

1 OPERATOR: This is Conference #: 48631574

2 Operator: Ladies and gentlemen, thank you for standing by. And welcome to the
3 GMD Level 2 Appeals Call.

4 During the presentation, all participants will be in a listen-only mode.

5 If you need to reach an operator at any time, please press star zero. As a
6 reminder, this conference is being recorded, Monday, June the 29th, 2015.

7 I would now like to turn the conference over to Ken Peterson, Chair of the
8 Standards Oversight and Technology Committee. Please go ahead.

9 Ken Peterson: Thank you, operator. Welcome everyone. I'm Ken Peterson, the chair of
10 the Level 2 Appeals panel on TPL-007-1 transmission planning performance
11 for GMD.

12 With me in the NERC office is, is my colleague Paul Barber. On the line
13 are other panel members, Fred Gorbet, Doug Yeager and Dave Goulding. I'm
14 also joined in the – in their conference center here by the legal staff and
15 communications personnel, Charlie Berardesco, Lauren Perotti, Brady Walker,
16 Janet Sena and Holly Hawkins.

17 We are here to consider the appeal by the Foundation for Resilient Societies,
18 who are appealing the NERC Board of Trustees' passage of the TPL-007-1
19 standard.

20 Foundation has established that they are an entity in standing that is affected
21 by the standard that was passed and what we are going to be considering is,
22 whether there are procedural elements that have been violated, shall we say,
23 that merits reconsideration of the process that the standard was developed

1 under.

2 There are limits to how much we can do as an appeal panel according to the
3 Standard Process Manual which is approved by FERC under NERC's Rules of
4 Procedure. And we will be hewing to those guides as we make our deliberation.

5 In the course of today, we'll be hearing from the Foundation and other
6 parties in addition to the chair of the drafting team and the – of standards –
7 current standards manager who will discuss the outcome of the level one appeal.

8 The proceedings are being recorded, there will be a formal transcript to –
9 available publicly for all the comments.

10 And with that, I would ask Charlie Berardesco to refer us to the antitrust
11 guidelines.

12 Charlie Berardesco: Yes. So, included with the package that was publicly posted are NERC's
13 antitrust guidelines, we conduct all of our meetings and recordings with those.
14 If anyone has any questions, please feel free to contact me at any point in time.
15 Thank you, Mr. Chair.

16 Ken Peterson: Thank you.

17 Now, the bulk of the material was provided by Foundation for Resilient
18 Societies - that's in our board's package and the panel has all read that material.
19 We have additional list of comments from other parties, including Storm
20 Analysis, LLC and Advanced Fusion Systems, Kappenman and Birnbach;
21 Nicholas Hanlon, Center for Security Policy; the Tennessee Valley Authority;
22 Peter Pry, EMP Task Force; Bonneville Power Administration; and James E.
23 Ference. Again, all of these comments are part of the public record and will be

1 – are available and will be published along with the transcripts.

2 With that, we now turn to Foundation for Resilient Societies, who I
3 understand have agreed to split their time with Kappenman and Birnbach, and
4 we don't have a reading yet on how that's going to be done, but there will be 30
5 minutes allowed for the appellant to make a case. We will stick to that
6 timeframe very closely, so I urge you to be succinct and to the point about the
7 areas that we're trying to come to decision and with respect to the SPM.
8 So operator, would you please open the lines for Mr. Popik and the other
9 members of the Foundation?

10 Operator: Mr. Popik, please go ahead.

11 Bill Harris: Thank you. My name is Bill Harris. Good afternoon. I serve as the director
12 – as a director, secretary and attorney for the non-profit Foundation for Resilient
13 Societies based in Nashua, New Hampshire.
14 I will just briefly address issues of standing and then ask our Foundation
15 Chairman, Tom Popik, to address our concerns of what we proposed are
16 procedural deficiencies relating to data collection, data sharing, modeling and
17 quality control.

18 We appreciate the opportunity to present our concerns that affect the
19 protection or failure to protect several hundred million residents of the U.S. and
20 Canada.

21 First, how does Resilient Societies have directly and materially affected
22 interests that are adversely affected by the NERC GMD standards development
23 process?

1 Our corporate charter establishes our research and education functions to
2 enhance resilience and critical infrastructures. And we have started with the
3 electric grid because all the other critical infrastructures depend upon it.

4 This mission would be defeated by precedence that could be established
5 where there to be a NERC standards-setting process that does not provide the
6 minimal protections while would also provides liability shielding. So that in
7 our view, the process may result in a reduction in the incentives in the
8 marketplace to protect the grid where it's essential to do so.

