:10
 82:16 85:2
six-inch 85:7
size 27:17 28:22 34:3
 77:12 85:14,15 91:4
 140:5 177:5
sizes 32:15 85:11 93:9
 99:6
skills 162:12

- slide** 20:8 49:1 52:2
 75:20 77:19 78:11
 79:17 102:8 103:10
 111:8 161:14 180:12
 180:14
slides 21:5 28:12 31:8
 31:11,15 49:18 50:17
 77:15 78:18,18 140:3
 164:21 184:13
slightly 50:20 134:13
slow 47:1
small 32:19 36:22 46:18
 67:2 118:3
smaller 33:20 34:3
 44:22 57:7 85:17
 97:15
smattering 15:14
Smith 2:17 3:17 182:4,6
 182:9 184:18
smooth 151:2
socket 133:19,22
 138:16 139:14,17
 163:9
soil 107:18 113:8,16
 119:1,5,22 124:20,21
 127:8
sold 175:7
sole 136:11
solution 141:18
Solutions 74:16
solvent 130:21 131:5
 131:10,11
somebody 45:18 47:5
 60:9 147:11 159:1
something's 116:14
somewhat 14:6
soon 177:4
sorry 52:6 60:11 83:15
 92:16 93:13 117:17
 130:4 137:22 139:13
 140:4 162:6 164:20
 165:17 184:13,16
sort 9:11 10:11 90:10
 94:5 186:7
sorts 155:17
sounded 92:19
sounds 55:19 67:16
 82:4
source 187:22
South 7:11 149:15,20
Southwest 151:8
space 33:21 176:2
 177:11
speak 124:16,19,20
 148:18
speakers 21:17
speaking 107:7 186:4
speaks 5:5 12:19
- special** 95:10
specific 20:12 41:22
 106:12 131:4 157:19
specifically 71:10
 74:17 92:6 98:5
 123:13 154:13 167:19
specification 106:21
 108:8 130:17 169:8
specifications 38:3
 167:16
specificity 157:18
specified 135:7
specify 88:10 108:6
 134:5
specs 59:17
Spectra 2:3 7:8 60:14
 92:2 120:10 175:13
speed 44:17 51:7
speeds 32:15
spend 56:21 132:9
spent 183:19
spill 10:1
spoke 5:3
squeeze 121:1
stability 72:5
staff 2:9 3:2 6:7 23:4
 24:4 37:17 38:10
 40:19 71:14 101:21
 102:18 107:20 110:22
 111:6 116:11,21
 133:14 135:14 137:4
 137:10 138:1 139:3
 156:12 158:4 167:22
 169:2,9 172:13
staff's 107:4,8 115:6
 139:8
Stafford 1:21
stage 62:2 101:17
stages 185:19 187:8
stairs 5:21
stairwell 6:2,3
stake 107:16
stakeholder 9:22
stakeholders 177:16
 182:22
standard 24:8 26:9
 27:12 28:5,9 29:2,13
 29:14 30:3 31:5 34:15
 37:7,8 49:2,3,14
 51:16,17 52:7,16
 53:11 54:2,3,19 55:6
 55:9,15 58:7,8,9,10
 58:11 59:21 60:1
 62:18 64:12 66:11
 70:19 71:5,15 73:2
 76:12 79:4,7 80:13
 86:1,18,21 88:20
 90:10 92:9,21 93:2,8
- 94:2,9,18 96:9 98:6,7
 98:18,20 99:6 102:19
 104:7 106:18 113:11
 131:4 134:9 139:2
 157:20 166:12 167:1
 167:19 175:19 176:6
 177:3
standards 6:14,16,18
 19:3,11,22 21:22 26:5
 26:7,18 27:4 30:16
 35:11 49:19 50:1,9,22
 51:11,12,22 52:14,15
 52:20 54:1 56:13
 59:10 60:4 79:22
 85:22 93:12 95:22
 96:4,15 98:12 100:19
 103:21 111:13 128:4
 130:18 134:22 135:16
 149:1 151:4 162:22
 166:16,18 177:5
 178:18 179:7 180:18
 187:15
standpoint 50:7 54:14
 86:17 88:2 89:7 93:12
 100:11 116:11,21
 134:6 142:1,9
stands 17:9
start 6:11 8:21 14:7
 23:19 43:3 48:5 49:12
 62:10,17 81:2 84:2
 118:15 124:7 148:3
 179:14
started 16:4 24:20 51:6
 64:1 147:4
starting 7:6 33:14
state 24:12,15 95:9
 151:7,15 154:15
 155:12
statements 69:2
states 140:4 151:17
 152:4
station 127:9
stations 106:3 108:21
statute 18:4
statutorily 4:10
statutory 17:21
stay 62:15 144:5 188:1
staying 22:20
stays 165:12
steadily 15:3
steel 46:12,13,15 61:14
 61:15 62:3,7,12 69:11
 69:11,13 76:16 83:4,8
 114:19 118:4
steelheads 83:4
step 17:7 27:5 33:7
 161:6
step-by-step 137:8
- 138:8
steps 137:11 141:22
 142:2,8 144:4 147:16
 147:20 148:2,5,10
 150:6,7,13 153:9,15
 153:22 157:7 158:12
 171:15
Stevens 2:18 6:21,21
stick 10:3 62:19 84:17
STM 54:17
stop 39:16 43:4 123:1
 123:15 155:21 165:11
 166:4
stops 67:6 123:18
storage 15:5 72:5 73:17
storing 167:3
straight 29:4
straightforward 56:1
strategic 14:17
street 1:21 146:14
strike 122:13,14 160:22
strikes 73:12
striking 158:8
stringent 113:12,17
 134:15 162:7
strings 27:19
strong 116:19,21 132:3
 188:7
strongly 117:4 138:3
 167:8 168:7,17
structure 137:20
structured 23:15
structures 130:13
 132:19 133:3,6
 137:14 149:9
studies 172:15
study 3:16 182:5,8,13
 182:17 183:10,14,14
 183:18 184:2 185:6
 187:1,19
stuff 90:15 143:7
 144:11 151:6
sub-part 100:5 101:12
subject 22:3 62:21 65:4
 153:7 182:11 183:22
 184:14 185:1,2
subpart 110:8 173:11
 173:12
subsidence 107:18
 113:8
Sue 7:22 44:10 47:4,13
 54:13 60:6 64:14
 66:19 74:3 81:9 97:13
 97:20 103:18 104:21
 109:15,16 112:13
 118:17 122:3 127:4
 128:21 129:9 143:20
 143:21 144:16 158:15

