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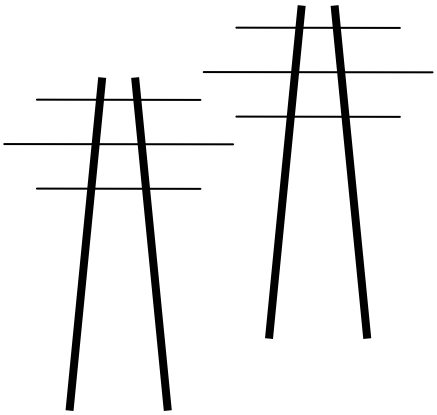


August 9, 2015

Dr. Julie Ann Smith Via email: Juliea.Smith@hq.doe.gov
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
1000 Independence Avenue S.W., Room 8E-032
Washington, DC 20585

Bill Storm Via email: bill.storm@state.mn.us
Environmental Review Manager
Department of Commerce
85 – 7th Place East, Suite 500
St. Paul, MN 55101-2198

RE: Comment regarding Draft Environmental Impact Statement
Not-so-Great Northern Transmission Line
DOE Docket No. EIS-0499; MN PUC Docket No. TL-14-21

Dear Dr. Smith and Mr. Storm:

Thank you for the opportunity to comment on the DEIS in the above-entitled matter. I am filing these Comments as an individual, and not in the course of representation of any party.

PROCEDURAL MATTERS

- **ROD Schedule:** The DOE Key EIS Schedule dated July 15, 2015, when hearings were held in Littlefork and International Falls, Minnesota, notes that the FEIS is due out in October, yet the ROD schedule is "uncertain."[1]
  - Has this changed?
  - When is ROD scheduled?
  - Why is this "uncertain" when Plains & Eastern Clean Line, with FEIS due out a month later than Great Northern Transmission Line, shows ROD in January?

- **NEPA review:** NEPA review is one of the topics taken on by the Council for Environmental Quality. **NEPA** (selected sections more relevant to transmission):

[1] See KeyEISSchedule_July2015.pdf .

- **Steps to Modernize and Reinvigorate NEPA**
  - Guidance for Programmatic NEPA Reviews
  - Guidance for Mitigation and Monitoring
  - NEPA Handbooks
  - NEPA Pilot Program
- Retrospective Regulatory Review Plan

- **Consultant – Lauren Azar, Azar Law, LLC:** Lauren Azar, as "NEPA Advisor, is a primary contractor for this DEIS. DEIS, §8.2 EIS Preparation Team, p. 673, Table 8-2 p. 674. Upon information and belief, Azar executed a conflict of interest statement attesting that they did not have a conflict of interest in this matter. Id. In 1999, Ms. Azar represented utilities, and also American Transmission Company, as it became the first transmission-only company in the Midwest. The focus of her work was to **advocate for the transmission company and transmission projects**. Ms. Azar was appointed to the Wisconsin Public Service Commission in 2007, and approved many transmission projects in Wisconsin. She served until May, 2011, when she resigned to join the Department of Energy, initially as senior adviser to U.S. Energy Secretary Steven Chu. In October, 2011, Ms. Azar was chosen to co-lead the Rapid Response Team for Transmission (RRTT) to oversee transmission projects nationally, establish schedules for permitting, and monitor and promote swift permitting of the projects. Azar is again in private practice. Her career has been one of promotion and permitting transmission and other utility infrastructure projects. In her words:

> I bring to this panel three perspectives: state, federal and the private sector. From 2007 to 2011, I was a Commissioner at the PSC of Wisconsin. While a state commissioner, I chaired both the state and RTO processes for cost-allocation over MISO's MVPs. I also co-founded and was the first President of the Eastern Interconnection States Planning Council (EISPC). Through that endeavor, we represented most of the states and Canadian provinces east of the Rockies in the interconnection-wide transmission planning.
>
> From 2011 to 2013, I was senior advisor to U.S. DOE Secretary Chu focusing on, among other things, transmission infrastructure. While at DOE, I co-led the RRTT and was the DOE's representative to the President's steering committee on streamlining federal permitting.
>
> I have returned to the private sector, which is where I started my 21-year career. I am currently representing utilities, including transmission companies, both incumbent and merchants. Not only am I working on permitting new transmission infrastructure, but I am also assisting utilities in how to address the challenges created by new emerging technologies and low natural gas prices. I am also co-leading a non-profit initiative aimed at required changes in our regulatory frameworks.

Comments of Azar to FERC.[2]

[2] www.ferc.gov/CalendarFiles/20150327132712-Azar,%2520Azar%2520Law.pdf+&cd=1&hl=en&ct=clnk&gl=us

- EISPC was a DOE funded program to facilitate transmission planning and expansion – the presumption was that transmission infrastructure should be built. See **Transmission Planning for the Future *& More*** L Mansueti (May 18, 2012).[3]

- **Azar's promotional focus:** From a March 2015 statement, where she referred to this Great Northern project as a great example of transmission development, presumes a need for "significant infrastructure buildout," and did not disclose her involvement with this Great Northern Transmission Line project:

> For example, DOE is currently preparing a joint EIS with the State of Minnesota and is piloting a pre-application process that is expected to result in dramatically shorter permitting times. DOE and Minnesota are on track to publish the Final EIS for the Great Northern Transmission Line – a 220-mile 500 kV line – within 16 months of the issuance of DOE's Notice of Intent. This pilot project is not only proving that NEPA and infrastructure development can co-exist, it demonstrates that electric transmission can be used as a compliance tool for § 111(d).

Comments of Azar to FERC.[4] Unless Azar is revealing something not publicly declared or disclosed, this GNTL EIS and transmission line have zero relation to use "as a compliance tool for § 111(d).)

- **Great Northern Transmission Line and §111(d).** As an aside to the above, based on Azar's comments, the EIS should clearly state if and how this project would or could be directly used as a compliance tool for §111(d), and identify coal plants or other burning technology shuttered as a direct result of this project.

- **Azar's Promotional Focus:**

> Fourth, as part of the RRTT, agencies' "front offices" convened weekly conference calls with its project managers for transmission projects, which sent a strong signal to field staff about the need to streamline. FERC "front office" staff could participate in these calls.

Id., p. 5.

- **Alternatives considered:** The alternatives considered by the DOE was not sufficiently robust in range or depth.

[3] www.ncsl.org/documents/Energy/LMansueti052012.pdf+&cd=1&hl=en&ct=clnk&gl=us
[4] www.ferc.gov/CalendarFiles/20150327132712-Azar,%2520Azar%2520Law.pdf+&cd=1&hl=en&ct=clnk&gl=us

- **No Action Alternative:** The request for action is a Presidential Permit The "No Action Alternative" in this EIS should logically focus on the DOE not taking the action requested, which is, simply, not granting the Presidential Permit request.

- **No Action Alternative:** The "No Action Alternative" can make no presumptions about whether the project would be built or not, although that could be presented as one option under the "No Action Alternative."

- **No Action Alternative:** The treatment of the "no action alternative" stated several conclusory reasons why the authors believed the "no action alternative" should be rejected. These conclusory statements require support and explanation.

- **No Action Alternative:** The "No Action Alternative" analysis consists of just six paragraphs and less than one page of narrative. This is inadequate on its face.

- **No Action Alternative:** The "No Action Alternative" was rejected based on three conclusory presumptions and a flawed interpretation of Minnesota law.

    - The first reason the "no build alternative" is rejected is that "not constructing the proposed Project would inhibit the Applicant's ability to connect Manitoba Hydro energy to Minnesota Power consumers and force the Applicant to obtain other energy and capacity purchases to meet the region's long term energy needs.

        - There are no citations provided for the assertions in this paragraph.

        - There is no substantiation of the assumption that if the DOE did not take action the project would not go forward, nor is there discussion of the role of the DOE and impact of not taking the action requested.

        - There is no discussion of the nominal nature of the PPA, at 250 MW, nor its relation or comparison to the capacity of the project that explains or supports the statements in this 3rd paragraph on p. 45.

        - The EIS should contain discussion of the 250 MW options available to Minnesota Power and whether this project is a cost effective means of addressing a 250 MW need.

- The Second reason the "no build alternative" is rejected is a claim that to not build the project "would leave the existing 500 kV transmission tie line from Manitoba to Forbes as the second largest contingency in the entire Midcontinent Independent System Operator (MISO) footprint." So what…

    - There are no citations provided for the assertions in this paragraph.

- NERC standards, adopted by FERC, require that the system be reliable in the event of contingencies.

- This is not a reliability project as defined by NERC, FERC, or even MISO.

- This project is not required for system reliability, whether defined as system security or system adequacy.

- "Therefore, not building the proposed Project would result in less-than-optimal transmission reliability" is a false statement. Transmission reliability in the project area is sufficient under NERC standards.

- The statement that "Therefore, not building the proposed Project would result in less-than-optimal transmission reliability" should be deleted.

- This paragraph should be deleted, it is mischaracterizing system reliability.

- The third reason given for rejection of the "No Action Alternative" is the most bizarre. It states that to not build the project "would negatively affect future North Dakota wind generation options because there would not be enough transmission capacity, and wind farms would continue to be required to shut down their turbines when the wind energy produced exceeds the transmission capacity."

    - There are no citations provided for the assertions in this paragraph. The EIS must provide citations for such a statement.

    - For at least a decade, wind generation from Buffalo Ridge has done a "frolic and detour" from Buffalo Ridge north through the Dorsey substation. Attachment, NM SPG presentation 9/28/2005. The EIS must address the presence of wind energy in the area and the impact of this existing wind generation on the GNTL project, and vice versa, the impact of the GNTL project on wind generation outlet.

    - Nothing in the electrical system and/or contracts prohibits transmission of fossil generated energy – in fact, FERC rules prohibit discrimination among generation.

The final paragraph on p. 45 misinterprets Minnesota statute regarding "need" and consideration of need in routing permit.

- The EIS, p. 45, states that "Under the Minnesota Power Plant Siting Act (PPSA), the determination of need, including size, type, timing and other considerations are statutorily prohibited" and the foot note references Minn. Stat. §216E.02, Subd. 2, which states:

Minn. Stat. 216E.02, Subd. 2. Jurisdiction.

The commission is hereby given the authority to provide for site and route selection for large electric power facilities. The commission shall issue permits for large electric power facilities in a timely fashion and in a manner consistent with the overall determination of need for the project under section 216B.243 or 216B.2425. **Questions of need, including size, type, and timing; alternative system configurations; and voltage must not be included in the scope of environmental review conducted under this chapter.**

Minn. Stat. §216E.02, Subd. 2 (emphasis added).

- The DOE's environmental review is NOT environmental review conducted under this chapter. It is NEPA environmental review, parallel tracks, but something very different from PPSA Environmental Review.

- The state has no jurisdiction to limit the scope of the DOE's NEPA review.

- That paragraph goes on to say that "… and "need" is not to be evaluated in the Environmental Impact Statement (EIS)., and the footnote references Minn. Stat. §216E.03, Subd. 5, which states:

Minn. Stat. §216E.03, Subd. 5. Environmental review.

The commissioner of the Department of Commerce shall prepare for the commission an environmental impact statement on each proposed large electric generating plant or high-voltage transmission line for which a complete application has been submitted. **The commissioner shall not consider whether or not the project is needed.** No other state environmental review documents shall be required. The commissioner shall study and evaluate any site or route proposed by an applicant and any other site or route the commission deems necessary that was proposed in a manner consistent with rules concerning the form, content, and timeliness of proposals for alternate sites or routes.

Minn. Stat. §216E.03, Subd. 5 (emphasis added). The DOE's environmental review is NOT consideration by the Commissioner.

- This is a limitation on the commissioner of the Department of Commerce.
- The state has no jurisdiction to limit the scope of the DOE's NEPA review.

- In the footnotes accompanying the text of the last paragraph on p. 45 regarding the Power Plant Siting Act, the footnotes should state the text referenced.

- In the text in the last paragraph of p. 45, the text should be rewritten to reflect the meaning and limitations conveyed in the statute.

- NEPA review that does not consider need for the project is insufficient and inadequate under NEPA.

SUBSTANTIVE ISSUES

Below are substantive issues regarding the DEIS in no particular order:

Obvious Errors Easily Corrected

- The DEIS shows many wells in the Taconite area (and perhaps others). These don't seem to be wells, and perhaps are drilling sites for mineral exploration? This was brought to the attention of Barr Engineering representatives, and should be corrected.

- Homes, particularly lake cabins, are represented as commercial and/or non-residential structure. In my experience with transmission EIS labeling, this is often wrong, and the EIS should review all "commercial" and "non-residential structure" claims for accuracy.

Need

- **Need:** Need for the project is raised in Section 2.2.2 Northeast Minnesota and Regional Energy Demand. The EIS should address the need claim of 883 MW compared with the cost and capacity of this project.

- **Need:** The EIS should consider whether the benefits of this project, primarily the ability of the Applicant to meet its contractual obligations to purchase power, is sufficient to justify the costs and impacts.

- **Need:** The DEIS, p. 19, Section 2.2.2 states that "Both MISO and the Applicant believe that a new 500 kV transmission line – which can carry a total of up to 883 MW of electric power – is needed to meet long-term regional needs, especially as industrial load in Minnesota's Iron Range continues to increase.

    - **Multiple** mines on the range have closed since this application was provided. The statements should be removed:
        - "is needed to meet long-term regional needs;" and
        - **"**especially as industrial load in Minnesota's Iron Range continues to increase.**"**

    - The FEIS should address historical demand, current demand, and updated projections.

    - MISO has not addressed need for the project, and this project was only added to the MTEP report because of a financing agreement.

    - MISO is not a regulator and has no regulatory authority in a need determination.

- MISO reviewed this project in the Northern Area Study which was to extend over the UP into Michigan, and not terminate at Blackberry. See GNTL Application.