9 Our corporate headquarters are in Nashua, New Hampshire. And we derive
10 much of the distributed electricity from Seabrook Station in New Hampshire.
11 They provide 40 percent of New Hampshire's power.

12 And additional power from Maine, and through Maine from New
13 Brunswick, Canada. And we have provided, as part of our evidence package,
14 two studies, one done by Central Maine Power and the second by Emprimus, a
15 manufacturer. The – these are found to pages 77 to 118 and pages 119 to 174
16 of the appeals package.

17 And they demonstrate how the NERC proposed standard would be applied
18 in Maine and New Hampshire. And essentially, only one transformer in Maine
19 would even need to be assessed, and according to the Central Maine Power
20 result, even Chester, Maine would not need a blocking device.

21 And, in New Hampshire, we have already had an experience with solar
22 storm in November 1998, following vibration of a stainless steel bolt. So, we're
23 concerned that the Maine sources of supply for our headquarters and our

1 operations will be jeopardized by the failure of an adequate reliability standard.

2 In addition, the way our Foundation works is we have a system of
3 telephoning, sometimes we can do video as well. But, we really depend upon
4 the electric grid and commercial telecommunications powered by the
5 commercial grid for our six directors who are located in Arizona, California,
6 Massachusetts, New Hampshire, South Carolina and Virginia.

7 Our virtual office business model depends on reliable telecommunications.
8 And in turn, depend on reliable electricity.

9 Combining a liability shield with a benchmark standard that requires no
10 protective equipment in the states of Maine and New Hampshire, defeats our
11 Foundation mission to provide greater resilience and not lesser resilience for
12 critical infrastructure.

13 And, now, I'd like to turn to Thomas Popik, our chairman and president,
14 who will highlight how the procedural deficiencies relating to NERC data
15 collection, data sharing, model validation and quality control transform the goal
16 of protections against solar storms into a liability shielding exercise that fails to
17 provide the essential protections that the power – the bulk power system need.

18 Thank you.

19 Ken Peterson: Thank you, Mr. Harris. Mr. Popik.

20 Operator, we lost Mr. Popik.

21 Operator: Mr. Popik's line is open.

22 Thomas Popik: Oh, hello? Hello? Can you hear it?

23 Ken Peterson: Yes, hello, Mr. Popik. Yes.

1 Thomas Popik: OK.

2 Ken Peterson: I can hear you now, thank you.

3 Thomas Popik: Wonderful. Thank you so much.

4 Again, my name is Thomas Popik, I'm chairman of the Foundation for
5 Resilient Societies. I'm a long-term participant in the Geomagnetic Disturbance
6 Task Force of NERC since 1991, and I'm also a degreed engineer. So, I
7 appreciate very much the opportunity to talk to you about some of the technical
8 – oh, excuse me, our attorney, Bill Harris is saying that I've been a member of
9 the task force since 2011. OK, thank you.

10 And I very much appreciate the opportunity today to present some of the
11 technical and procedural issues in our appeal.

12 So, I'm just going to outline without the benefit of presentation aids some
13 of the things I'm going to be talking about, I'm going to quickly delineate the
14 technical issues that relate to quality control. And then I'm going to talk about
15 some specific real-world examples that show the deficiencies in quality control
16 in the NERC standard development process.

17 Importantly, I'm going to address the failure of the NERC standard drafting
18 team to use what would be a standard scientific method. And I'm going to finish
19 by summarizing how these defects relate to the Standard Processes Manual and
20 I'm going to ask you as the subcommittee of the NERC Board of Trustees to
21 address these defects. So I'm just going to quickly read through some of the
22 technical issues that relate to quality control.

23 So, first, a failure to include in the benchmark model, risks posed by

1 harmonic current production and transformers and the impacts on generators
2 and other equipment in the bulk power system.

3 Failure to include in the benchmark model methods to estimate VAR
4 consumption and the consumption of VAR on voltage stability.

5 Failure to include the risks and impacts of vibration on high-voltage
6 transformers and also generator components such as stators and turbines.

7 Failure to establish standards for mandatory installation operation of
8 geomagnetically-induced current monitors and that has been discussed in the
9 FERC orders.

10 Failure to require NERC registered entities to collect GIC data and also
11 publicly release this data, and we believe that if this data is not collected and
12 publicly released, it could produce antitrust implications for the electric utility
13 industry.