158:16 161:15,16
 164:5 171:4 174:2,4
 175:4 179:21 181:12
Sue's 46:6,8 47:21
sufficient 133:12
 137:12 148:6,21
 152:2
suggest 68:14 117:12
 132:14 142:1 167:20
suggested 36:1,9 68:6
 98:19 108:6 114:21
 135:2 138:21 141:12
suggesting 34:22
suggestion 37:13 42:20
 67:7 93:17 123:1
 133:11
suggestions 41:6,7
 133:8 135:2 166:15
 167:2
suggests 140:18
 148:22
suite 51:1
suited 32:7
summary 182:8
sun 71:18 72:20
supplement 157:13
supplier 73:16
support 34:22 41:18
 46:7 67:14 85:9 92:6
 106:11 107:16 108:1
 108:22 113:20 117:10
 131:16,19 133:17
 136:18 167:7 169:22
 179:6
supported 108:3,5
 131:18
supportive 47:9
supports 107:13
supposed 30:22 121:19
sure 8:12 10:12 12:20
 36:14 39:11 46:2
 75:10 77:3 78:15
 97:10 98:3 110:8
 119:4 144:1 145:7
 150:10 169:15 175:6
 178:4 180:12,14
surface 32:13
survive 73:17
Susan 2:3 41:10
sweep 145:18
swimming 144:9
system 45:5 75:2,12
 114:12,19 118:21
 119:11 146:7 147:1
 150:21 154:16 155:1
 158:21 167:13
systemic 25:3
systems 42:15 44:20