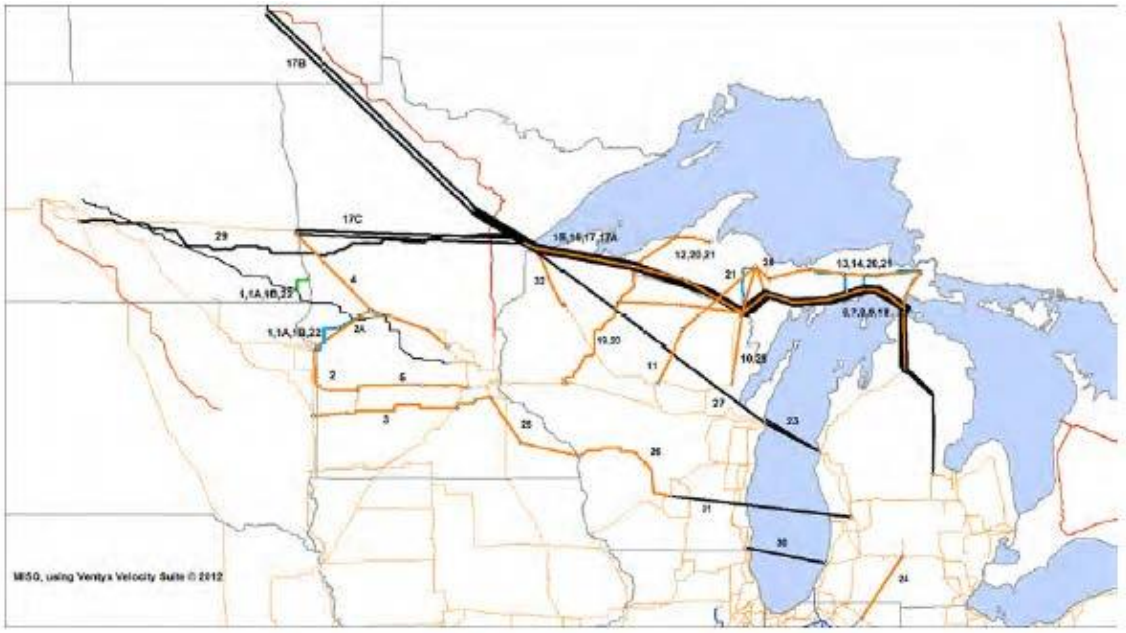


Figure E-2: Northern Area Study Transmission Options

- A statement that this project has anything to do with regional need is false as the line as proposed in the application terminates in Blackberry, Minnesota, and any reference to regional need should be removed.

- The project is listed in MISO MTEP Appendix A as project 3831, and that includes extension to the Arrowhead substation. The EIS should explain this discrepancy between the Application and the MISO Appendix A listed project 3831. Attached MISO Appendix A 3831 line items.

- The 883MW number used repeatedly in the DEIS should not be used as it is a paper number only, representing a 250 MW PPA, a 133 MW transfer of energy agreement that is not electrically related to this line, only to the parties, and 500 MW of planned, but not yet contracted, Manitoba Hydro sales.

- The 883 MW number used repeatedly in the DEIS should be used only with the explanatory words "883MW as requested for authorization by the Presidential Permit" or similar description of the origin and limitations of the Presidential Permit.

- The MTEP Appendix A list this project as a 1732 MVA project, not 883MW, and the FEIS should reflect this 1732 MVA rather than the 883 MW.

- The DEIS states this would help meet long-term reliability needs, but it is not needed – the system as it is must comply with NERC/FERC reliability issues or it

cannot be built – the system as it is IS in compliance with NERC/FERC reliability rules. This is NOT a reliability project.

Bees

- **Bees:** On the way to the hearing in International Falls from the Big Bog campground, I saw at least 12 bee colonies alongside the road, plainly visible, most hives of the Wilmer Honey Farm. I'd guess that there were also hives that were not directly adjacent to the roadway. Bees are dying off everywhere. A search of the DEIS does not reveal any instances of "bee" or "bee keeping" or "honey" in the narrative, nor is there any analysis of impacts of transmission on bee populations. Transmission lines have an impact on bees, for example, "[e]xposure of bees in conductive (e.g., wet) tunnels produces bee disturbance, increased mortality, abnormal propolization, and possible impairment of colony growth."[5]

- **Impact of electric fields on bees**: Dr. Peter Valberg, paid mouthpiece for utilities, states that electric fields have no impact on bees, yet recommends Faraday cages for bees under transmission lines to avoid adverse effects of electric fields:

> At elevated ELF electric field levels, adverse effects can be avoided by either keeping surfaces dry or by shielding the hives from the ELF electric field with an open-mesh conductive screen, *i.e.*, a screen having a mesh size large enough not to hinder the flight of bees to and from the hive. Moreover, honeybee colonies not located directly underneath a high transmission power-line are not expected to be impacted, because the electric-field strength drops off rapidly as one moves laterally away from the right-of-way (ROW) location directly below the maximum sag point of the conductors.

Summary of Potential Effects of 345-kV Power-Line Electric and Magnetic Fields (EMFs) on Honeybee Hives and Honeybee Behavior, p. 4.[6]

- **Impact of magnetic fields on bees:** Dr. Valberg also notes potential impacts on bees of magnetic fields, and again recommends simple faraday cage to minimize impacts:

> The sensitivity of bees to changes in steady magnetic fields appears to be at about a level that is one percent of the earth's field, and honeybees may use a memorized "map" of the geomagnetic field to assist in foraging activities (Walker and Bitterman, 1989; Hsu *et al*., 2007). The magnetic component of power-line ELF-EMF could potentially exert some torque on tiny ferromagnetic particles contained within honeybees or single-molecule magnetic moments (*e.g.* "free-radical" molecules). Although magnetite particles in living organisms are plausible geomagnetic field sensors (Adair 1994; Kirschvink *et al*. 1992, 2001), functional biogenic ferromagnetic material has been established only in a limited number of organisms (for example, magnetotactic bacteria), although suspected in a variety of species (*e.g.*, honeybees). In these organisms, the magnetic interaction is believed to provide sensory guidance, and is not likely to lead to physiological malfunction or disease.

Summary of Potential Effects of 345-kV Power-Line Electric and Magnetic Fields (EMFs) on Honeybee Hives and Honeybee Behavior, p. 5.

[5] See e.g., Mechanism of biological effects observed in honey bees (Apis mellifera, L.) hived under extra-high-voltage transmission lines: implications derived from bee exposure to simulated intense electric fields and shocks (www.ncbi.nlm.nih.gov/pubmed/3178903).

[6] Online at www.nocapx2020.info/wp-content/uploads/2010/02/attachment5.pdf

- **Reduction of Greenhouse Gas Emissions:** Implied that this project would reduce GHG emissions by enabling use of less fossil fuel, but there weren't even any rough numbers to substantiate that. The EIS must provide specifics and citations for these claims.

Cost/Benefit Analysis

- **Cost/benefit analysis must be more specific and cite to support in the record:** In light of Michigan v. EPA decided earlier this month, any agency doing analysis that includes benefit claims, and where a cost/benefit analysis is part of the analysis, the cost and benefit claims must be sufficiently specific. These "benefit" claims are not benefits.

Capacity

- **Capacity of the project as designed:** This is a 500 kV triple bundled transmission line, the largest configuration in the state. MISO lists the rating of this line as 1732 MVA. See Attached (selected) MISO Appendix A. The range of capacity should be reported.

- **Capacity of a triple-bundled 500 kV transmission line**: It is not clear that at 1732 MVA the MISO rating addresses the triple-bundled configuration of the project. The EIS should verify and state the capacity of the line as designed, and identify normal and emergency rating for single, double and triple bundled configurations.

- **Capacity of a triple-bundled 500 kV transmission line:** The capacity of a triple-bundled 500 kV transmission line is not accurately represented in this proceeding. For example, in the Susquehanna-Roseland transmission proceeding before the New Jersey Board of Public Utilities (BPU), the project proposed, and permitted, was initially a quad-bundled 500 kV transmission line, later reduced to a triple-bundled transmission line. From the Stop the Lines brief in that docket, the thermal limit of that 500kV line, the amperage and capacity for that line if there were no other limiting factors is 1838 amps per wire, in the quad-bundled configuration, a total of 7,532 amps, and in the tri-bundled configuration, 5,414 amps and 4,795MVA, essentially 4,795 MW. Attachment, Susquehanna-Roseland Transcript (selected), Testimony of Couch, Tr. p. 318; Testimony of King, Tr. p. 1254-1255.

- **Quantification of planned use of capacity:** It is unclear what the rating of the line is, which sets the capacity limits of the project. Various numbers appear in the DEIS (see e.g., § S.3 883 MW; § 2.2.2 383 MW + 500 MW = 883 MW; § 2.2.3 250 MW PPA + 133 MW Optimization Agreement"). The EIS should specifically note the normal and emergency rating of the line, the Presidential Permit MWs, and the expected capacity of the line. Impacts, including transmission system impacts, should be reviewed for all these MW levels, EMF calculations be performed for all these levels, and cost/benefit analysis for the various MW levels.

- **Capacity of project:** DEIS "capacity" is not consistent with MISO MTEP, which shows a rating of 1732 MVA, far less than potential of a tri-bundled 500 kV line, but far more than the PPA levels or that requested for the Presidential permit.

- **Capacity of project:** If the DOE is defining the capacity of project as the Presidential Permit level of MW, without respect to the potential capacity of the project as expressed in normal and emergency ratings, the DOE should 1) state the normal and emergency ratings in MVA; and then 2) state expressly that the DOE is defining the capacity of project as the Presidential Permit level of MW and identify that level of MW.

Public Interest

- **Public Interest:** The EIS should set forth the criteria that serves as the basis for a public interest determination.

- **Public Interest:** The EIS should address whether a project with a predominantly private purpose of importing and selling power, far beyond the 250 MW PPA, can be in the public interest.

- **Public Interest:** The EIS should address the scope of Section 1222 and whether it is in the scope of Section 1222 for the DOE to participate in a private interest project.

- **Public Interest:** The EIS should address the purpose of a Presidential Permit for 883 MW in light of the 250 MW PPA from Manitoba Hydro to Minnesota Power, the 133 MW agreement sending energy in the other direction, and analyze whether building this large transmission line for that small amount of energy is in the public interest.

- **Public Interest:** The EIS should address whether a project with a predominantly private purpose of importing and selling power, far beyond the 250 MW PPA, can be in the public interest.

Alternatives Analysis

- **Alternatives:** The only alternatives considered, other than the non-substantive consideration of "no action," were ones that required granting a Presidential Permit. A wider range of alternatives must be considered.

- **Alternatives:** Any alternative would have to focus on failure to grant a Presidential Permit, to mirror the request for approval of a Presidential Permit.

- **Alternatives:** Alternatives considered were not sufficient – only the "preferred alternative" of granting of the permit, four alternative border crossings, 22 route segment alternatives, and nine alignment modifications were considered. These are not alternatives to the project, but are a number of different ways to move the project forward. This is inadequate on its face.

- **Alternatives:** There were no system alternatives considered, such as cogeneration at a large customer location. The EIS should include system alternatives.

- **Alternatives:** There were no non-transmission alternatives considered. The EIS should include non-transmission alternatives.

- **Alternatives:** There were no financial or contractual alternatives considered, such as Power Purchase Agreements from other more local sources, distributed generation, or purchasing the power on the open market. The EIS should include financial and contractual alternatives to this financial/contractual project.

- **Alternatives:** The only alternatives were various border crossings, and route segment and alignment alternatives, all transmission alternatives to build and operate the project.

- **Alternatives:** The alternatives should include consideration of a Presidential Permit for the full normal and emergency rating of the transmission line.

- **Alternatives:** The alternatives should include consideration of selling energy and capacity, beyond the PPA 250 MW, up to the full normal and emergency rating of the transmission line on the energy market.

- **Alternatives:** Because the transmission project is designed with greater normal and emergency rating than will be used, the alternatives should consider building a smaller capacity line, including lower voltage, different conductor and transformers, that would limit the capacity of the transmission line to 1) the PPA amount, and 2) the Presidential Permit request amount.

- **Alternatives:** As a reasonable alternative, The EIS should consider amendment of the Mesaba Project siting permit.

- **Alternatives:** The EIS should evaluate use of the Mesaba Project site permit, which would inject up to 600 MW at the Blackberry substation. (this is in no way an endorsement for Mesaba Project or generation under a PPA with Excelsior Energy).

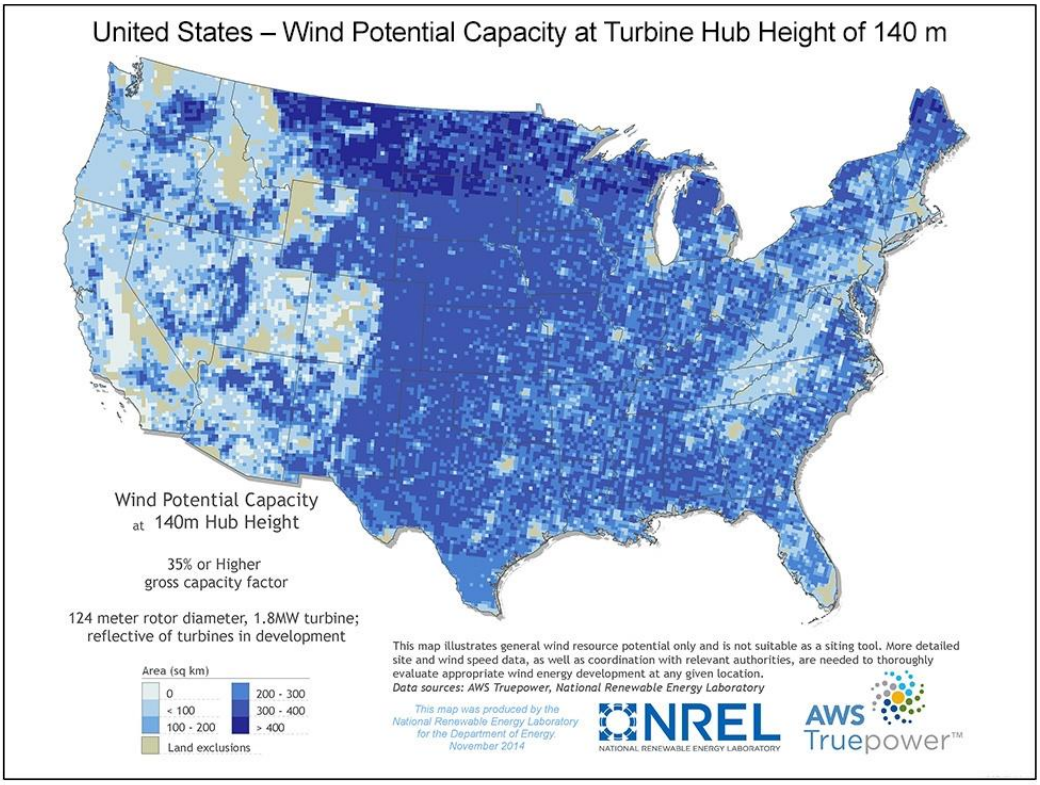
- **Alternatives:** As a reasonable alternative, the EIS should consider use of a PPA for Mesaba Project generation to meet their projected need for power (this is in no way an endorsement for Mesaba Project or generation under a PPA with Excelsior Energy).