14 Failure to validate the NERC benchmark model against actual historic GIC
15 data within the United States. Failure to perform cost-benefit analysis as
16 mandated in FERC Order 779. And finally, the very important issue of this
17 limit for thermal assessment of transformers of 75 amps per phase, and how that
18 limit was determined.

19 So, I also would say that this is our level two appeal, so we've gone through
20 the level one process and we did read the response of the standard drafting team
21 and NERC legal staff. We don't have time to argue every single legal issue with
22 only 30 minutes.

23 And so, I'm just going to, instead, talk about some highlights and common

1 sense examples of past events and deficiencies in the NERC process. And, I
2 would say, this is much like the review that would probably take place were a
3 blackout to result from a geomagnetic disturbance.

4 But I would also add, all the NERC legal reasoning will have absolutely no
5 effect on the probability of a blackout from geomagnetic disturbance. So we
6 can come up with all sorts of reasons, but it's not going to affect what the sun
7 does.

8 So, I'm going to talk about some specific examples now. So, let's just talk
9 about the Seabrook transformer. In 1998, there's the solar storm. And shortly
10 after that storm, an examination of the Seabrook Station transformer determines
11 that it has failed. And it causes a 12.2 day outage of Seabrook Station.

12 That was a relatively new transformer manufactured only in 1981 and
13 installed in 1986. These are the kind of events that should have been collected
14 and analyzed by the NERC standard drafting team. I'm just going to say, if you
15 don't look for failures during GMD events, you're not going to find many. And
16 that's a primary defect, a quality control defect of this standards-setting process.

17 I'll give you another example of how just common sense conflicts with the
18 standards-setting process. So, there was a formula step for what the geoelectric
19 field would be predicted to be under the benchmark GMD event.

20 Central Maine Power then did a study of their network and their
21 transformers to find out how many transformers would be required to have a
22 thermal assessment under the now passed standard, TPL-007-001.

23 And the result that Central Maine Power came up with was only one

1 transformer in the State of Maine would even need a thermal assessment. We're
2 not saying it would need protection, just a thermal assessment. All other
3 transformers would be exempt from any assessment whatsoever.

4 And we know the State of Maine is almost adjacent to Quebec where there's
5 already been a GMD blackout. And, we can also compare this modeling result
6 of Central Maine Power under the formula in the NERC standard and compare
7 it to an official U.S. government report by the Oakridge National Laboratory,
8 which said there would be four to eight transformers within the State of Maine
9 under risk during solar storm.

10 Then we can also talk about the Salem nuclear plant. And we would point
11 out that there are dramatic scaling factors based on latitude and also based on
12 ground model in the standard. And we would question, would the Salem
13 nuclear plant, with these dramatic latitude scaling factors and ground model
14 scaling factors, why did that transformer burn out during a relatively moderate
15 solar storm in March 1989? These are the kind of questions that should have
16 been answered by the NERC standard drafting team that were not.

17 Now, I'm going to move onto something that's very important. And, it's the
18 failure to use the scientific method, that's a failure of the NERC standard
19 drafting team.

20 So, let's just go back to high school science. The scientific method, you set
21 a hypotheses and then hypothesis, and then you collect real-world data to test
22 whether that's correct or not. Our position is, that this NERC standard, there
23 hasn't been real-world data collected to test whether it just simply one or more

1 hypotheses in the standard.

2 And let me go through some detail, but I'll say at the beginning, that because
3 of the very large loss of life that might occur as the result of a GMD event or a
4 solar – also called a solar storm, it's extraordinarily important that the scientific
5 method be followed in this case.

6 And so, we have the NERC standard drafting team which has set a
7 benchmark geomagnetic disturbance event that relies on data from Northern
8 Europe during a short time period in which there were no major storms, instead
9 of using observed magnetometer and GIC data from the United States and
10 Canada over a longer time period with larger storms.

11 So, that doesn't make sense from a scientific standpoint. And then we also
12 move onto what I'll call a conjecture, it's this scientifically unproven hotspot
13 conjecture that somehow we can average down a solar storm over a small
14 geographic area. We don't see the support for this hotspot conjecture any place
15 in the material of the NERC standard drafting team other than conclusory
16 statements. And then we'll move onto the geomagnetic field scaling factors.