45:1,2,8,21 47:21
 56:18,22 60:21 63:11
 67:19 75:8 114:22
 143:14 154:20

T

T-A-B-L-E 3:1
table 11:6,16,21 13:6
 50:8 68:4 73:10 85:22
 88:9 92:15 93:4 97:22
 98:7 99:10 120:16
 188:4
tables 88:12 92:11 99:5
tag 34:8,9
take 6:6 13:11 17:15
 26:11 27:5 34:9 41:3
 41:6 55:3 56:22 60:20
 67:3,17 76:3 82:2
 124:2 132:19 137:11
 138:8 141:22 142:7
 142:19 144:4 153:14
 154:1,4 156:21
 158:12 168:7,16
 171:14
taken 142:1
takes 11:13 45:6 48:2
 121:3
talk 16:13 26:9 27:1
 28:17 51:18 58:5,17
 70:16 87:9 89:10
 94:20 139:7 167:20
 168:22 186:13
talked 105:16 113:22
 114:3
talking 14:22 72:7 78:3
 105:15 118:15 139:13
talks 59:8 78:10 88:22
 102:9
tanks 155:16
tape 20:14
target 57:17
tarp 71:20 72:1
task 39:7 96:13 151:13
 151:22
team 22:4 24:2,3,17
 43:8 118:17
technical 18:20 19:2,11
 19:22 22:15 24:5 58:4
 79:22 84:4 93:11
 95:14 103:20 107:7
 111:12 116:11 122:7
 128:3 137:10 162:21
 169:22 172:13 175:21
 176:6 178:17 180:17
technically 19:6,14
 20:3 72:8,13 80:4
 104:2 111:16 128:7
 145:1 151:2 163:3

167:12 176:18 178:22
 180:21
technologies 150:19
technology 33:15 48:6
 48:7 74:16,17,21
 186:9,10
tell 9:1 61:14 70:22
 154:19
telling 152:10
tells 42:14
temperature 28:18 71:1
 79:2
temporary 165:8,17
ten 47:18 70:3,6 72:7
 72:14 82:6 114:11,11
ten-minute 82:2
tendency 119:22
tent 13:4 41:8
term 142:5
termination 135:22
territories 146:4
test 67:3 127:9
tested 108:14,18
testing 66:20 73:4
text 102:2,2 103:10,11
 110:15 127:16 147:16
 159:14 161:11 162:14
 178:8
thank 8:2 12:3 15:18
 16:1 23:21,22 39:22
 40:1,9,12 41:10 64:17
 66:16 68:17,19 70:12
 80:15 82:5,6 97:19
 109:18 111:22 112:3
 127:13 128:22 129:20
 162:10 182:1 185:3
 188:2
thanks 11:1 14:1 15:19
 21:7 23:21 44:10 46:3
 47:7 69:14 103:9
 180:11 182:6 186:3
 188:9
These 2:11 14:4,10
thermal 113:16
thicker 87:1
thickness 92:13,15
 93:6,8 95:18 99:5,12
 99:17 135:10 170:1,8
 170:16
thing 5:16 41:19 49:17
 56:8 61:21 72:6 75:16
 83:7 101:16 138:9
 142:21 145:8 150:10
 151:15 154:19 156:4
 157:5 161:18 165:12
 165:12
things 5:18 11:9 15:15
 34:2,11 48:9,13 68:16

71:2 90:12 100:8
 143:3 149:10 155:17
 187:20
think 10:6,19 11:17
 12:4,6 17:22 24:21
 26:10 31:15 32:16
 34:8 37:21 40:13,21
 41:12,14,16,19,20
 42:2 43:11 44:3,6
 45:10,11 47:1 48:3,4
 48:18 49:5 53:1,20,21
 55:6,8,13,14,16 56:2
 57:8,9,10 58:1,6,13
 58:13,16 59:7,12,15
 59:22 60:2,3,14,16,18
 60:20 61:4,12,20,21
 62:6,15,19 64:18 65:7
 68:20 69:22 70:19
 71:5,11 72:3,15,16,17
 73:1,4 75:17 76:1,3,4
 76:12 77:20,21 78:2
 78:19,21 79:9 81:21
 82:17 87:6 88:3,15
 89:9,15,18 90:3 93:18
 94:1 96:17 98:9,11
 99:17,19 100:1 101:8
 102:20 108:12 109:17
 114:3 116:13,20
 117:13 118:6,7,19,20
 120:2,12,20,21 121:6
 121:10,13,17 122:9
 122:14 123:6,13
 124:11 125:6,9 126:8
 130:8 131:1 132:8
 135:14 137:6 138:6
 140:10 141:19 142:15
 147:7,12 148:14
 149:21 150:10,13,15
 152:9 153:16 155:5
 155:18 157:15 158:6
 158:18 159:6,9,16,18
 159:18,22 160:9
 161:18 162:1 164:20
 166:6,18,22 167:17
 168:4,15 169:2,4
 170:14,18 171:5,13
 171:15,16 172:13,16
 172:22 173:19 174:5
 175:2,4,9,13 176:13
 177:1 184:18 186:6
 187:9
thinking 43:12 90:6
 126:18 141:9
thinks 156:3
third 19:17 113:14
 167:4
thought 4:20 36:13
 38:21 40:15 43:19