- **Alternatives:** As a reasonable alternative, the EIS should consider use of the Mesaba Project site Hoyt Lakes site for a generation site:

    - Hoyt Lakes is closer to projected load.
    - Mesaba permit could likely be amended without much difficulty.
    - Hoyt Lakes use of Mesaba Permit would not require transmission.
    - Hoyt Lakes site for generation would create jobs on Range.

- **Alternatives:** Energy efficiency and conservation could easily meet their projected need for 250 MW.

- **Alternatives:** Minnesota Power can generate its own renewable energy. NREL's current wind resource maps show increased potential in the Minnesota Power service territory. [7]



- **Alternatives:** These suggestions of use of Mesaba site permit is in no way an endorsement for Mesaba Project or generation under a PPA with Excelsior Energy.

- **Alternatives:** The only alternatives considered were those of the DOE-EERA scoping document. This is not a broad enough range of alternatives to comply with NEPA.[8]

- **Alternatives:** The DEIS notes that "[t]he purpose and need for DOE action is to decide whether to or not to grant the Applicant a Presidential permit." DEIS, p. S-3. As a "connected action" the DEIS analyzes "the proposed construction, operation, maintenance, and connection of the portion of the transmission line within the United States." Because the transmission line facilitates both construction of a new hydro dam and transmission from that dam to the U.S./Canada border, these are also connected actions and their impacts should be analyzed in the EIS.

- Alternatives: In section S.2.1 and 1.2.2 the DEIS states that the "DOE's Purpose and Need for Agency Action" includes to "connect" – as above, due to the stated purpose, the DEIS should consider the full extent of the connected actions.

[7] Enabling Windpower Nationwide, NREL: http://energy.gov/eere/wind/wind-resource-assessment-and-characterization
[8] 40 CFR 1502.14.

All 22 Mesaba Energy Project references that presume it will be built should be removed from the DEIS

- The Mesaba Project is NOT moving forward. Statements that it is moving forward, that it is expected to be built, whether express or implied, should be deleted.

- The Mesaba Project Generation Interconnection Request, MISO G-519, has been withdrawn. See MISO Active Queue.

- The Mesaba Project EIS has not been and is not planned to be completed. For years release of the ROD was "uncertain" and some time ago, it disappeared from DOE "Key EIS Schedule" releases. Attachment, August 15, 2011 Key EIS Schedule and July 15, 2015 Key EIS Schedule.

Inherent inefficiency of transmission

- Transmission lines are more unstable the longer they are. This project is 220 miles, and requires series compensation,[9] which is necessary to assure stability of the line.

- This line is in need of a separate "structure which will house the 500 kV series capacitor banks necessary for reliable operation and performance of the proposed transmission line." The EIS should address the impact of a project on the grid where performance and reliable operation is so compromised that it requires a separate series compensation site.

- Noise is typically expected for series compensation equipment.[10] The EIS should specify both the range of noise levels expected by the equipment at various locations and specify in the narrative and cite the Minnesota noise standards.

- The EIS should specify whether the Minnesota noise standards cover the range and character of noises expected at series compensation, regeneration, substation and line noise (i.e., MPCA's noise standards do not cover infra-sound, or most impulsive sounds), and whether B weighted or other weighted modeling is necessary.

Carbon Dioxide and Carbon Sink

- **Carbon Sink**: The DEIS raises "loss of carbon sink" due to clearing and removal of forested areas in the ROW as an issue. DEIS, p. 1.10. The EIS should address what will occur after these trees are removed, i.e., whether left to rot, burned, etc., and carbon impact of that treatment.

- **Mitigation of Carbon Sink:** The DEIS should address various means of mitigation of loss of carbon sink through clearing RoW, and the cost of mitigation.

[9] DEIS, p. CSA-1 Abstract,, and noted 129 additional times in DEIS.
[10] DEIS, p. S-15, §S.8.1.

- **Carbon Impacts:** The DEIS should evaluate impacts of carbon emissions due to clearing trees for the dam at the source of this project, and emissions if they are left in the water or if burned.

- **Carbon Impacts:** The DEIS gives a hat tip to historical generation via coal on p. 20, but does not address whether coal generation will be reduced as a result of this project. If the EIS links this transmission project to decrease of coal generation by Minnesota Power, the EIS must document specifics and timeline of decreased coal generation. Increase of non-coal generation does not necessarily equal decrease of coal generation – there is no direct link.

North Dakota Wind Energy Renewable Optimization Opportunity

- **Renewable Optimization:** Renewable Optimization is not physically related to this project. The EIS should include a map of the transmission system in the area.

- **Renewable Optimization:** The EIS should show expected power flows for the North Dakota wind, whether it would flow over Minnesota Power's DC line from Fargo, or whether it would use the same route to Manitoba as Buffalo Ridge wind in its "Loop Flow" problem where Buffalo Ridge wind frolics and detours through the Dorsey substation on its way to Forbes substation and further south. Attached §9.10, p. 5, NMSPG Meeting Minutes, 9/28/2005.[11]

Property Values

- Conclusions on DEIS p. 113 are not reasonable:

    - "Proximity to a transmission line does not always cause property values to go down." This is misleading, and should be removed. The EIS should be objective and consistent.

    - Impact on property values should address compensation for land condemned for transmission line.

    - Impact on property values should address compensation for decreased value of remaining land in parcel where land is condemned for transmission line.

    - Impact on property values should address compensation for decreased value of land in proximity to transmission line.

    - If property values go down, potential reduction is in range of 1 to 14%. This is misleading, a wide range and should be narrowed down. A cited study on same

[11] See also post about Buffalo Ridge to Manitoba Loop Flow: http://legalectric.org/weblog/194/

pages says 0-20% for ag land based on disruption of farm operation. The EIS should be objective and consistent.

Electric Fields and Magnetic Fields

- The section on electric and magnetic fields should calculate the full range of potential levels based on the line specifications. The line specifications should be disclosed.

- The tables for electric fields do not state the current used for the calculations.

- The tables for magnetic fields do not state the current used for the calculations.

- The tables for magnetic fields should also include a column for "Distance from Centerline at which mG level is 2 mG" and disclose that distance.

Forestry

- Impacts on forestry and state and federally sanctioned forestry programs should be addressed in EIS.

- Identification of and impacts on land in forestry programs such as Tree Farm Association or Sustainable Forest initiatives must be disclosed in EIS.

Thank you for your consideration of these Comments. Please let me know if you have any questions or require anything further.

Very truly yours,

Carol A. Overland
Attorney at Law

Enclosures

cc: David Moeller, Minnesota Power dmoeller@allete.com
Eric Swanson, Winthrop & Weinstein eswanson@winthrop.com

Written Comments of Lauren Azar
Attorney and Advisor, Azar Law LLC
Former Public Service Commissioner of Wisconsin
Former Senior Advisor to the Secretary of U.S. DOE

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FERC Docket No. AD15-4-000

Technical Conference on Environmental Regulations and Electric Reliability, Wholesale Electricity Markets and Energy Infrastructure

St. Louis, Missouri, March 31, 2015

***

Thank you for the opportunity to speak on the infrastructure needs to comply with the Clean Power Plan (CPP)

Regional Planning for the Necessary Infrastructure:

While the final § 111(d) rule is not yet released, we know that states will be well positioned to comply if they bolster energy efficiency and increase the generation of low- and no-carbon electricity. Not surprisingly, several studies have shown that regional approaches will be the most cost-effective method of compliance.

As is apparent from the draft rule, some states are closer to compliance than other states. The rule's differential impact on states must be addressed if states are to pursue regional compliance. States have successfully navigated regional approaches in the past, even when the states were not similarly situated. The Mid-continental Independent System Operator's (MISO) Multi-Value Projects (MVPs)

are a perfect example.

The states in the upper Midwest were faced with renewable portfolio standards or goals (RPS) and realized that a regional approach to compliance would be most cost-effective. Those states identified geographic areas where they wanted to develop renewable generation and asked MISO to develop a transmission plan around those areas. The remaining states in MISO replicated this process.

In the end, MISO developed a number of MVPs that allowed all of the states within the MISO footprint to comply with their respective RPSs. The states and MISO stakeholders then developed a cost-allocation proposal that shared the costs of the MVPs.

The MISO MVP process succeeded because of the following three factors:

(1) Legal mandates or goals – the states were required to comply with their own various RPSs;
(2) MISO developed a portfolio of transmission projects that allowed all of the states to benefit. Even though some states benefited more than others, all of the states were able to comply with their legal mandates; and
(3) The transmission owners coalesced around the final product, both the transmission plan and cost allocation, because their state commissioners were not only supportive of the effort, but leading it.

The similarities between complying with § 111(d) and the RPSs are striking. The MISO states have already demonstrated the ability to comply with legal mandates through regional cooperation. It can be done again.

FERC's Role in Interregional Planning

The United States has a plethora of low- and no-carbon fuels to generate electricity. But those fuels are not evenly distributed throughout the states. To fully utilize all of our low- and no-carbon fuels, the RTOs must conduct meaningful interregional planning.

As we discovered during the Eastern Interconnection Planning effort, the planning authorities and RTOs use different metrics and different planning assumptions. Consequently, it is difficult to identify where interregional transmission projects would be most beneficial.

FERC can solve this problem by requiring adjacent planning authorities and RTOs to use the same metrics and planning assumptions when conducting interregional planning. Only by comparing apples-to-apples, will we be able to identify infrastructure needed at the seams, which will result in the most cost-effective compliance of § 111(d).

Building Infrastructure Quickly Enough to Aid Compliance

The United States needs new infrastructure for many reasons: to remain globally competitive; to address aging infrastructure; to meet public policy goals; and to respond to changes in the generation fleet prompted by emerging technologies, low natural gas prices and struggling nuclear plants. Both the electric industries and natural gas industries are already responding to this call to action. The nation's transmission and natural gas industries have been in build cycles for years. To comply with § 111(d), these build cycles must and can continue.

While federal and state permitting has improved during the current build cycle, we can do better. While at the DOE, I worked with nine federal agencies, including FERC, on the Rapid Response Team for Transmission (RRTT). The Secretaries of Interior, Agriculture, and Energy along with the Chairs of FERC and Council on Environmental Quality (collectively the Transmission Cabinet) held quarterly meetings on the federal permitting process. Streamlining efforts continue to this day.

For example, DOE is currently preparing a joint EIS with the State of Minnesota and is piloting a pre-application process that is expected to result in dramatically shorter permitting times. DOE and Minnesota are on track to publish the Final EIS for the Great Northern Transmission Line – a 220-mile 500 kV line – within 16 months of the issuance of DOE's Notice of Intent. This pilot project is not only proving that NEPA and infrastructure development can co-exist, it demonstrates that electric transmission can be used as a compliance tool for § 111(d).

Federal and state agencies are not the only ones working on shorter development timelines. The private sector is as well. For example, a class one railway is currently working on a project to install a high capacity HVDC line underground on its railroad right-of-way (ROW). The developer does not anticipate needing eminent domain since it already owns the ROW. Of course, already owning the ROW, not needing eminent domain and having lines underground will help to speed the federal and state approval processes. Projects like this could certainly be used as a compliance tool for § 111(d).

In sum, while the permitting time for transmission remains a challenge, at least one federal agency and one state are proving that it can be done quickly. The private sector is also developing creative solutions to simplify and shorten the permitting process. Though both of these efforts are encouraging, more must be done to ensure transmission is permitted in a timely manner.

FERC's Role in Transmission Permitting:

FERC can play a role in streamlining the federal permitting. First, the Chair of FERC could convene quarterly meetings with the Transmission Cabinet to discuss the progress in evaluating applications for transmission lines that are required for compliance with the CPP ("Compliance Projects").

Second the Transmission Cabinet could announce an "all hands on deck" approach to Compliance Projects. The Principals could ensure that pertinent field staff understands the importance of prompt evaluation of these applications. (DOE is demonstrating that the evaluation can be completed within a two-year period.) The call for "all hands on deck" should come from the Principals and should be repeated often.

Agency field staff is currently implementing rules and guidances that were created before the need for significant infrastructure build-out. Staff is making decisions today that are based on how things were done yesterday. But today differs from yesterday. Accordingly, the management of federal agencies, both career and political, must ensure that current policies are infused into the staff-level decisions. Equally importantly, agency management must create feedback loops to obtain confidence that field staff is implementing their duties in light of current policies.

Fourth, as part of the RRTT, agencies' "front offices" convened weekly conference calls with its project managers for transmission projects, which sent a strong signal to field staff about the need to streamline. FERC "front office" staff could participate in these calls.

Fifth, FERC could develop an informal appeal process for applicants of Compliance Projects who believe the vetting of their applications

are stalled or not being handled according to current policies. The appeals would be done within the confines of the Transmission Cabinet.

Sixth, during the Transmission Cabinet's quarterly meetings, FERC could ensure that Principals receive an accurate status report on how their agency staff is performing on the Compliance Projects. FERC, as an independent agency, could play an important role in providing this accurate assessment.

Where there is a Will, there is a Way

The federal government has an important role in assisting the states to comply with § 111(d), including FERC. Federal permitting of transmission need not be an impediment to § 111(d) compliance; indeed, with sufficient dedication, federal agencies can facilitate compliance.