17 And, these scaling factors, they don't comport with the real-world data that
18 has been collected for North America. And, for this, I would refer to the
19 subcommittee to other material which is then the record of the appeal. And I'll
20 refer to this specific page and so we can go to page 30 and I'll refer you to the
21 graph, NERC geomagnetic field scaling factor. And, data from several storms,
22 1972, 1982, 1989, and we can see a line that shows what the dB/dt would be at
23 various geomagnetic latitudes. And then we can – according to the benchmark

1 GMD event and then we can see real observations. And we can see at the real
2 observations, they'll comport to the NERC model and the standard.

3 And perhaps, maybe this is one reason why the standard drafting team didn't
4 validate the model using data from the United States, because if they had,
5 perhaps they would have seen this kind of discrepancy. This is a fundamental
6 failure of quality control by NERC, and it needs to be addressed by your
7 committee and by the NERC standard drafting team.

8 So, let me then go on to this limit of 15 amps of GIC for exemption of high-
9 voltage transformers from thermal impact assessment. And let's be clear, we're
10 just talking about an assessment here. We're not talking about whether a
11 transformer would actually need to be protected with the hardware protective
12 device just for an assessment because if a transformer in model GIC would
13 experience less than these limits of amperage, there wouldn't even need to be
14 an assessment of the transformer done to see if it's vulnerable. It would just be
15 assumed that's invulnerable, even if it was a transformer 30 years old, 40 years
16 old. And so the way the standard was originally drafted, the limit for amperage
17 was 15 amps per phase.

18 And what happened, I'll just give you folks on the committee the history of
19 this, because you really should understand that the standard with a limit of 15
20 amps failed on ballot. And the next thing that happened is the limit was changed
21 to 75 amps per phase. And then the standard passed on ballot.

22 And we looked back in the white papers, we don't see sufficient scientific
23 support for a limit of 75 amps. There are some very limited tests that are very

1 incompletely documented and some hypothetical paper models, theoretic
2 models that are just conjectures that a thermal limit of 75 amps would be
3 appropriate.

4 Let's be clear, that there's many, many designs of large power transformers,
5 hundreds of designs. They're idiosyncratic, and the concept that you could
6 establish a limit of whatever amperage, but especially a high limit like 75 amps
7 based on test of just a few transformers and paper studies is scientifically
8 ludicrous.

9 This is a fundamental failure of quality control, and it needs to be addressed
10 by NERC and the standard drafting team.

11 So now, I'm going to summarize. There have been essential failures in data
12 collection, and this data collection, it's specifically addressed in the Standard
13 Processes Manual. There's a reason why there's a provision for data collection
14 in the Standard Processes Manual, because it would be required if a scientific –
15 the scientific method was followed.

16 And, I should also point out, public data does exist for United States and
17 Canada, but the NERC standard drafting team, I'll say, it didn't adequately use
18 this data because I did carefully read that they referenced some place that they
19 had somehow incorporated that data or whatever. But let's be clear, the
20 principal data used here was from Northern Europe.

21 Let's also be clear, NERC is in possession of two transformer databases,
22 (GADS and TADS), and these were not used in standard setting. These
23 databases potentially have information on transformers that failed during or

1 after solar storms. Why wasn't that data collected? Or, let me put it this way,
2 the data was collected, why wasn't introduced by the standard drafting team?
3 Your committee needs to address this.

4 We also did research and we found that electric utilities have over 100 GIC
5 monitoring locations within the United States. And there are several decades
6 of data from the EPRI SUNBURST system. Why wasn't this data used in
7 standard setting?

8 Again, if the fundamental failure of the scientific method, and I'll refer to a
9 specific section of the NERC Standard Processes Manual, although I could have
10 referred to other sections all through this, is 6.0 Processes for Conducting Field
11 Tests and Collecting and Analyzing Data - why wasn't this done?

12 Multiple comments have been submitted to the standard drafting team
13 showing that the NERC formulas and tables are inconsistent with real-world
14 observations during solar storms within the United States. And we don't feel
15 that these comments were appropriately addressed.

16 Let's look at other ANSI standards. They depend upon and appropriately
17 used safety related data on relationships between structural design or protective
18 equipment in the effective mitigation of earthquakes, hurricanes, maritime
19 accidents, airplane crashes, train derailments, and car crashes. Can you imagine
20 any of those safety standards being set without collecting data?

21 And then I'll talk about safety factors.

22 Really, millions of people could die during a solar storm because of electric
23 grid outage. We should have appropriate safety factors. And we don't see

1 safety factors being incorporated in the standard except implicitly, and it
2 appears to be just minor safety factors.

3 1.4 on the geoelectric field. Is that really – with the lack of scientific
4 knowledge here, and one of the reasons we have a lack of scientific knowledge
5 is the failure of NERC to collect data. Is it really appropriate not to have explicit
6 and ample safety factors?