48:2 51:5 69:9 71:7
120:8 137:17 138:18
139:8 140:9 162:3
thoughtful 48:19
thoughtfully 48:10
thoughts 39:19 50:8
109:13 123:10 137:9
157:22 160:15
three 26:16 27:21 32:10
47:17 70:2 72:7,14
91:3
three-inch 106:13
107:5
throw 36:8 118:13,18
throwing 119:14 144:12
tie 81:20
tied 30:9 31:5 155:2
time 5:12 11:10,12 14:7
26:13 29:22 32:9
35:13 36:11,16 38:6
39:1 40:7 42:6 44:13
47:20 48:1,11 56:4,22
57:10,15 60:21 63:9
64:10,18 65:7,14,16
65:20 66:8 67:17 68:3
68:9,12,21 70:11
72:18 73:14 90:6
94:22 105:13,15
122:16 133:6 137:14
144:22 182:11,12
183:5,5,16
timeframe 42:4,18
44:11,15 48:5
timeframes 70:9
timeline 37:10 38:9,20
47:12 48:8
times 18:21 33:10
91:10
timing 37:15 55:10
60:18
titled 178:19
to-do 96:11
today 4:8,16,22 5:10,14
8:3,4,5,17 9:9 12:20
13:10,11 14:5,12 16:6
17:2 18:9 27:7 39:19
66:7 83:19 96:6,13
97:5
today's 4:16 10:22
tomorrow 8:19,21 9:7,8
9:10,13 14:3,12,12
15:1 16:17 39:17 40:5
188:6,7,9
tonight 188:6
tool 174:15
toolbox 174:16
top 32:6 34:13,14 78:19
141:10

topic 62:16
topics 9:4
total 37:16
touch 5:15
tough 100:4
town 146:6
traceability 23:9,20
24:21 26:8,22 28:9
31:10 35:2,8,12 37:6
40:18 41:19 42:21
47:9 48:18 49:22 51:9
51:14,19,21 53:3,6,8
54:6 58:15 59:1 60:10
71:5 74:18 76:11
77:22 78:2,3,9 80:1
80:11
traced 42:13
tracer 132:15
tracing 67:9,15
track 46:13,19
trackability 67:9
tracked 42:13
tracking 23:9,19 24:20
26:8,22 28:9 31:9
35:2,8,12 37:5 40:17
41:18 42:21 47:6,9
48:18 49:21 51:9,13
51:18,21 53:2,6,8
54:5 58:15,22 60:10
60:16 67:15 71:4
74:18 76:11 78:1,5
80:1
trade 22:11 167:7 185:2
185:4
traditionally 28:1,19
29:19 83:17,21
train 24:12 42:17
training 24:10 48:12
67:21
transcript 12:10,11,22
20:17,19,22
transition 36:19
transitioned 35:11
transitioning 29:9
transmission 2:3 9:15
14:22 23:2 63:1 65:22
152:6 185:5
transportation 1:1
185:15
travel 11:13
treatment 32:14
tremendous 162:12
trench 149:16 150:19
trenchless 130:3,10,11
131:15 137:5 138:6
141:12 153:18 163:6
trend 166:3
tricky 133:1

tried 71:12
truly 24:3
trust 63:15,17
try 26:20 33:19 51:7
66:6 91:17 110:8
121:8 138:2 142:11
144:11 176:2,16
182:16 184:10
trying 21:16 26:4,14,17
50:14 61:1 65:19
77:14 86:7,9 124:15
125:7 153:4 157:12
172:11 175:15 184:8
tubing 85:15
tuned 188:1
turn 4:19 10:20 15:17
15:20 82:13 110:12
122:20
turning 13:20
tweaked 20:11
Twenty 170:3
two 5:19 6:4 8:6 18:11
18:11 25:17 27:21
28:13 32:10 37:5,15
39:4 44:17 45:10 46:1
47:13 54:4 57:6 59:4
62:3 68:5 76:14 77:22
78:17 80:8 147:18
177:14
type 28:22 34:3 75:2,16
77:12 103:3 119:5
183:9
types 35:3 59:14 106:9
typical 118:1
typically 27:20 33:13
34:5,7 53:9,10 107:12
115:22 116:3
typing 162:12