Today, the states have all of the tools that they need to comply with § 111(d). My hope is that states invest significant resources to create State Implementation Plans (SIP) that adopt regional approaches. The current mantra in some corners of "just say no", will likely result in those states having insufficient time to develop a cost-effective SIP, i.e. those states are painting themselves into the proverbial corner. Instead, states can use the MISO MVP model to develop a plan where all states benefit.

Where there is a will, there is a way.

My background:

I bring to this panel three perspectives: state, federal and the private sector. From 2007 to 2011, I was a Commissioner at the PSC of Wisconsin. While a state commissioner, I chaired both the state and RTO processes for cost-allocation over MISO's MVPs. I also co-founded and was the first President of the Eastern Interconnection States Planning Council (EISPC). Through that endeavor, we represented most of the states and Canadian provinces east of the Rockies in the interconnection-wide transmission planning.

From 2011 to 2013, I was senior advisor to U.S. DOE Secretary Chu focusing on, among other things, transmission infrastructure. While at DOE, I co-led the RRTT and was the DOE's representative to the President's steering committee on streamlining federal permitting.

I have returned to the private sector, which is where I started my 21-year career. I am currently representing utilities, including transmission companies, both incumbent and merchants. Not only am I working on permitting new transmission infrastructure, but I am also assisting utilities in how to address the challenges created by new emerging technologies and low natural gas prices. I am also co-leading a non-profit initiative aimed at required changes in our regulatory frameworks.

http://blogs.platts.com/2011/05/31/smart_grid_is_a/

The Barrel The essential perspective on global energy

Smart grid is all fine, but just get transmission built, group tells DOE

By Kathy Larsen | May 31, 2011 05:58 PM Comments (0)

A transmission-interest group lamented the other day that the Department of Energy didn't specifically put upgrading and expanding the high-voltage transmission grid in the Strategic Plan it released earlier this month.

True, expanding the grid is not in there. "Modernizing" the grid is, and unsurprisingly, DOE focuses on new technology to make what amounts to a "smarter grid," to integrate renewables better and get to a more "actively controlled distribution network" (must be longhand for "smart meters").

But to the group known as Wires, building more transmission is essential, and DOE's championing of "policies that remove barriers to grid expansion and upgrades" is critical. DOE's Strategic Plan may not say so, but maybe Energy Secretary Steven Chu's new hire, Wisconsin utility regulator Lauren Azar, will focus on that as well as on the technology and innovation.

Azar has made a name for herself in the transmission planning and policy arena. As president of the Organization of MISO States, she dealt with thorny fights among transmission owners and customer groups about where transmission should go and who should pay for it (not that these battles are necessarily resolved.) MISO is the Midwest Independent Transmission System Operator.

She was president of the Eastern Interconnection States' Planning Council, companion group to the Eastern Interconnection Planning Collaborative. She was engaged there in what could be the transmission planning challenge of the century: herding local, regional and commercial interests from everywhere roughly east of the Rockies to try getting some kind of coordination.

Before Azar was at the PSC, she did electricity law and, among other things, worked on creation of American Transmission Co., which put together various systems in Wisconsin to form the country's first stand-alone transmission company.

Announcing her appointment as senior adviser to Chu, the PSC said Azar would "work with industry, states and other federal agencies to facilitate the development of our nation's electrical infrastructure." Initial work would focus on "the transmission grid, transmission-related technologies (such as energy storage) and on the federal power marketing administrations."

Now, getting back to the Wires group, which calls itself "voice of the electric transmission industry" and whose full name used to be Working Group for Investment in Reliable and Economic Electric Systems. In a letter to Chu, President Jolly Hayden of NexEra Energy Resources says of the Strategic Plan that because doubling renewables deployment by next year is a DOE goal, "the absence of any mention of upgrading and expanding the high-voltage transmission system is inexplicable."

The industry and financiers are ready to put themselves into building transmission, Hayden says, and a Brattle Group study done earlier this month "confirms the tremendous potential that transmission manufacturing and construction hold for job creation and economic stimulus." DOE shouldn't take those benefits for granted, Wires says.

"Many barriers and challenges to future transmission improvements remain," the group says, and DOE must lead policy development to get rid of transmission-building barriers.

Transmission siting is a state issue, and Congress hasn't succeeded in making that any different. Transmission cost sharing is basically a federal issue (the Federal Energy Regulatory Commission) but given the power industry's structure — more state and local authorities than you can shake a stick at — DOE will have to get creative to get far on this one.

http://www.eenews.net/stories/1059992057

DOE: Chu's grid guru came in 'like gangbusters,' left quietly

Hannah Northey, E&E reporter

Greenwire: Thursday, December 19, 2013

In 2011, then-Energy Secretary Steven Chu brought in an ambitious Wisconsin state utility commissioner to advance the Obama administration effort to site and build critical power lines and transmission technologies.

Lauren Azar was seen as the person who could help Chu's Department of Energy navigate a maze of local opposition, permitting delays and lengthy reviews to get transmission projects going.

But it’s unclear whether Azar's two-year run that ended in September will bring about clear game-changing transmission breakthroughs.

Former Department of Energy senior adviser Lauren Azar. Photo courtesy of DOE.

That's not to say she didn't try. Saying she came in "like gangbusters," Azar focused on overhauling government-owned chunks of the power grid that outraged lawmakers, utility groups and four politically wired entities known as power marketing administrations, or PMAs.

Azar's time at DOE was marked by a big blowup over a memo that Chu sent last year to the PMAs, ordering them to leverage partnerships, rate-making power and financing to spur upgrades to their collective 33,700 miles of transmission and boost reliability and access for renewable energy sources.

While little known to the public at large, PMAs are a big deal. Their transmission overlaps power lines across almost half the country.

PMA customers that enjoy the country's cheapest electricity said they were blind-sided. Republicans flagging the cost of energy as a campaign issue attacked the memo as a "top-down" approach that favored renewables and threatened to disrupt the PMAs' statutory authority. Eventually, 166 House and Senate members from both parties expressed concern, and the House Natural Resources Committee, which oversees the PMAs, launched an investigation.

Fingers pointed to Azar. The American Public Power Association blamed the Chu adviser for failing to collaborate with industry in her pursuit of a pro-renewable energy agenda.

"The perception was that had she collaborated and consulted with folks more at the outset in developing the agenda she wanted to pursue, and then worked with customers to prioritize and implement those things, that would have been much more effective," said Joe Nipper, the trade group's senior vice president of government affairs.

The memo hit a nerve with members of Congress protecting regional PMA customers. Azar, one source said, was the latest in a line of DOE senior officials who have tried and failed to make similar reforms.

Azar, 52, who has moved back to her hometown of Madison, Wis., and launched a law firm, Azar Law LLC, maintains that her DOE stint was a success.

Given the short amount of time to make big changes at DOE -- Azar was, after all, picked by Chu, who himself resigned last February -- she said she mapped a timeline for tapping into existing transmission siting authorities and helping critical projects get started.

"I'm much more about where the rubber meets the road than high-level policy debates," Azar said.

She rejected the notion the controversial memo was all her doing or representative of a top-down approach. Both DOE and PMA officials, she said, helped implement the order. Chu asked the PMAs to take a leadership role, she added.

"Folks who were critical of the memo were pulling up very specific sentences or words ... which I understand if you didn't like the memo, that's exactly what you do to attack it," Azar said. "But if you do look at the overall thrust of the memo, it was quite simply, 'Let's ensure we have a robust, resilient, modern grid.'"

Others who fought strayed too close to the PMAs and faced similar problems.

Jimmy Glotfelty, founder of Clean Line Energy Partners and a former senior electricity adviser for President George W. Bush, said Azar should be remembered for trying to build infrastructure and integrate renewables in a thoughtful and cooperative manner.

"The customers of PMAs are pretty protective, and if you ask a lot of people who have been in her shoes -- including myself -- it's not uncommon to get into debates with customers of PMAs," he said. "They're tough negotiators."

'Visible transmission advocate'

Chu's selection of Azar was largely seen as a sign of the Obama administration's intense interest in expanding the grid to support renewables and tackle climate change, sources said.

"The DOE should always have a visible transmission advocate, and she served that role," said Rob Gramlich, the American Wind Energy Association's senior vice president of public policy.

Whether the department will take the same approach under Chu's successor, MIT nuclear physicist Ernest Moniz, remains unclear. Following Azar's departure, Skila Harris, who served as the Tennessee Valley Authority's first female director and as a special assistant to former Vice President Al Gore, began serving as senior adviser for the PMAs (*E&E Daily*, Sept. 11).

Expanding transmission is seen as a difficult task considering the projects can intersect environmentally sensitive areas, require years of review and often face stiff opposition from landowners who don't want hulking infrastructure in their backyards or sightlines.

Transmission siting is also where federal and state interests often clash.

Azar was picked in no small part because of her extensive state-level experience.

Before joining DOE, she was a member of the Public Service Commission of Wisconsin, which is responsible for overseeing electricity, natural gas, telecommunications and water industries. Former Gov. Jim Doyle (D) appointed Azar to serve on the commission in March 2007 for a six-year term.

A law school graduate of the University of Wisconsin, Madison, Azar specialized in electric and water utility issues before joining the state agency. She also helped create the country's first stand-alone transmission company.

Azar also served as president of the Organization of Midwest Independent Transmission System Operator States, a nonprofit organization of 13 states and a Canadian province overseen by the Midwest grid operator.

She was also the first president and co-founder of the Eastern Interconnection States' Planning Council, where she co-led efforts to organize states east of the Rockies in interconnectionwide planning.

Azar brought that same spirit to DOE. She helped bring together the "federal family" in 2011 -- nine agencies key to streamlining federal permitting of major new power lines that could have taken up to 15 years to garner approval (*Greenwire*, Oct. 5, 2011). DOE already had existing authority to do so under 216(h) of the Energy Policy Act of 2005, language that allows the agency to coordinate federal and environmental reviews.

"DOE, until I got there, implemented [the rule] in somewhat of a tepid manner," she said. "I came in like gangbusters as I always do and not only helped to lead the rapid respond team for transmission but helped DOE draft some rules for 216(h), negotiate with the nine agencies."

PMA memo

As for the memo, Azar characterized her work as a "huge success" that complemented Chu's recognition of the PMAs' importance.

"As the Energy secretary, you're the CEO of the largest transmission utility in the United States," Azar said. "Secretary Chu, one of his primary priorities was to make sure we had a safe, reliable, resilient transmission grid. He took that quite seriously, and he asked the PMAs to take a leadership role in doing that."

She rejects assertions from lawmakers and industry groups that the memo was a Washington directive.

"I know part of the controversy was that this was a 'top-down approach,'" Azar said. "On the contrary, if you ask the [WAPA] staff, they'll tell you the recommendations came from them."

The endeavor started with the 15-state Western Area Power Administration, or WAPA.

Chu set out his goals in the memo and asked the PMAs to work with customers to lay out a plan. A joint team of WAPA and DOE officials -- after numerous meetings, workshops, webinars, telephone conferences and written comments -- crafted recommendations that Chu later adopted, she said.

"Indeed, I was told that the opportunity for feedback here far exceeded what WAPA normally uses for its normal initiatives," she said.

Azar noted the effort led to proposed changes to streamline WAPA's authority to borrow up to $3.25 million from the U.S. Treasury to build critical transmission. As laid out in the memo, she also championed Texas-based Clean Line Energy's application to partner with DOE through its never-before-used authority under Section 1222 of the Energy Policy Act, which would allow a PMA with federal authority to site the line and overcome state opposition.

But sources said it's unclear whether other provisions in the memo will be implemented outside WAPA -- or even inside WAPA.

WAPA spokesman Randy Wilkerson said not all initiatives laid out in the original memo made it to the drawing board.

In the original memo, for example, Chu said WAPA had decided to take part in an "energy imbalance market," a tool that allows grid operators to balance load over a larger footprint while integrating wind and solar in real time.

But Wilkerson noted that the memo may have been misleading and WAPA is still considering such a move, one that's drawn concerns about cost from customers receiving historically cheap power. "I think that some people got the impression that ... we were doing more than we were at the time," he said.

WAPA also isn't implementing the memo's call for new rates to support the deployment of electric vehicles because such retail issues aren't handled by WAPA, Wilkerson noted.

Other sources said the kerfuffle fizzled as quickly as it began.

"[WAPA] is looking at it as an issue that we're moving on from," Wilkerson said.

http://www.theenergydaily.com/events/azar_bio/

Energy Daily – Lauren Azar Biography

Ms. Lauren Azar
Commissioner
Wisconsin Public Service Commission

Governor Jim Doyle appointed Lauren Azar Commissioner of the Public Service Commission (PSCW) in March 2007 for a term that expires in March 2013. Aside from her duties as a Wisconsin Commissioner, Azar is currently the President of the Organization of MISO states (OMS). The OMS is a non-profit organization of representatives from each state that is included in the Midwest Independent System Operator (Midwest ISO). As president of the OMS, Commissioner Azar is leading a regional planning and cost allocation effort for developing electric transmission over the Midwest ISO region, which includes 13 states and one Canadian province. Commissioner Azar also sits on the Electricity Committee and the Nuclear Issues – Waste Disposal Subcommittee of the National Association of Regulatory Utility Commissioners (NARUC). At the state level, Commissioner Azar led an initial investigation into the development of wind generation on Lakes Michigan and Superior resulting in an extensive report, which may be found at: http://psc.wi.gov/globalWarming/05EI144/index-WindonWater.htm.

Prior to her appointment to the PSCW, Commissioner Azar worked as an attorney and practiced extensively in the area of electric and water utilities, representing both ratepayers and utilities. As a representative for ratepayers, Commissioner Azar negotiated power purchase agreements and resolved disputes with utilities. While representing utilities, Commissioner Azar helped to create the nation's first stand-alone transmission company and helped to site a 210-mile extra-high voltage line in Wisconsin and Minnesota. In addition to public utility law, among others, she also practiced environmental law focusing on water law and on contaminated properties.