7 And so, we ask the NERC Board of Trustees correct the deficiencies that
8 we have cited today. Thank you very much.

9 And now, we'll pass it over to John Kappenman.

10 Ken Peterson: Thank you, Mr. Popik. Mr. Kappenman.

11 John Kappenman: Thank you.

12 I'm here today just to offer a few brief comments on the NERC standard
13 TPL-007-001. And that it was drafted in such a way that procedural errors in
14 our opinion will cause inadequate assessment of future storm threats to the
15 electric power grid, and as a result, it could lead to inadequate protection of the
16 grid and the public for this threat.

17 This could harm my company, my firm, and other professional firms
18 directly and materially. We would be reluctant to provide services to electric
19 utilities and electric power generators covered by the standard, especially
20 knowing of the deficiencies in that standard.

21 Moreover, if our firms were to provide engineering services or equipment
22 under this NERC standard, there is potential for civil and criminal liability due
23 to the defective nature of the standard.

1 NERC's registered entities may gain a safe harbor from liability, but there
2 would be no such protection for suppliers like myself to the electric utility
3 industry. This is a direct and material harm to both my company, as well as
4 Advanced Fusion and all other companies that desire to provide such services
5 and equipment.

6 These concerns exist because NERC did not perform adequate quality
7 control in the development of the NERC standard. In particular, NERC did not
8 collect available GIC data from electric utilities and utilize that data to validate
9 and check the quality of the standard.

10 Moreover, NERC did not use transformer failure data available in its own
11 databases, member utility company databases, or a number of other publicly
12 available databases.

13 In addition, there are other significant scientific and engineering omissions
14 and procedural errors. The NERC hundred year-storm intensity profile is
15 clearly incongruent with the observances for storms over just the last 30 years,
16 where these storms indicate threat levels that may be a factor of two or higher
17 than what the NERC standard calls for.

18 And this is a procedure that clearly did not properly collect and evaluate
19 storm data.

20 In addition, the NERC standard incorporates a hotspot averaging conjecture
21 which is based on a scientific paper drafted by the NERC standard team
22 members. However, this paper has not been published and has further not been
23 disclosed to myself or anybody else involved in the review and balloting of the

1 standard. And this was used as the justification for significant down rating of
2 the NERC geoelectric field levels.

3 The NERC standard and models, in short, simply cannot explain the GIC
4 levels and failures that have occurred in past storms. In fact, using the NERC
5 standard, I have shown in public presentations that GIC levels predicted through
6 worst-case storms or worst-case storms per the NERC standard can be much
7 smaller than the GICs already observed in recent storms in number of occasions
8 and locations.

9 This is further demonstrated by a public presentation by Chairman Koza
10 from the NERC standard team when he reviewed the impacts of the standard
11 on the PJM system. This clearly illustrates the inadequacy of the standard and
12 lack of public protections that would result from its implementation.

13 The level two appeal panel should consider remedies including the
14 following. Number one, replacement of the downwardly average electric
15 geoelectric fields. These are erroneously calculated per the hotspot conjecture
16 and with the – they should be replaced with the maximum expected values.

17 Number two, rework of the benchmark GMD event.

18 Number three, rework of the transformer thermal screening criteria using
19 actual transformer failure and observational data that we know exist.

20 Number four, evaluation of the impacts of vibration on transformers, not
21 just thermal screening.

22 Number five, examination of impacts of harmonics on grid equipment and
23 utility customers.

1 And number six, incorporation of appropriate safety factors in the standard.

2 Thank you. That concludes my comments.

3 Ken Peterson: Thank you very much, Mr. Kappenman. Is your colleague, Mr. Birnbach
4 with you? Does he have comments?

5 John Kappenman: He is not with me and he has no further comment either.

6 Ken Peterson: Well, thank you very much.

7 That then concludes the presentation of the Foundation for Resilient
8 Societies. Our next presentation will be by the chair of the standard drafting
9 team for Project 2013-03 Geomagnetic Disturbance, Mr. Koza. Operator,
10 would you open Mr. Koza's line please?

11 Operator: Mr. Koza, your line is open.

12 Frank Koza: OK, thank you and good afternoon.

13 I want to start with a brief history of the standard drafting team. May 2013,
14 FERC issued an order, Order 779, which directed NERC to prepare standards
15 related to GMD mitigation in two stages one, operational and the second to be
16 planning.