U

U.S 1:1 2:2
ultimate 84:9
ultimately 33:4 49:9
65:1 73:22
unable 16:6
unanimous 105:11
113:1 129:19 164:15
180:9 181:22
undamaged 132:14
underground 15:5
130:13 132:19 133:3
137:13 143:14,16
144:10 148:7,11
149:8 158:9
understand 58:22 70:5
90:2 119:12 120:18
141:16 142:5 147:20
171:14 177:12 184:8

184:10
understanding 119:20
147:15 175:21 184:5
understood 43:2
underway 14:16
unfortunately 47:15
63:21 137:22
unknown 143:7 145:15
158:11
unmarked 145:5,10
update 45:21 54:2 94:2
95:22 96:4,9,15 98:12
167:1
updated 45:3,5 96:2
102:19
updates 90:10 100:1
updating 54:3 98:10
upfront 8:7 10:19
156:15
upgrade 47:19
upgrading 47:16
upsets 142:22
usable 120:7
use 18:19 23:10 36:20
43:22 47:5 52:3 66:11
87:12 94:11 130:14
130:21 131:5,11,12
132:15,16 142:4
153:5 157:8 159:14
165:8,22,22 166:1
167:13 168:19 177:18
179:8
users 69:12
utilities 137:14 143:17
148:8,11 149:9
150:22 158:9 159:5
utility 2:6 149:7,7
158:20
utilizing 184:6
UV 71:16 72:2,10 73:1,7
UV-cured 33:6

V

vague 64:11
validated 176:19
value 11:15,20 46:13
83:8 86:19,22 87:5
valve 65:22 169:7
variety 9:4 15:1
various 47:3 66:21
154:14
varying 32:15
vendors 47:3 117:2
vent 167:11,14 168:10
verbatim 20:16
verify 132:13
version 26:12,15 27:9
28:3,3,8 32:11 49:22

51:7 52:9,13,21 53:2
53:15,17 54:11 59:13
59:16,20 86:1,4,4
88:6 89:1 92:14,16
93:13,16,17,22 94:12
95:5 96:2,3 97:6 99:3
99:11,19 103:11
123:19
versions 28:6 88:1
93:22 94:15 95:3
versus 31:6 36:10 37:2
72:22 76:12 93:7
134:7 140:19 157:18
184:6 185:15
vet 61:7,22
Vinnie 24:6
vintage 172:14
Virginia 1:21 2:6 7:19
144:16 145:9
visible 36:7 68:12 73:14
voices 188:7
volume 42:12
vote 3:12 9:8,9,10,21
13:22 16:15,22 17:14
17:14,17,19 21:8
75:18,22 80:18 97:5,8
102:2,21 112:4
161:14
voted 18:15
votes 21:6
voting 3:4 8:6 13:11
16:2,13 18:10 20:12
96:18

W

W 2:5
waiver 95:9 100:14
walk 16:2 129:21
walking 82:13
wall 29:18,20 32:20
87:1 92:13,15 93:5,8
95:17 99:4,11,16
135:9 170:1,8,16
want 17:13 24:5 26:4
31:9,14 35:19 51:4
52:6 60:22 63:16,18
69:22 75:11 78:15
84:11,16,16 91:6,8
93:6 97:10,12 100:21
102:17 103:7 104:14
110:21 125:8,9,10
135:15 137:7 139:12
139:13 141:20 142:4
142:21 144:3 150:10
150:15 151:22 152:10
152:12,14,20 159:21
168:21 170:20 173:7
173:17 178:4 183:1