Commissioner Azar has been recognized by Madison Magazine as a leading lawyer in environmental law, and was also named as one of the Best Lawyers in America for 2007 in the area of energy law. Commissioner Azar has authored several articles for the National Business Institute. She co-edited and co-authored the Wisconsin Environmental Law Handbook, Fourth Edition, July 2007.

Commissioner Azar received her Bachelor of Arts Degree from Rutgers College and a Master of Arts in Philosophy from Northwestern University. She also has a Master of Science in Water Resources Management and a law degree from the University of Wisconsin-Madison.

Transmission Planning for the Future *& More*

NCSL Task Force on Energy Supply

May 18, 2012

Denver, CO

Larry Mansueti

Director, State & Regional Assistance

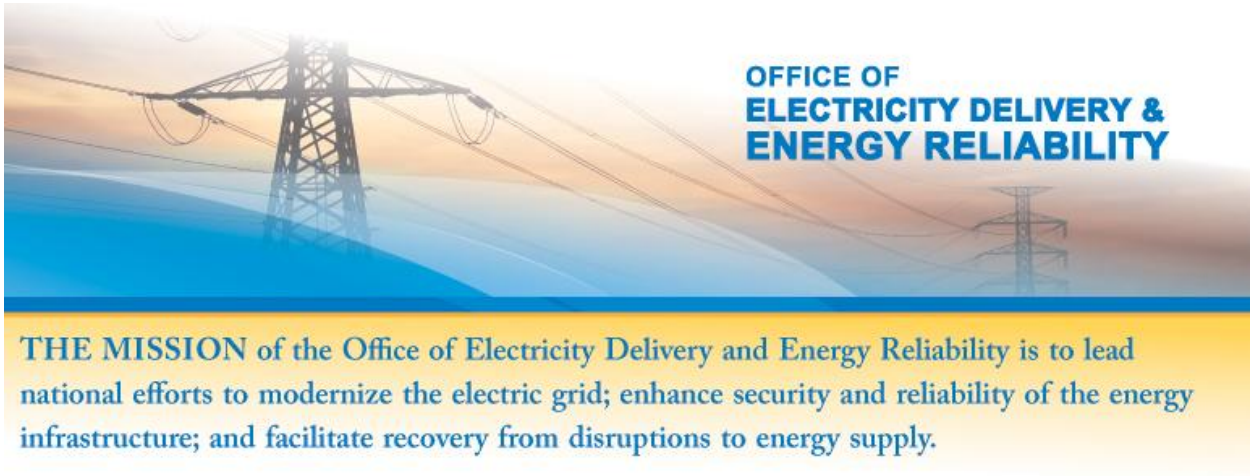
Office of Electricity Delivery and Energy Reliability

U.S. Department of Energy

Presentation Overview

I. Overview of DOE Office of Electricity
II. Interconnection-Wide Planning Efforts
III. DOE Transmission Congestion Study
IV. Federal Transmission Permitting Coordination
V. And *More*

Office of Electricity Delivery and Energy Reliability

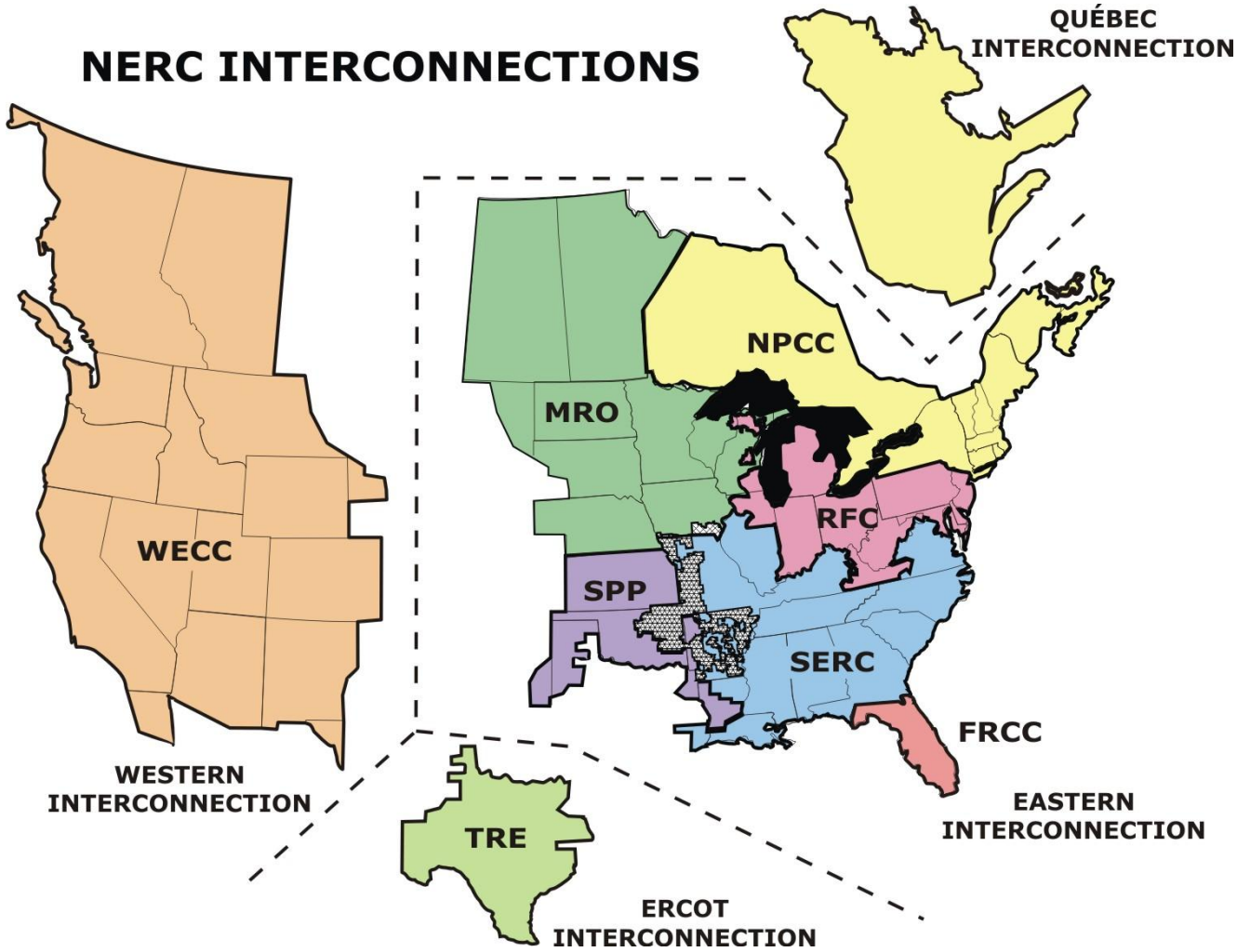


- Three Divisions
  - Permitting, Siting and Analysis
  - Infrastructure Security and Energy Restoration
  - Research and Development

Permitting, Siting and Analysis Division

- Interconnection-Wide Transmission & Planning (& Related Resource Planning)
- National Transmission Congestion Study
- Cross-Border Transmission Line Permits and Electricity Exports Authorizations
- Required Coordination of Federal Transmission Permits & Authorizations
- State and Regional Policy Assistance

Three Electricity Interconnections Serve the U.S.



Interconnection-Wide Transmission Planning

- DOE called for open, transparent interconnection-level planning as early as 2006 (in its first *National Electric Transmission Congestion Study*)
- DOE has supported such work in the West for over 10 years
- The westerners and ERCOT had experience and relevant institutions to build on in responding to the initiative DOE launched in 2009. By comparison, the East faced a much greater challenge in responding to DOE.
- Broader than just “transmission planning”

Interconnection-Wide Transmission Planning

- Grants awarded under Recovery Act to planning entities in Eastern and Western Interconnections, and ERCOT
- Relevant organizations already existed in the West and ERCOT. No such organizations existed in the East, and had to be created.
- Major purpose was to aid the establishment of institutional capabilities to analyze long-term utility system expansion options at a large geographic scale.* Using alternative scenarios. Plus related "resource planning"-type work outside of transmission
- **The Real Benefit: new relationships & dialogues that did not exist before*

Total Funding: $80M (Recovery Act)

- Eastern Interconnection Planning Collaborative - EIPC(industry experts) — $16 M
- Eastern Interconnection States Planning Council – EISPC (state officials) — $14 M
- Western Electricity Coordinating Council – WECC (industry experts) — $14.5 M
- Western Governors Association - WGA (state officials) — $12 M
- ERCOT A (industry experts) — $2.5 M
- ERCOT B (state officials) — $1.0 M
- National Labs (supporting all above) — $20 M

Eastern Interconnection – Accomplishments to Date

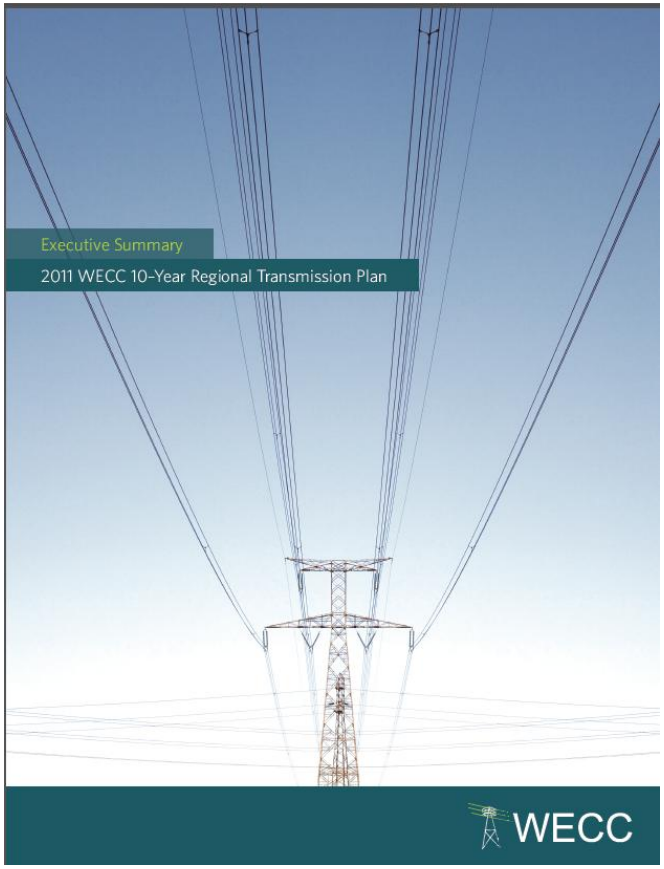
- Formation of the two eastern organizations – industry & states (not assured would happen)
- EIPC's Phase I report delivered 12/16/11 – details eight 20-year macroeconomic futures (72 sensitivities)
- EIPC's Phase II analysis launched – will develop 3 "bookend" 20-year transmission expansion scenarios (ie. BAU, medium, high buildouts)
- EISPC state participants have provided key leadership in EIPC work
- EISPC has initiated an eastern Clean Energy Zone study

Eastern Interconnection – Addt'l Supporting Work

- Future outlook of coal & other traditional resources over the next 25-30 years
- Review of nuclear resources
- Economic ramifications of resource adequacy requirements & an updated assessment of the "one-day-in-ten-year Loss of Load Probability" criterion that underlies current generation reserve margin requirements;
- An overview of state laws, regulations and rules and orders relevant to identification of energy zones in the Eastern Interconnection;
- Extensive review of co-optimizing methodology and techniques for the planning of both generation, in particular resources that are remote from load, and transmission
- Desire to look at electricity – natural gas interdepencies

Western Interconnection – Accomplishments to Date

- WECC delivered 10-year Regional Transmission Expansion Plan on 9/30/11 – plan focuses on new lines and upgrades needed to meet state RPS requirements
- 20-year plan now being developed
- Development of new planning techniques and tools, including inclusion of environmental data and concerns in planning process
- Multiple insights on adequacy of transmission investments over next 10 yrs; lots more



Western Interconnection – Accomplishments to Date

- Input to WECC planning to ensure planning reflects state policies
  - Ex: Reduced WECC 2020 demand projections by 2,000 MW
- Sponsored several utility resource planners forum – “what are they planning to buy and build”
- Moving the west to better integrate growing variable generation (i.e wind and solar)
- State Wildlife Decision Support Tools
  - -- Ex: Southern Great Plains Crucial Habitat Assessment Tool

Western Interconnection – Analyses Gave Major Insight

"WECC's first 10-year plan indicated that no new major transmission is needed by 2020 to meet demand and state policy objectives (e.g., Renewable Portfolio Standards) beyond the "foundational" projects already under development are [sic] energized by 2020, as expected."