17 In June 23, the standard drafting team was appointed by the NERC
18 Standards Committee. And in July 2013, the team members participated in
19 standards training to prepare us for our assignment.

20 In November 2013, the Board of Trustees approved our first standard which
21 is EOP-010, which relates to operational mitigation of GMD.

22 And then, in December of 2014, the Board of Trustees approved the draft
23 that we're talking about now, which is TPL-007, having to do with basically the

1 planning standards associated with GMD.

2 In terms of process, we held a total of eight in-person meetings related to
3 the development of the two standards. Three of them were devoted to the
4 development of the EOP-010 standard. And five in-person meetings related to
5 the development associated with TPL-007. Total of 21 days of work by the
6 drafting team in in-person meetings.

7 There were FERC observers present at all meetings and in – on
8 teleconference with those meetings as well.

9 In addition, we conducted several – with technical conferences and
10 webinars. We held three webinars for EOP-010 and three webinars for TPL-
11 007.

12 In addition, we ran technical conferences related to TPL-007 in May and
13 July of 2014.

14 At our meetings, we considered all submitted comments during each step of
15 the process.

16 I'm going to then turn to the specific concerns just expressed by the
17 Foundation and other commenters.

18 First of all, with relation to harmonics, the standard drafting team in the
19 standard requires – will be requiring entities to consider harmonics in the
20 development of their vulnerability assessments. We did not specifically come
21 up with, I'll say, deterministic requirements for the consideration of harmonics
22 because the tools and expertise to conduct such analyses really are not widely
23 available in industry. So – however, we do include and expect that the

1 registered entities, the applicable entities will be considering harmonics in their
2 vulnerability assessments of the system.

3 Second item has to do with VAR consumption, calculation. The standards
4 in general are not intended to address how calculations are to be performed.
5 The standards basically set the requirement that we expect the registered entities
6 to meet, and then the procedures and the tools and the processes to accomplish
7 that are really not contained in the standards.

8 And I will say, in the case of VAR consumption, the NERC GMD Task
9 Force has prepared a number of work papers to address how VAR consumption
10 is to be calculated, and that is available through registered entities to consider
11 once the standard is approved.

12 In addition, there are commercial tools available and power system analysis
13 software that will help permit the registered entities to develop the calculations
14 for VAR consumption. But, like I say, we really are not to consider that or
15 include those kinds of how-tos in the standard.

16 Next item has to do with transformer vibration. Right now, at least where
17 the research and the industry is, is that there is at least has not, at this point,
18 been established a firm relationship between vibration or even sound in the
19 geomagnetic parameters has been established. So, as I understand that this is a
20 topic of active research, the issue of whether vibration will lead to the
21 transformer failures is something that's currently being considered in research.

22 Next item is GIC monitors. Standard – here again, standards are not
23 intended to prescribe the tools for accumulating data or for data acquisition

1 within the standards. You know, the drafting team would acknowledge the
2 importance of having GIC monitors stationed around the system to take their
3 measurements. As the Foundation has stated, there are a number of GIC
4 monitors currently installed in the system and the number is increasing. But, in
5 terms of standards development, it's inappropriate for the standard drafting team
6 to require those devices to be installed as part of the standard.

7 Next topic is public release of the GIC monitoring data. Here again, the
8 release of system data is really not intended to be addressed in the reliability
9 standards. The release of that kind of data is really an individual decision of
10 the asset owners. I know some asset owners have chosen to release that kind
11 of data. But, in terms of standard development, again, that is not something that
12 we would expect to consider or have required as part of the standard
13 development process.

14 The proposed standard, as it's written, really meets the NERC and FERC
15 guidelines, and really does not create a barrier to competition.

16 The next topic I'd like to address is the issue of including actual historical
17 GIC data. The standard as it exists today was based on a statistical analysis. It
18 is, we believe the best available high-fidelity data set that's available to develop
19 this benchmark. We'll acknowledge, yes, it is Northern European data. But it
20 is the best available data that we had to develop the benchmark. It was
21 developed through the standards process as specified in FERC's order.

22 Now, I'll say this about use of actual GIC data. We believe actual GIC data
23 is not the appropriate method for establishing a continent-wide benchmark. The

1 scientists generally agree that there is a local geomagnetic enhancement
2 associated with space weather or so-called hotspots as was referenced by the
3 Foundation's presentation. But, GIC is a function of system topology and
4 inappropriate for a benchmark to be specified in a geoelectric field terms. So,
5 we believe the benchmark that we use is the best data. We believe it meets the
6 intent of the FERC order to potentially deal with severe impacts on the bulk
7 power system caused by GMD events.