186:17 188:6
wanted 27:5 99:2
180:14 182:17
wanting 49:6 157:17
wants 27:14 79:8 97:11
161:6
wasn't 25:17 43:14 89:8
91:9 95:5 98:13
148:10
watching 11:7 103:4
water 144:21 145:8,10
145:15,16 146:14,17
146:19 147:2,5 155:2
155:2,16
watering 147:1
way 5:20 23:8,14 45:8
46:18 47:6 49:20
55:11 62:8 72:2,9,16
89:3 90:8 93:10
100:19 101:1 107:17
109:5 121:21 123:7
143:8,9,10 156:17
159:3 174:6 186:16
186:18
ways 5:20 6:4 34:18
91:17,18
we'll 5:16 6:9 7:4,6 8:5
8:9,19,22 9:15 14:11
14:22 16:14 17:12
18:11,21 20:12,14,15
21:4,10 23:17,19 26:9
27:1 54:1 67:9 68:2
81:2 82:6 89:20 110:8
124:1 130:8 133:13
167:1 169:6 179:13
181:5 188:8
we're 10:9 12:5 15:6,12
15:19 17:22 20:11
21:16,19 22:13,20
23:15 26:4,14,15,17
32:16 42:8,14,15,16
42:17 43:12 47:13,18
48:8 49:15,20 50:2
53:19 54:7 55:11 56:4
56:5,5,10 57:5,8,10
59:4 61:16,20 62:4,6
62:20 67:5 74:16
75:17,20 77:3,4,14
78:3 81:1 82:2,16
87:6 88:1 90:8 91:18
95:18 96:2 97:22
101:15 105:12 106:7
117:14 121:14 122:17
124:15 126:10 138:4
142:10 147:8,14
157:12,12 158:2,10
165:19 171:11 175:15
183:3 185:1,13

we've 19:19 25:4,14
74:19 76:15 95:2
101:7 105:16 113:5
121:12 131:6 146:11
146:16 150:16 170:18
183:11 187:12
weak 130:15 131:19
132:2 138:12 159:15
163:8
weatherability 70:1
weathering 70:11 73:3
73:9
website 12:13 151:18
185:10
WEDNESDAY 1:13
week 15:12
welcome 4:6 10:3 39:15
40:10 80:16
well- 32:6
well-suited 32:2
went 25:16 82:9 89:4
95:3 140:3 168:14
188:11
weren't 25:6,7
wet 127:8
Whetsel 16:5
White 7:1,1
wide-ranging 14:13
Wiese 5:3 182:11,17
willing 138:4
Winnie 24:7
wire 132:15
wishes 16:7
word 31:4 36:5 65:3,10
147:13 152:20
wording 77:16
words 14:9,11 125:14
150:8
work 5:11 22:13 43:1
45:21 48:11 55:22
61:18 63:12,13 75:2
84:4 99:19 128:2
143:18 161:7 168:4
171:10 175:5 177:11
188:8
worked 26:8
working 5:9,13 15:3
25:13,19 47:16,20
48:5 74:19 87:9 122:5
124:17 131:7,8 132:7
151:16 153:20 183:3
works 153:6
workshop 31:10 58:15
132:8,10
worry 125:13
Worsinger 2:7 7:13,13
46:5,6 58:20,20 66:17
66:17 69:4,4 77:8,8

77:20 79:9 81:11,12
96:10 105:1,2 112:15
112:16 117:9,9,21
129:11,12 142:13,13
145:22,22 147:21
152:19,19 154:11,11
158:5,5 160:20,20
164:7,8 169:12,12,16
173:6,6,14 178:12,15
178:15 180:1,2 181:2
181:14,15
worst 72:19,21
worth 120:22
worthwhile 121:8
worthy 49:17
wouldn't 44:18 100:6
171:20
wrap 50:14
Wrap-up 3:20
wrinkle 73:18
write 91:17 123:22
written 93:11 98:15
100:5 108:4 109:5
133:11
wrong 47:10 125:3
wrote 58:6
www.regulations.gov
12:14

X

X 110:10,19
X52 83:8
Xcel 2:2 7:21 73:21
90:2 111:11 118:13
141:16 162:20 172:8

Y

yeah 24:20 44:16 50:16
51:6 56:2 62:5,11,14
69:20 70:22 74:12
75:10,19 76:7 78:22
82:15 84:2 90:16
92:10 95:20 99:20
100:2 110:10 124:22
140:9 142:1,14
149:13 150:12 152:11
155:8 160:1,4 168:19
170:9 173:19 174:20
176:20 177:6 187:1
year 16:17 22:9 26:13
38:22 42:9,11 45:6
57:6,19 75:6 77:1
114:12 127:9
years 10:14 11:17
26:16 27:11 30:8
34:16 36:10 37:16
39:4 44:17 45:6,10,13
45:16 46:1 47:13,17