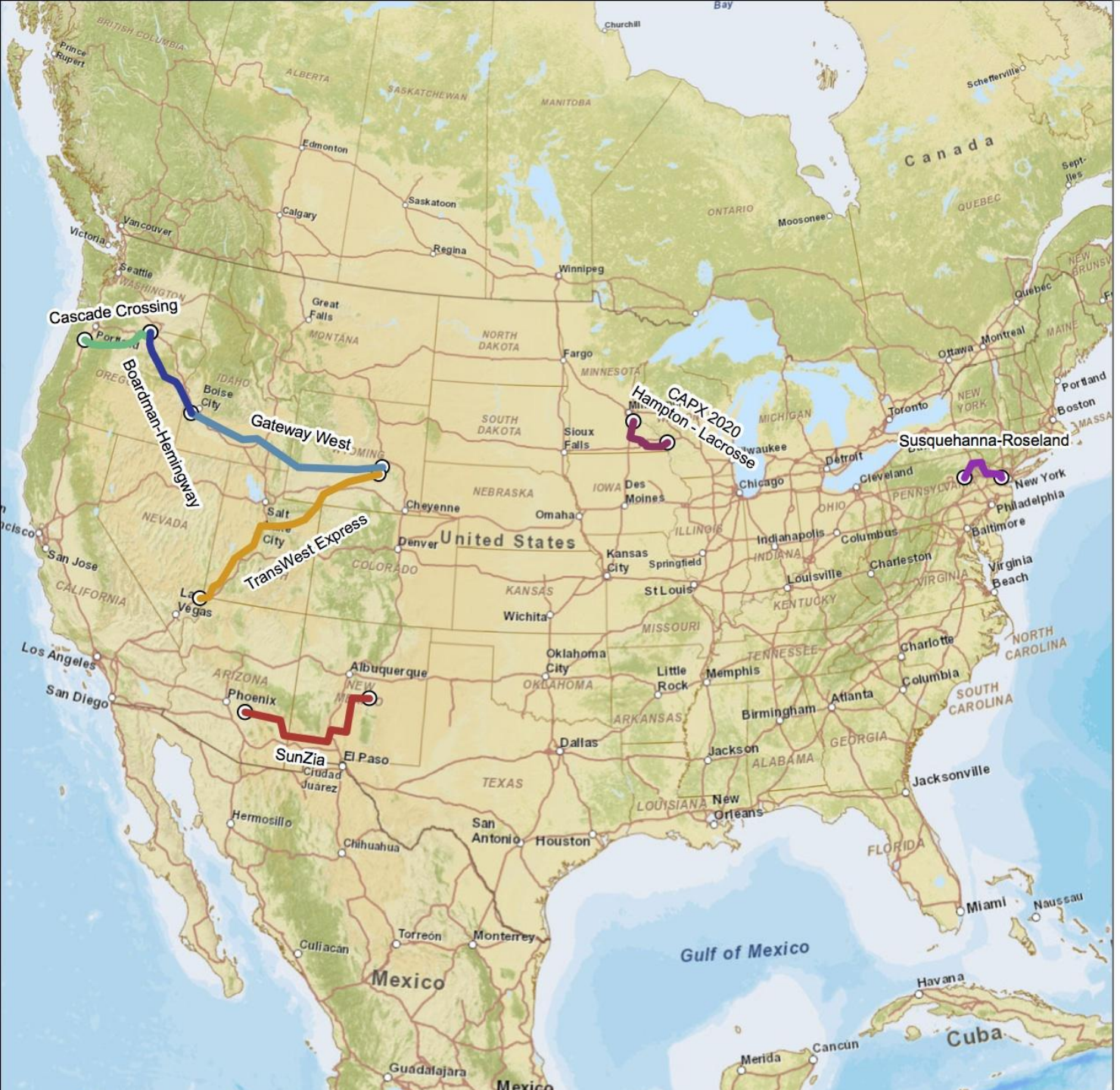
-- WA UTC Comm. Phil Jones, Oct. 12, 2011 Congressional Testimony

Coordination of Federal Transmission Permitting

- *Federal law requires*: Section 216(h) of the Federal Power Act, created by EPACT 2005, designated DOE as the lead agency to coordinate transmission lines requiring multiple Federal permits
- MOUs signed by 9 Federal Agencies to execute section 216(h)
- State RPS's in West driving transmission buildout

Rapid Response Team for Transmission

- Announced June 2011
- Builds off Energy Policy Act of 2005 requirements for better Federal coordination on transmission permitting
- Co-lead by CEQ and Depts of Energy & Interior



Rapid Response Team Pilot Projects

Transmission Lines

Project Name

- Boardman-Hemingway
- CAPX 2020 Hampton-Lacrosse
- Cascade Crossing
- Gateway West
- SunZia
- Susquehanna-Roseland
- TransWest Express

0 175 350 Miles

Last updated 9/20/2011

N

RRTT Site Visits
Tease Out Process Reforms

- RRTT has to date conducted a series of site visits for five of the seven RRTT pilot projects
- Site visit participants included Federal, state, and local agencies; Tribal representatives; project proponents and contractors
- During the site visits, participants identified project-specific challenges and potential solutions that could improve the agencies' processes

The *And More*

- The game changer that shale gas is for the electric industry and the U.S.
  - -- Low prices, domestic jobs boom, foreign policy implications
- DOE's announcement of first-ever methane hydrate extraction
- DOE's Announcement of small modular nuclear support
- Watching reliability as EPA rules are rolled out (30-40 GW out of 310 GW coal retirement announcements so far)
- What is the post-2020 future?

Draft Meeting Minutes
Joint Meeting of
Northern MAPP (NM-SPG) Sub Regional Planning Group
And
Missouri Basin (MB-SPG) Sub Regional Planning Group
Missouri River Energy Services Office
Sioux Falls, S.D.
9:00 a.m., September 28, 2005

1. Introductions

COMPANY	ATTENDEE Name	COMPANY	ATTENDEE NAME
BEPC	Del Galagher (phone)	SD PUC	Martin Bettman
DPC	Jerry Iverson (phone)	OTP	Jason Weiers
GRE	Mike Steckelberg	OTP	Michael Kawlewski
MHEB	Hilmi Turanli	WAPA	Ed Weber
MISO	Todd ?? (phone)	WAPA	Gayle Nansel
MISO	Yaming Zhu (phone)	Xcel	Angela Maiko
MN PUC	Ken Wolf	Xcel	Bill Raihala
Excelsior	Steve Sherner (phone)	Xcel	Dean Schiro
MP	Mike Klopp	Xcel	Jason Standing
MRES	Brian Zavesky	Sharbakka Eng	Glen Sharbakka (phone)
MRES	John Weber	WAPA	Daniel Olson
MRES	Richard Dahl		
MP	Mike Klopp		

2. Assign Minute Taker: Hilmi T. volunteered to take the minutes.

3. Review Minutes

   3.1 August 2, 2005 NM-SPG meeting minutes: Mike K. questioned the statement where it says "NW Exploratory Study was superseded by Cap X 20/20 Study" in the minutes. This will be discussed further in today's meeting. The minutes were approved.

   3.2 August 3, 2005 MB-SPG meeting minutes: No Comments; Approved without opposition.

4. Review agenda

5. General NM/MB SPG Business

6. Transmission Planning:

   6.1 Follow-up work on 2003 report-PUC order: Mike S. gave an update; Certificate of Need for the Mille Lacs project will be completed in first quarter of 2006.

MP is coordinating the Certificate of Need (CON). October 30 is the deadline for other updates.

Minnesota 2005 Biennial Transmission Planning Report: The report is being put together by Lindquist & Vennum Company. A draft will be issued by October 1, 2005. The complete report will be submitted by November 1, 2005. Ed W. suggested that SPG's should receive a draft copy of the report before submission so that others have a change to review and comment.

Mike S. stated that zone meetings have been ineffective and changes are being sought in the public participation process.

7. MAPP 10-Year Plan Update

7.1 TPSC 10 Year Report Updates (Forms 1-3): MISO is creating the database to help with the model building and study efforts. Dave Duebner (MISO) is leading the project and is populating the database with MTEP 06 information. The goal is to use this as the main list of planned and proposed projects. Dave has included this year a list of equipment already in service.

Del G. has sent the MB SPG portion of the MAPP 10 year plan update to the members for review. It will be sent to the TPSC in a week or two. Ed W. will contact MDU to check if they any projects that should be listed. Projects by MISO member companies will automatically be incorporated to Forms 1-3 by Dave D. Steve Sherner questioned if Mesaba project items have been listed in Forms 1-3. Mike S. will check into this. Mike will also e-mail the Forms 1-3 in Excel form rather than PDF. This year only the text part of 10 year plan updates or any recent changes to the 2004 plan would have to be submitted.

The TPSC will finalize the update to the 2004 10-year plan at their October 26, 2005 meeting and forward it to RTC before their December 1, 2005 meeting.

8. Transmission Project Updates:

8.1 Mille Lacs area transmission: The project was identified in MTEP 03 for voltage support and load serving. GRE will file a CON application by the first quarter of the 2006.

8.2 Lakefield—Wilmarth 345 kV series compensation: Angela M. reported that project is on schedule. The series compensation station will be about mid way on the line near Fieldon Township, with in-service in 2007.

8.3 SW Minnesota Wind: Angela M. reported that all of projects are on track.

8.4 Pequot Lakes – Badoura 115 kV line: Mike K. has presented the highlights of this project and also distributed a public information newsletter. This project

will upgrade the load served (growth 2.8%) in the area by construction of a 115 kV line.

8.5 Tower - Babbitt 115 kV line: Mike K. presented the highlights of this project and also distributed a public information newsletter. This project will upgrade the load served (growth 2.3%) in the area by construction of three sections of 115 kV lines. This project and the Pequot Lakes—Badoura project will both be in the Minnesota state plan to be submitted this year. Approval is sought by June 2006 with construction in 2007 and 2008.

8.6 Arrowhead – Weston 345 kV line: Mike K. reported that Minnesota portion of the line is built. Construction has started in the Wisconsin. The issues with all the counties have been resolved. A 800 MVA PST (phase-shifting-transformer) has been ordered from VA Tech (Siemens) to be delivered in fall of 2006 and to be moved to the site by winter 2006/07.

8.7 Watertown – Brookings 115 kV loop: Ed W. reported that there is significant load growth in the Brookings and Flandreau areas. Some of the crossarms and poles on the lines in this loop are in need of repairs. Western has considered re-building the entire line at 230 kV but, for now, they are replacing the damaged poles with 115 kV poles.

8.8 Chisago – Apple River 115/161 kV line: Angela M. reported that the certificate of need is to be submitted soon, possibly by the end of 2005.

8.9 North West Public Service: Ed W. reported that there is considerable load growth in the Mitchell area. One possibility is to tap into Ft. Thompson – Sioux Falls 230 kV lines. There is also potential wind development in this area only with aninterconnection request so far.

8.10 Jackson Area Transmission: Brian Z. reported that the plan was for Jackson to be served from the new Xcel 161 kV line between Fox Lake and Lakefield Junction. This line would be owned by Xcel with both terminals owned by Alliant. Hence the Jackson load would switch to Xcel control area and Xcel pricing zone, but line would be operated by Alliant. However the change in control areas will require a transmission service request to be filed under MISO rules. In a letter sent to MISO, MRES made a formal request to address this issue urgently. SPG's resolve that MISO finalize this issue so that Jackson load could be served from 161 kV supply.

9. Transmission Studies

9.1 Iowa-Southern Minnesota Exploratory Study: Yaming Z. reported the results will be incorporated to the MTEP 06 report, plus it will be published as a separate report. A Lakefield Junction – Winnebago 345 kV line is one of the options being studied.

9.2 Northwest MAPP Exploratory: Mike S. reported that Glen Sharbakka gave a presentation to Upper Great Plains Group ?? (UGPTC). Walt Grivna also presented the results from this study to the same group. There are two proposed transmission routes. The first one is a Belfield—Fargo—St. Cloud 345 kV line and the second alternative is Belfield—Granite Falls—Twin Cities 345 kV line.

The study team has concluded its efforts. The alternatives and economic studies will now be incorporated into the CapX2020 effort. Big Stone II development has also been incorporated into the CapX2020 study due to its location.

9.3 Coordinated Generator Studies (Group 4): There is no update on this study.

9.4 Buffalo City/Lake Pulaski: Low voltage at Buffalo (Minnesota) (20 MW load) has prompted the need for this study. Angela M. reported that there are two alternatives being considered: A new Buffalo—Dickinson line 115 kV line, initially operated at 69 kV, and a Buffalo—Lake Pulaski 115 kV line.

9.5 Worthington Load Serving Study: Study work is continuing.

9.6 Big Stone II generation: Jason W. gave an update. The interconnection and delivery studies have been on-going. Stability studies have just been completed. A certificate of need document is being drafted for the Big Canby – Granite falls (Hazel) 345 kV line which is the common component for two proposed alternatives. The interconnections facility study would be conducted next.

9.7 CapX2020 load serving: Mike K. gave a presentation on the study. His presentation, the Cap X2020 report and other relevant information are all posted at CapX2020 website. Within the next 15 years 8000 MW of new generation to is needed to supply 6300 MW of new load growth. The CapX area is primarily in Minnesota and partially in Dakotas, northern Iowa and western Wisconsin. Transmission development to connect these generation resources to load centers are divided into scenarios; each scenario depending on a particular generation pattern. The total cost of transmission facilities by year 2020 amount to about $2.3 billion. A first group of facilities, call Group 1 facilities, are planned to be completed by the year 2012 and are estimated to cost $600 million. A memorandum of understanding is being prepared in between eight Transmission Development Partners to facilitate the financing and construction of the CapX2020 projects. MISO's tariffs for cost recovery for transmission services would be a back up plan. Ken W. stated that routing and siting, which used to be the responsibility of EQB, is now being transferred to MnPUC as part of June 2005 legislation.

9.8 Mesaba Generation: Steve S. reported that the last update on this project was given on May 5, 2005 meeting. The ad-hoc committee for the studies consists of AEP, MP, GRE, XEL and MH. For the first unit (MISO project no G477)

rated 530 MW located at Hoyt Lake (near LTD Taconite) the designated point of interconnection is Forbes 230 kV bus. The plant was designated as network resource. Last March, screening and stability results were completed. This project assumes that Arrowhead – Weston project is in place. Some 230 kV breakers at the Forbes bus would need to be replaced. The Phase II study, which is the system impact study, started on May 11, 2005 by PTI. It uses summer peak load flow cases. One 115 kV MP line is overloaded (including in the base case as well). MP is completing the short circuit studies. There were some problems with the 2005 stability model, as a result stability studies were delayed, but they are now under way. The results will be reviewed at an October 7, 2005 meeting.

For Unit 2, rated up to 600 MW (Project no G519), an alternate location north of the taconite plant was proposed. The in-service date is one year later at 2011. The point of interconnection is the Blackberry 230 kV bus. It is assumed that the Boswell – Wilson 230 kV (in-service 2010) will be built by this date, but the Maple River – Benton 345 kV line will not likely be completed (in-service 2012). This unit will require conversion of existing Blackberry – Benton and Blackberry – Arrowhead from 230 kV to 345 kV and construction of a new Blackberry – Riverton 230 kV line.

9.9 Buffalo Ridge Incremental Generator Outlet: *(This item was incorporated in the next agenda item)*

9.10 SW Minn-Twin Cities EHV Development: Mike S. reported that a study review meeting was held with Rick G. (Excel Engineering) yesterday (9/27/05) at the MRES offices. The base case plan proposes a 345 kV line from White (near Brookings) to Lyon County (near Marshall) to Franklin (near Redwood Falls) to Helena to Hampton (southeast TC metro). An alternate to this would be a 345 kV line from Hazel (near Granite Falls) to Blue Lake (southwest Metro). Both options assume a 345 kV line between Big Stone - Canby – Hazel – Lyon Co.