8 Next topic is cost-benefit analysis. Costs were considered – we believe
9 appropriately considered by the standard drafting team and stakeholders as
10 specified in Order number 779.

11 The next topic is quality control. All the directives in the FERC Order 779
12 were reviewed and addressed. There was a considerable effort done by the
13 standard drafting team to continually review where we stood relative to
14 directives in the FERC order and to ensure that we had addressed all of those
15 directives, and we believe that we have.

16 And then, regarding previous Foundation comments that we believe we
17 reviewed all the comments not just of the Foundation, but all the comments
18 were reviewed from all the commenters and addressed, and we thought we did
19 a very consistent and comprehensive job of addressing comments.

20 With regard – and then finally, with regard to the 75 amp per phase
21 requirement that was mentioned in the Foundation's presentation, that 75 amp
22 limit, if you will, is the result of a very, very large number of analyses that were
23 run with three separate transformer models.

1 So, even though – yes, we cannot possibly model every transformer and
2 conduct analyses of every kind and we'll acknowledge the Foundation comment
3 here that there are a lot of transformer types out there. We believe we had a
4 range of transformer models to work with, a large number of analyses were
5 done and we're very comfortable with the 75 amp per phase limit for the
6 determination of a list of preliminary assessment of when and more substantial
7 thermal benchmark with the – for thermal analysis would be required.

8 So, those are our comments relative to concerns expressed by the
9 Foundation. And that concludes my presentation.

10 Ken Peterson: Thank you very much, Mr. Koza.

11 We'll hold any questions from the panel until we've heard from all three
12 presenters.

13 Next will be Howard Gugel from NERC staff, the director of standards, to
14 discuss the results of the level one appeal.

15 Operator, you can open the Mr. Gugel's line please.

16 Operator: Mr. Gugel's line is open.

17 Howard Gugel: Good afternoon. My name is Howard Gugel and I am the director of
18 standards at NERC.

19 I'm here to present NERC staff's position and response to the level two
20 appeal filed by the Foundation for Resilient Societies on the pending TPL-007-
21 1 standard, sometimes referred to as the proposed GMD standard. Thank you
22 for allowing me the opportunity to present for this panel today.

23 NERC's goal is to provide an open and transparent process for the

1 development of reliability standards, and NERC appreciates the Foundation's
2 ongoing participation in the standard development process.

3 NERC develops reliability standards in accordance with Section 300,
4 Reliability Standards Development of its Rules of Procedure and the NERC
5 Standards Processes Manual. The development process is open to any person
6 or entity with a legitimate interest in the reliability of the bulk power system.
7 NERC considers the comments of all stakeholders and a vote of stakeholders
8 and the NERC Board of Trustees as required to approve a reliability standard
9 before the reliability standard is submitted to FERC for approval.

10 Section 8 of the Standards Process Manual provides the basis in which an
11 entity can challenge the standards development process. Importantly, this is
12 limited to only procedural actions or inactions.

13 For this reason, I'm not going to address the merits of the technical
14 arguments presented by the Foundation because such consideration is not
15 presented under or permitted under the limited appeal rights provided by
16 Section 8 of the Standards Process Manual. However, I will address the
17 procedural actions or inactions asserted by the Foundation. That is, that NERC
18 reliability standard staff failed to perform essential quality control and that the
19 standard drafting team failed to respond to the Foundation's comments during
20 the development process.

21 In short, NERC has reviewed the complete record of the development for
22 proposed Reliability Standard TPL-007-1 and the information contained in the
23 Foundation's complaint to determine whether NERC's Standards Process

1 Manual was followed during the development of the standard. There is no basis
2 in the Foundation's assertions that NERC failed to follow the Standards Process
3 Manual during the development of proposed Reliability Standard TPL-007-1.

4 In response to the Foundation's assertion that NERC staff failed to provide
5 quality control in the development of the proposed standard, the Foundation's
6 quality control assertions are without basis based on the following. NERC staff
7 coordinated a quality review of the reliability standard as required by Section
8 4.6 of the Standards Process Manual. This quality review included an
9 assessment of whether the proposed standard is within the scope of the SAR,
10 which specified that the reliability standard developed or revised through the
11 project would respond to the directives and FERC Order number 779.

12 Additionally, the standard drafting team maintained a consideration of
13 directives document to describe how each directive in Order number 779 was
14 addressed in TPL-007-1 and the supporting material.