48:3 50:3 53:16 54:4
59:4,5 64:6,7 65:15
65:21 68:5 70:2,3,6
72:7,14 74:20 76:2
80:8 114:11 116:3
127:6,6 155:1 172:17
175:4 177:15,19
183:6,12

yelling 188:6

yellow 25:18

Z

Zamarin 105:3

Zoning 2:5

0

0.062 135:14

0.31 83:22

0.4 83:22

0.40 135:11

0.90 135:10

09a 50:3 53:19 54:8

101:6

1

1 1:14 3:4 80:7 113:10

113:17 115:4 116:9

116:20,22 133:13

1-1 150:8

1:00 1:21

1:01 4:2

10 150:11 165:2 169:17

169:22 170:15 171:10

172:9,14,15 175:22

176:18

100 47:11 83:14

11 53:16 54:11 60:4

86:21

11,000 166:8

11/PA-12 59:2

11c 53:1

12 28:2,6,8 53:20,21

54:12 82:22 86:1,9

89:1 91:4 92:14 93:16

94:7 96:20 98:7

103:22 135:1 150:2

152:15

12- 84:10

12-inch 86:3 92:15,16

93:5 152:5

120 83:14

121 90:18

123 90:19

125 84:8,9,11 86:15

89:10,12,16 91:1

12AE-1 52:12

12th 185:9

131,000 166:9

14 86:4 89:2 92:6,16

93:21 94:10 96:19,22

103:2

14- 92:20

140 83:14,18 87:11

15 50:22

150 87:2

16 3:5 28:13

16-digit 28:11 29:3 32:5

34:17 38:12 43:20

180 83:16,19

180F 87:11

182 3:17

186 3:18,21

192 22:20

192-3 37:3

192.3 77:16 80:12

192.311 170:10

192.311(b) 179:5

192.319(b) 163:12

192.361(b) 163:13

192.455(g) 115:9

192.59 168:3

192.756 163:15

193.2 27:1

1973 109:7

1987 26:12

1999 53:17 59:20

2

2 3:7 21:10 80:9 87:21

115:2

2:18 82:9

2:30 82:6

2:31 82:10

20 36:10 50:22 51:11

64:6 116:3 165:4

170:20 173:1

200 59:19 83:22 84:22

87:2,21 88:2 89:14

2008 25:15

2009 25:4 26:14

2010 25:4

2012 26:6,15 49:22 50:5

50:9 51:6 53:7,15

59:15

2014 166:7

2015 22:7

2016 1:14

2017 183:15

2021 14:15

204 106:5

21 3:6

21-month 183:14

21st 16:17 22:7

23 3:8

2313-12 52:8

24-inch 84:13 86:5

88:18 89:5,8 91:6

94:11 99:7,9,14

250 59:10 84:22 85:6

87:18,22 88:2 89:15

2513 26:12 28:4 29:14

50:18 52:3,21 53:17

59:13,20 86:15 92:10

131:5

2513-09a 27:8

2513-11c 53:5

2513-14 92:5 96:16

2620 134:14,16 136:11

2708 91:2

2897 28:9 29:10 32:3

35:12 49:2 52:11

77:17 78:10

3

3 3:16 80:11 115:2

30 116:3 127:6,6 155:1

170:8

312 88:5

316 87:22 88:3

31st 22:9

32 84:5,14,17,18 155:13

32312 87:20

34 10:14

35 177:19

39 3:10 22:10

4

4 3:3 82:20 85:5 133:16

4-inch 138:20

4:27 188:11

4:30 8:5,16 9:1 11:3

128:1

40 84:6,16 90:22 93:7

103:7,8 104:10

455 114:9

455(f) 115:14

465 117:20

4710 91:2

49 18:5

5

5 171:9

50 30:8 64:6

50-year 30:19

500 42:9

5L 95:3

6

600 42:10

60115 18:5

68 3:11

7

7 52:7,8 77:19 78:11

73 83:14

8

8- 150:7

8:30 8:22

80 3:13

811 7:19 144:16

82 3:15

87 51:3

9

90 150:9

90s 149:15

950 1:20

99 26:12 51:3 59:13

99.9 122:16

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: Gas Pipeline Advisory Committee

Before: US DOT

Date: 06-01-16

Place: Arlington, VA

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.



Court Reporter

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701