Construction of these west-east 345 KV corridors does not eliminate the loop flow north through Manitoba, however it does reduce the loop flow amounts from 8-10% to 3.6-4.0%. The analysis also included a double-circuit cost/benefit estimate.

Another study team meeting is scheduled for October 10, 2005, at the OTP offices in Fergus Falls.

9.11 C-BED Transmission Study for Distributed Generation: Jason W reported that a conference call was held with himself and George Crocker, Mike Michaud., and Mike K. It is proposed to develop transmission infrastructure for up to 2500 MW of distributed generation in Minnesota.

9.12 West Central Minnesota: GRE is completing a load serving study for near Willmar area with projects that have an in-service date of 2009.

9.13 MECA Load Serving Study: Jeremy S. of BEPC sent a draft report to MB and NM SPGs without the attachments. The study used 2004 MAPP series models for 2014 model. The base case has a number of impacted facilities. Comments should be sent to Jeremy S. A presentation o this study will be made at the next SPG meeting.

9.14 Rugby Wind Farm Study: Jason W. has sent the report to MISO. Steady state results appear to be acceptable, 500 kV line loop flow appears to be existing. However for dynamic performance a 5 Mvar capacitor bank needs to be added at Paynesville. Deliverability study will be completed by MISO. MISO assumes 20 % wind availability and system peak conditions, hence simultaneous transfer levels are not tested at their maximum levels.

10. Other

10.1 Next Meeting will be held on November 30, 2005, in Elk River at the GRE office starting at 9:00 am[1].

Respectfully submitted
by H.M. Turanli, Manitoba Hydro.

[1] This meeting is now scheduled to take place at the MAPP/MISO St. Paul offices.

Appendices AB: Project Facility Table 12/02/2014

Target Appendix	App AB	Region	Geographic Location by TO Member System	PrjID	Facility ID	Expected ISD	From Sub	To Sub	Ckt	Max kV	Min kV	Facility Rating	Facility Description	State	Miles Upg.	Miles New	Plan Status	Estimated Cost	Cost Shared	Postage Stamp	MISO Facility
A in MTEP14	B>A	West	MP, MH	3831	7200	6/1/2020	Dorsey	US/MB Border	1	500		1732	Dorsey-US/Manitoba Border 500 kV Line	MH		160			N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	7201	6/1/2020	US/MB Border	Iron Range	1	500		1732	US/Manitoba Border-Iron Range 500 kV Line	MN		220		$573,207,005.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	7202	6/1/2020	Iron Range			500	230	1200	New Iron Range 500/230 kV Substation adjacent to existing Blackberry 230/115 kV Substation	MN		0	Planned	$46,023,004.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	7622	6/1/2020	Warroad River			500		1732	New midpoint series compensation station on Dorsey - Iron Range 500 kV Line	MN		0	Planned	$52,433,712.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	20289	6/1/2020	Iron Range	various		230			Modifications to and reroutes of existing 230 kV and 115 kV lines at Iron Range Substation site	MN		2	Planned	$3,891,711.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	20290	6/1/2020	Blackberry			230			Two 230 kV panel replacements at Blackberry to facilitate interconnection of Iron Range 500/230 kV Substation	MN		0	Planned	$275,000.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	20292	6/1/2020	Arrowhead			230			One 230 kV panel replacement at Arrowhead to facilitate interconnection of Iron Range 500/230 kV Substation	MN		0	Planned	$137,500.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	20291	6/1/2020	Forbes			230			One 230 kV panel replacement at Forbes to facilitate interconnection of Iron Range 500/230 kV Substation	MN		0	Planned	$137,500.00	N	N	Y
A in MTEP14	B>A	West	MP, MH	3831	20293	6/1/2020	Hilltop			230			One 230 kV panel replacement at Hilltop to facilitate interconnection of Iron Range 500/230 kV Substation	MN		0	Planned	$137,500.00	N	N	Y

COMMISSIONER FIORDALISO: All right, let's continue.

MS. TAMASIC: May I make a statement on the record?

COMMISSIONER FIORDALISO: Yes.

MS. TAMASIC: It is difficult enough for us Intervenors representing these very interested parties here to deal with the myriads of discovery.

I just want to put on the record what I said, what we all said, in our motion: This petition is not ready for prime time, this petition should be suspended until it is complete.

The notion that we are coming in with

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drawings six weeks from now, where is the public interest and public notice on that?. It is so unfair.

COMMISSIONER FIORDALISO: Well taken. Let's proceed at this point.

CROSS-EXAMINATION BY
MS. OVERLAND:

Q Mr. Crouch, there were some changes that I would like to talk to you about. First there was a change to the quad bundled 500 kV line. Can you explain what that change is?

MR. CROUCH: We reduced bundle size from quad-bundle to tri-bundle.

Q Why was that?

MR. CROUCH: We were pushing the manufacturing limits of monopoles so it took those out of consideration, and there was a a very large interest from the public about the use of monopoles for aesthetic reasons, and in order to consider those we took a look at whether or not we could reduce the bundle size so that it would be less impact on the structure and we could consider using monopoles; that's why we did that.

Q How would that affect opacity?

MR. CROUCH: Since the quad bundle was

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not primarily being designed for opacity, it really is not a change in the opacity of the line.

The line is designed to carry the same amount it would have carried if it had four, it is not an opacity issue.

Q What about the MVA issue?

MR. CROUCH: No, it's the same, the amperage of the line actually feeds the A portion of the MVA.

Q Megavolt amperes?

A Yes.

Q Since we're on that line, why don't you explain what a megavolt ampere is?

MR. CROUCH: There are different ways to categorize power, so two things that make up the power happen to be voltage and amperage.

When you talk about overall power of the circuit, what is it capable of carrying, you essentially multiply the voltage times the amperage and come up with the MVA rating.

Q And you are saying this is mostly a change based on amperage, correct? I mean the change is -- let me--that the design of the line was based on

amperage so that a change would not have an impact on that; is that correct?

MR. CROUCH: Not necessarily. One of the considerations in desiging the line would be to carry a certain amount of power, in this particular case I believe it was 3,005 MVA.

Q That would be the entire package of conductors that would carry 3,005 MVA?

A Correct.

Q And for the 280 line, what would that MVA be for that?

MR. JACOBER: I think you meant 230.

Q I'm sorry, 230, thank you.

MR. JACOBER: The single conductor I believe is designed to carry 730, approximately 734 MVA.

Q And as I understand, that would be reconductered and then bundled, but you are changing that.

MR. CROUCH: We are simply replacing the existing 230 kV in kind, except in a different cofiguration.

Q What are you replacing it with?

MR. CROUCH: The same, with a 1590 ACSR single conductor.

Q Are you familiar with ACSRs?

MR. CROUCH: Yes.

Q What is it?

A It's a different type of conductor, it's an aluminum conductor steel supported as opposed to ACSR which is an aluminum conductor steel reinforced.

Q Why do you use ACSR instead of ACSS?

A In certain cases it has to do with braided breaking strength, and we do use in certain instance ACSS.

Q Is there a capacity different between ACSR and ACSS?

A Depending on how you construct the line, yes, the ACSS conductor can operate at a higher temperature.

Q When you say depending on how you construct the line, does that mean things like transformers on either end, or what do you mean by that?

MR. CROUCH: Just speaking about the line, it would depend on how you sag and tension the line.

Q What about the transformers?

MR. CROUCH: They are circuit components, so that affects the circuit rating as opposed to the line rating.

Q And what was the circuit rating of the old configuration and the circuit rating of the new configuration?

MR. CROUCH: They are still the same.

Q Now, you were talking about impacting the, just a minute, pushing the manufacturing limits of monopoles.

What do you mean by that?

MR. CROUCH: Well, once we had gotten into the detailed design, the Phase II design, you then have an opportunity to go to pole manufacturers with the engineering data.

Once we did that, some manufacturers had indicated that they would not be able to manufacture a single monopole and some questioned whether they would be able to do it.

At that point we decided to consider changing the conductor.

Q Was it a weight issue, a tension issue?

MR. CROUCH: It happens to be the size of the pole and it has to do with tension primarily.

Q So essentially the pole could not handle having that much on it?

MR. CROUCH: We were pushing the limits of manufacturing, we weren't quite sure whether they

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could make them or not.

As I indicated, some said they could, some said that they could not.

Q So is it correct that if you have that 3,005 MVA and four, and then you reduce it to 3,005 MVA on three, doesn't that change then the amps for those particular conductors?

MR. CROUCH: Each individual conductor would carry a little bit more amperage in the tri-bundled configuration as opposed to the quad bundled configuration.

Q Doesn't that also change all your EMF modeling?

MR. CROUCH: Not necessarily. It does affect somewhat the audible noise, but we would still be able to meet all of the requirements at the edge of the right-of-way.

Q What I am considering is, what Amp rating was used for the modeling and how that changes for the EMF modeling, because what it would do logically -- Is it correct that what it would do logically is raise the amperage of that three lines as opposed to four, so it would raise it by --

MR. CROUCH: I prefer to let Kyle speak to your concern in the EMF.

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Q What is different in the construction aspect of it which is when you have four and you reduce it to three, what kind of percentage does it raise that three by?

MR. CROUCH: As far as raise by?

Q Okay.

You have got Amps, you have 3,005 spread across four, so then what does it take then, take a quarter of that and spread it between the three.

MR. CROUCH: It would take three, if it's in the tri-bundle it is essentially a third of the 3,005.

In the quad bundle it would have been a fourth of 3,005.

Q 3,005 and that's MVA, so what Amps do you have for that 3,005; is there a direct correlation between the Amps and MVA?

MR. CROUCH: Yes.

Q Okay.

So then if you have the 3,005 MVA how many Amps is that?
MR. CROUCH: Just off the top of my head, for a tri-bundle it's a little over a thousand.
Q And that's for conductors?
MR. CROUCH: Yes.

Q So you have a little over a thousand, in the quad bundle would it be around a thousand?
MR. CROUCH: No, it would be 3,005 divided by four, a little over seven hundred.
Q So then you are saying with the three it would be around a thousand, ballpark?
MR. CROUCH: Yes, that's correct.
Q Who would be the witness that would have the specifics on that?
MR. CROUCH: Which specifics?
Q To go from ballpark figures to specifics.
MR. CROUCH: Which specifics are you speaking of?
Q MVA and Amp?
MR. CROUCH: I can actually come up with that. Specifically speaking, the design of the line is 3,005 MVA, so for the conductor itself it is a little over a thousand MVA.
And then on the quad bundle it would have been 3,005 divided by four.
So that's the specific answer.
Q We can do the math, but we have on the record what the formula is.
MR. CROUCH: Yes.
Q You are saying that has an impact on the

conductor noise?
MR. CROUCH: Primarily the quad bundled configuration was to address audible noise requirements at the edge of the right-of-way.
Q I may have to think about this.
(Pause.)
Q That would have an impact, too, though, on substation design?
MR. CROUCH: Not necessarily, because it's the same amount of power that you are carrying in the line.
Q But would it mean that there are fewer transformers?
MR. CROUCH: No, you are still requiring the same amount of power to flow so you are not reducing the amount of current by reducing the conductor.
In this case because the conductors that we were putting up were to address audible noise it would still be able to meet audible noise with a tri-bundle.
Q When you have bundles, doesn't one bundle go to a transformer and another bundle go to a different, you know, phase --
MR. CROUCH: Yes.

Q And they are divided up?
MR. CROUCH: Yes.
Q So doesn't that mean there is three, not four, no?

MR. JACOBER: If I can answer that question, no, it does not.
Basically you have three phases, and in each phase you either have four conductors or three conductors, but the transformers still, you would still have three transformers for that transformer bank either way.
Q They are set up by phase rather than by bundle?
MR. JACOBER: Yes.
Q Does that mean then that you have -- then if the MVA would be the same, the transformers would be the same; is that correct?
MR. JACOBER: That's correct.
Q Thank you.
MS. OVERLAND: And given this is a new change, is this a change that we could also take some time to look at and address again when we deal with the changes of substations.
MR. RICHTER: No objection from PSE&G.
COMMISSIONER FIORDALISO: Yes.

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MS. OVERLAND: Because this is an important, this is a big change.
Q Mr. Jacober, you say you are licensed in seven states?
MR. JACOBER: Yes.
Q That's all electrical?
MR. JACOBER: Yes.
Q Now, I want to clarify, because I am from the Midwest, we call them substations but you call them switching stations, and can you address the distinction between them, if there is one?
MR. JACOBER: Basically a switching station and substitution in the matter of this case can be used interchangeably.
Basically as the definition goes, it's a location where lines come in to interconnect with the system, so we can say that they are used interchangeably as to this subject.
Q In your direct--just one moment--in your direct on page 7 you are describing the equipment, and although the locations may change of the East Hanover switching station, will the equipment change, or will that still be the same?
MR. JACOBER: Where is that?
Q Page 6 starting at line 16, where you are

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describing the equipment in the East Hanover switching station, will that still be the same?
MR. JACOBER: Can I read through it?
Q Sure.
(Pause.)
MR. JACOBER: The movement of the proposed alternative that's feasible on the Roseland site would still maintain a GIS switchyard, that is presently would utilize in this case nine breakers and a breaker and-a-half substation rather than six breakers that would be installed in a GIS building very similar to the East Hanover.
Q Nine instead of six, why?
MR. JACOBER: The new, the alternative, the feasible alternative, would include similar to

MS. MOSKOWITZ: Right. He was at least going to attempt to answer.
COMMISSIONER FIORDALISO: He was going to attempt to answer the question you had.
MS. OVERLAND: It had something to do with a number.
COMMISSIONER FIORDALISO: Thank you very much. I told you I was getting stoonad because I did try to remember that and I didn't.
If you could repeat the question so --
Do you remember it?
MR. KHADR: Yes, I remember it.
COMMISSIONER FIORDALISO: You remember it.
Maybe you could ask the question and then give us the answer.