15 The quality review included an assessment of whether the proposed
16 reliability standard meets NERC's benchmarks for excellent standards and the
17 criteria for governmental approval. Among other things, this assessment
18 included a review to determine whether the proposed standard is based upon
19 sound engineering and operating judgment, analysis or experience as
20 determined by expert practitioners in the particular field. The SDT that
21 developed proposed Reliability Standard TPL-007-1 consisted of engineers,
22 planners and operators that are at the forefront of the industry's GMD activities.
23 Industry experts determine that the proposed standard is technically sound.

1 Therefore, there is no basis to support the Foundation's assertion that the
2 quality control was improperly conducted.

3 In response to the Foundation's expressed concern with the standard drafting
4 team's response to Foundation's comments during the standards development
5 process, the Foundation asserts that NERC has failed to fully address its prior
6 comments regarding various issues noted in this complaint during the standards
7 development process. Pursuant to sections 4.12 and 4.13 of the Standards
8 Process Manual, the standard drafting team made a good faith effort to resolve
9 all objections to the proposed standard and responded in writing to the
10 comments of the Foundation where required by the Standards Process Manual.
11 NERC's response to the level one appeal contains a complete description of
12 each of the technical comments raised by the Foundation and a reference to
13 each place in the record of development where the standard drafting team
14 responded to the comment. In those instances where the Foundation raised an
15 issue, the standard drafting team responded to the comment each time in the
16 response to comments documents that are developed during the standards
17 development process, posted and included with the standard when it is
18 presented to NERC's Board of Trustees and filed with applicable regulatory
19 authorities for approval.

20 Although it is clear that the Foundation disagreed with the standard drafting
21 team on some technical issues during the development of the standard, there is
22 no basis to assert that NERC staff or the standard drafting team failed to follow
23 the process outlined in the Standards Process Manual that requires all comments

1 received during the posting and balloting to be addressed.

2 Accordingly, NERC staff and the standard drafting team followed the
3 prescriptive process in the Standards Process Manual during the development
4 of the proposed standard, including conducting a thorough quality review and
5 responding to all comments submitted during the posting and balloting of the
6 proposed standard.

7 For these reasons, I respectfully request that this panel find that the NERC
8 standards development process was properly followed and that there were no
9 procedural actions or inactions that adversely impacted or will impact the
10 Foundation.

11 Thank you.

12 Ken Peterson: Thank you, Mr. Gugel.

13 I'd like to ask each of the panel members in turn if they have questions for
14 any of the presenters.

15 Paul Barber?

16 Paul Barber: Not at this point.

17 Ken Peterson: Doug Yeager?

18 Doug Yeager: Not currently. Thank you.

19 Ken Peterson: Fred Gorbet?

20 Fred, do you have any questions?

21 Fred Gorbet: I'm sorry, I was on mute. Ken, sorry. Yes, I do.

22 I had one question for – really for Mr. Koza. If I understood Mr.
23 Kappenman's comments, he referred to the issue of hotspots in a paper that was

1 developed by the standard drafting team that was not published or disclosed,
2 and I just wonder if I can have a comment on that from – on behalf of the
3 standard drafting team.

4 Frank Koza: Sure. Subsequent, I guess, to the proceeding that we were at today, a paper
5 has been published that's been published in the *Earth, Planets and Space*
6 publication. It deals with the issue – in fact, the title of the paper is, “Regional-
7 scale high-latitude extreme geoelectric fields pertaining to geomagnetically-
8 induced currents.” It does address the issue of what we have called spatial
9 averaging or the hotspots. It was – it's authored by a number of folks,
10 Pulkkinen, Bernabeu, Eichner, Viljanen, and Ngwira. And it's been published,
11 like I say, in *Earth, Planets and Space*.

12 So, that has happened, I guess, since the proceedings of this panel put
13 together.

14 Fred Gorbet: Thank you very much.

15 Ken Peterson: Thank you. Mr. Goulding?

16 Fred Gorbet: That is the only question I had at this point, Ken.

17 Dave Goulding: No, I don't have any questions at the moment, Ken. Thank you.

18 Ken Peterson: OK, well, that concludes the formal part of our proceedings for the day.

19 We'll also consider the written comments that were submitted by other
20 parties. We will do that on our own. And, we will move to deliberate with
21 dispatch according to the charge that's been given to us.

22 Thank you very much to all the presenters for being very succinct and the
23 excellent work on your briefs.

1 And that concludes our panel for today. Thank you very much.

2

3

4

END

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23