Unless you know the question.
MS. OVERLAND: Well, that would help me interpret the answer if he give the question too but maybe rather --
COMMISSIONER FIORDALISO: It's sounds like a Laurel and Hardy routine.
MS. OVERLAND: How about if I restate it?
COMMISSIONER FIORDALISO: Please.
CROSS-EXAMINATION OF MR. KHADR BY MS. OVERLAND:
Q. I want to be clear what number it is that I'm looking for, because, as I understand it, in the configuration now with the four down to three conductors on the 500 kV side, the limiting factor is in substation, be it GIS, switched gears, transformers, it is not the line.
So what I wanted to know is what the ultimate rating for the line is if all things are good and glorious and best of all worlds?
A. The circuit rating is limited by its connect switch. And 2007, 2008, and 2009 we had modelled the line rating as 2,650 MVA, normal and 340 MVA emergency for our --
Q. Is that three --
A. I'm sorry. 3,040 MVA emergency, four-hour emergency rating. As you know, PJM study is a 15-year

analysis. That rating has gone through the 15 years and it did not show that we going to need anymore than that rating for the full 15 years.
If you look at the existing 500 kV circuits that we have, they are all dual conductor per phase, and a rating of I believe 3,005 and 300 -- 3,400 MVA for emergency.
PJM -- and we don't see any need for higher rating on a conductor than what we -- than what I just mentioned right now. The reason we are doing -- going with tri and before with quadruple is to limit the noise level at the edge of the right-of-way, not for higher capacity on the line, higher capability on the line.
We need to recognize that we cannot force flow on that line alone. If things change, not only the flow going to go on that line but also going to go on the parallel 230 kV circuits that line, as well as the parallel 500 kV circuits which all have much lower rating than this line would.
Q. I want a number.
A. All I'm saying is that we studied it for 15

years. We don't need any additional capability on that line. That line we design it for triple conductors per phase for noise levels.
Q. But that does not answer the question of what if
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all things were great and good and you did not need to worry about substation limitations, noise limitations, what the capacity would be --
A. It's much more --
Q. If may I finish, please?
-- if I had the conductors -- the conductor manufacturer's spec sheet, what would that say?
A. It's much more than just the transformers on the line or the disconnect switches on the station.
Q. Correct.
A. It's all the parallel lines that we have, it's the 500 kV. When you use that line -- number one, okay, based on Kirchoff's law (phonetic) -- it's a network analysis -- network analysis which shows that that line would have flow similar to the other 500 kV lines within the same thing -- same limitations. You cannot push huge amount of flow on that line for the simple reason that if you lose that line that flow is going to go back on the 230 kV panel circuits and cause severe overloads.
Q. There is an RTEP with a network of backbone lines which is only the beginning of the regional expansion plan. And what I want to know again is the number or if you will provide a spec sheet for the conductors for that line because I want -- with all changes coming up, a lot of things will change. The noise restriction may
1252
not change, but substations can change and your planning for expansion. There's new lines being build all over. And when the new RTEP comes out, there will be more. And when the next RTEP comes out, there will be more, and so all of this will build up the 500 kV network.
So I want to know the number, if all those limitations were removed, what the total potential capacity for that line would be according to the manufacturer, that number.
COMMISSIONER FIORDALISO: Maybe I can cut through the chase here. Does a number exist?
MR. KHADR: I do not have that number.
COMMISSIONER FIORDALISO: Are we able to calculate that number? Is that possible?
I don't know. I'm asking you. I just want to get to a point where we continue here so we can get to leakage so we can get done here.
MS. MOSKOWITZ: So you are --
COMMISSIONER FIORDALISO: Is there a number or is that number able to be calculated that you're aware of?
MR. KHADR: I do not do the calculation for the line ratings. I'm not sure what's really involved in calculating that number. I would presume that that number could be calculated.
1253
COMMISSIONER FIORDALISO: Ms. Moskowitz, I'm sorry, I didn't mean to cut you off, but I'm just trying to move this along.
MS. MOSKOWITZ: I know. And I'm trying to as well.
I'm being told that Mr. King knows the

number. I know we're sort of going from witness to witness here, but if we can have your indulgence, perhaps he can --
COMMISSIONER FIORDALISO: Mr. King, come up to the microphone.
MS. OVERLAND: Wasn't he just the witness who didn't know just a minute ago.
MR. KING: I was this morning.
MS. MOSKOWITZ: No. No.
COMMISSIONER FIORDALISO: I don't think that's correct.
You're still under oath, sir.
If you could just give us a number that Ms. Overland is looking for.
CROSS-EXAMINATION OF MR. KING BY MS. OVERLAND:
MR. KING: Can I just take a second to calculate?
MS. OVERLAND: Yes.
MR. KING: The current that I think you're
1254
interested in is the amount of current you can push through a particular conductor before it exceeds a certain temperature.
MS. OVERLAND: It's own rating all by itself in a vacuum all by itself.
MR. KING: All by itself. And the limiting component is whatever you say the maximum temperature is. That's the only thing would --
MS. OVERLAND: Correct. Thermal limits.
MR. KING: Thermal limit of a conductor. If you chose the number to be 140 degrees celsius for a 1590 ACSR Falcon conductor, the number -- the amount of current you'd have to push through based on the PJM summer normal rating conditions with no wires and a high temperature, variably no wind and a high temperature would be 1,838 amps per wire. So if we had four of those it would be 7,352 amps and would go to down to three, three times that 1,800 would be 5,514 amps.
MS. OVERLAND: 5,514 amps.
MR. KING: That would be the current required to raise the conductor temperature to 140 degrees based on the PJM summer --
MS. OVERLAND: Rating conditions.
MR. KING: -- conditions.
MS. OVERLAND: And then do you have an MVA
1255
number for each of those.
MR. KING: If I can calculate it for you.
MS. OVERLAND: And then I will shut up on this topic.
COMMISSIONER FIORDALISO: And you have very few leakage questions. Correct?
I'm sorry?
MS. OVERLAND: Not many. A couple.
COMMISSIONER FIORDALISO: A couple is good. I'll take it.
MS. OVERLAND: This was only one.
MR. KING: If I did my square roots correctly, 5,514 amps per phase would correspond to 4,795 MVA at 500 kV, if did my square roots correctly.
MS. OVERLAND: Okay. And -- okay. That will do it. I am happy.
COMMISSIONER FIORDALISO: Ms. Overland, if

SCHEDULES OF KEY ENVIRONMENTAL IMPACT STATEMENTS*

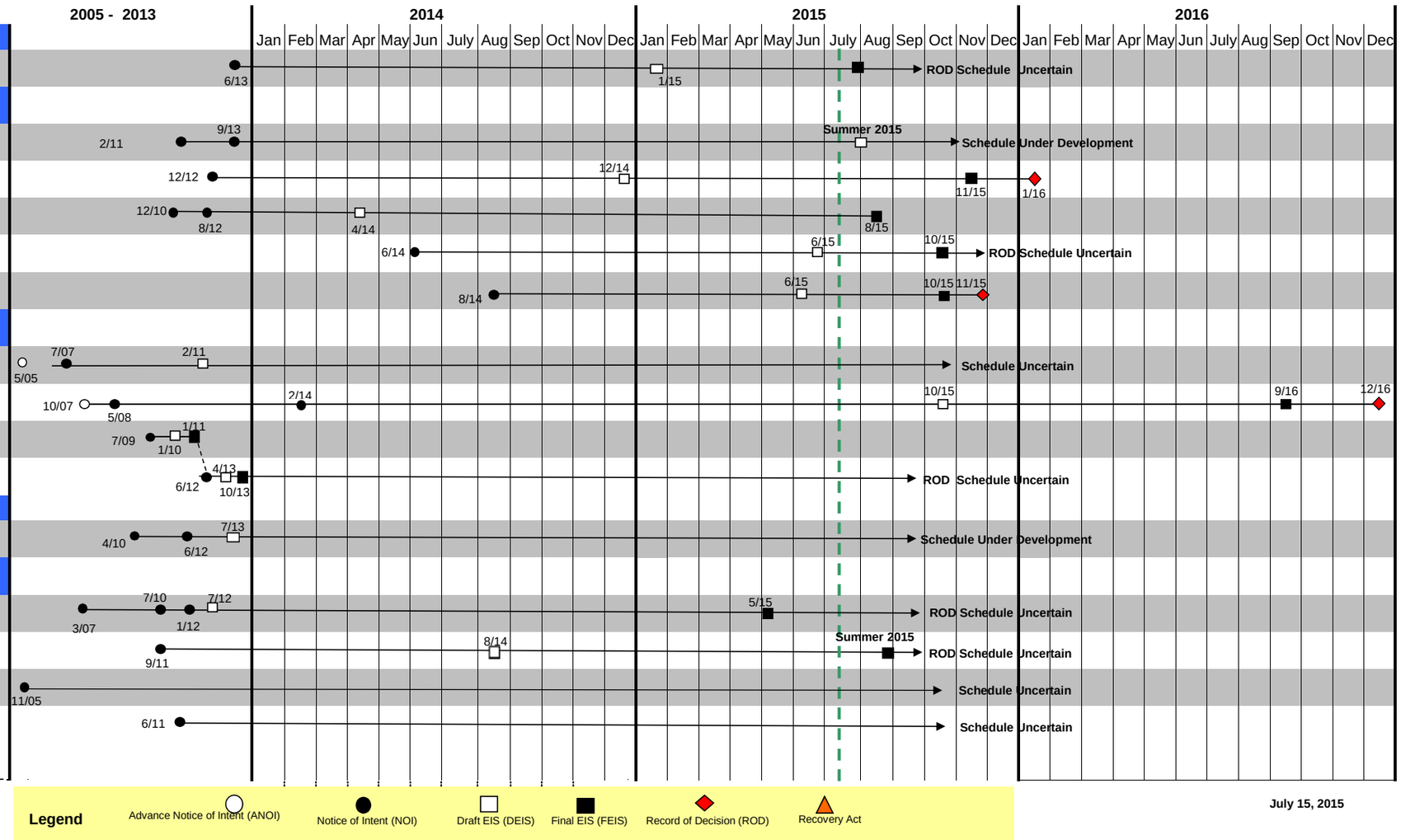

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*Chart represents anticipated activity and is not a commitment for documentation or date. Does not include Power Marketing Administrations Environmental Impact Statements.

July 15, 2015

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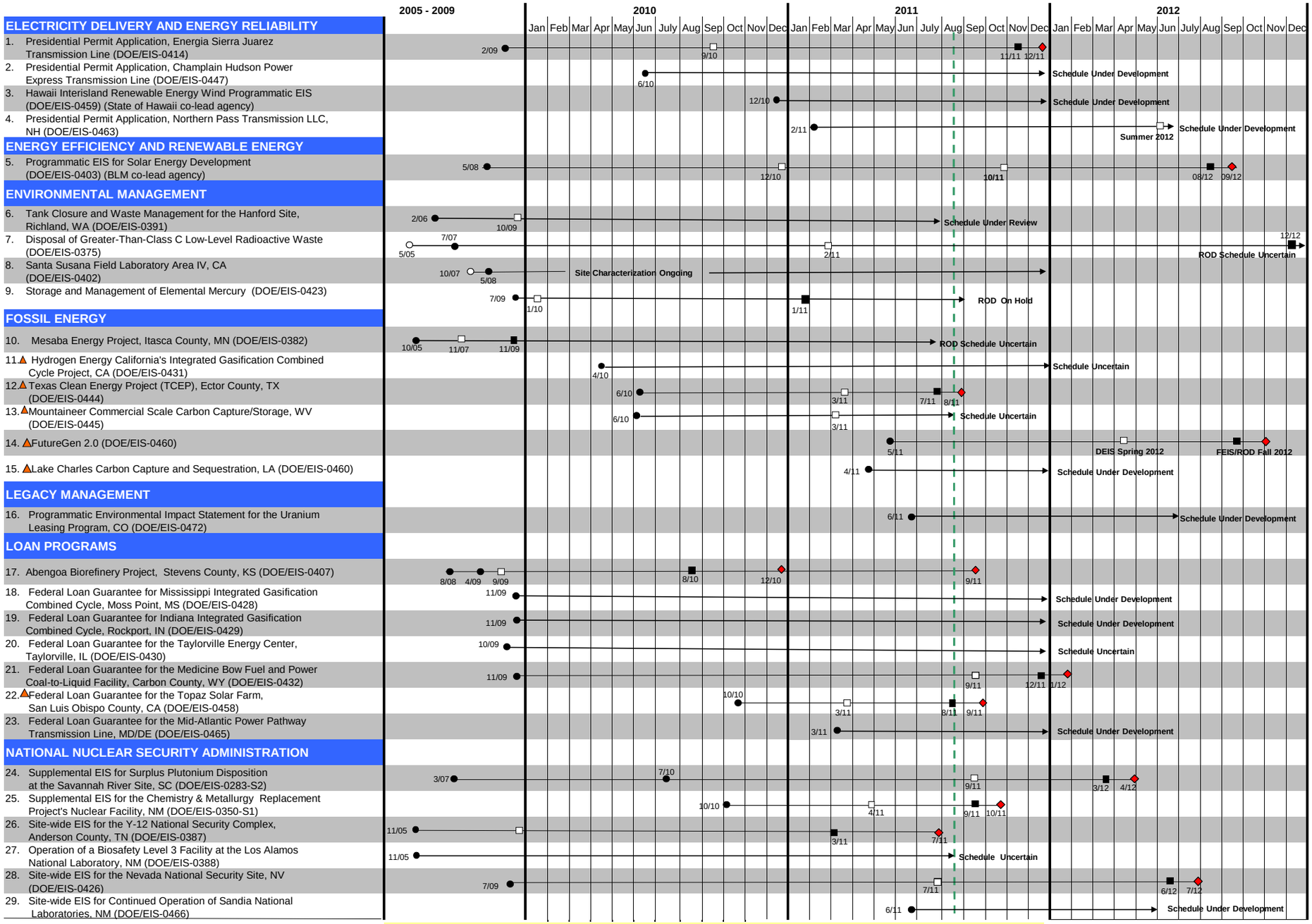

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August 15, 2011