**Agenda For Reference:**

**Thursday 8:00 am Coffee**

**Thursday 8:30 am 1. Administrative and Organizational Review**

Welcome

Antitrust Guidance

Adoption of Agenda

Adoption of Draft GEH Minutes

**Thursday 9:00 am 2. Process Review**

**Thursday 9:30 am 3. Presentations and Discussion[[1]](#footnote-1)**

NAESB WGQ Pipeline Segment

PJM

ACES Power

**Thursday 12:30 pm Lunch**

**Thursday 2:00 pm** Fidelity National Information Services

Skipping Stone

**Thursday 4:00 pm Closing Remarks and Planning for Day 2**

**Thursday 5:00 pm Suspend For the Day**

**Friday 8:00 am Coffee**

**Friday 8:30 am Call the meeting to order**

**Friday 9:00 am 3. Presentations and Discussion *(Continued)***

Environmental Defense Fund

Coalition of Energy Technology Firms

OATI, Inc.

**Friday 12:00 pm Lunch**

**Friday 1:30 pm 4. Closing Remarks and Planning for Next Meeting**

**Friday 2:00 pm 5. Adjourn**

**Day 1 Whiteboard Notes:**

**NAESB WGQ Pipeline Segment**

* Meaning of “Manual” v. Automated, with regard to
  + information transfer
  + analyses required for Scheduling
* Is there a threshold size above which a pipeline tends to automate its process?
  + factors = can’t identify which ones can be automated.
  + number of customer, types of service, tariff, equipment, number of transactions
  + also preferences of management, FERC’s minimum standards for automation, cost of instituting automation
* Shippers’ practices are not mandated by FERC. Their systems tend to be proprietary so changes introduce costs.
* Gas control capabilities vary by pipelines + gas suppliers
* “Art of Scheduling”: have the trade-offs associated with manual v. automated been analyzed?
  + Not as an industry, but done individually
* How does the “Art of Scheduling” vary according to nomination cycles?
  + It depends, most (80-90%) nominations are in timely nominations cycle, but all cycles have the need for “Art of Scheduling”
* Observation re: LDCs
  + They have to do parallel nominations/scheduling processes to accommodate varying customers’ need (since power plants sometimes are on the LDC system)
  + Important for pipelines to have discretion to address issues as they arrive.
  + Extent of automation at LDCs? It depends on size
* Question about cost implications of building more flexibility into pipeline scheduling/capability
  + Do service options and charges cover? They have to or flexible options can’t be done
  + NAESB doesn’t address prices
  + If flexibility is part of firm rate, then the customer pays for it.
* If FERC adopts a NAESB standard, it becomes mandatory
  + Mandated for the pipelines
  + NAESB standards have to reflect the variety of approaches because the industry operates under specific tariffs and NAESB standards. FERC looks to the industry to come up with standards.
  + Question of standardization and whether FERC would likely mandate standardization of entire process.
  + Recall that Canadian supplies don’t fall under FERC jurisdiction.
    - But sometimes there are reactions across the border to FERC policy
    - And vice versa
* Question RE: No-Notice services and the need for flexibility and electronic scheduling.
  + No-Notice is a firm service offering, and it has to be taken into account in scheduling.
  + Hourly (non-ratable), it has to be taken into account in scheduling
  + Limited use of hourly service towards the end of the Gas Day. Constraints relate to options available at that end or day. Scheduling on the fly. Too little time to do whole process.
  + Producers and gatherers tend to resist further automation.
* Implications on non-jurisdictional entities (e.g., Canadian firms, producers) should be taken into account.
* Question about the implementation of FERC-mandated April 2016 changes (time lines)
  + Like other implementation processes, this one still has testing, etc. Testing of whether new software, audit structures, etc. are working. How did these changes affect the business? Still a work in process.
  + Electronic part is the easy part. The business practices still need to unfold. Need time to see whether problems still exist and whether it’s working ok and we don’t need more automation.
  + It’ll take time to see the level of benefits that can be realized (and whether there are benefits).
* No one-size-fits all, with regard to
  + automation level
  + “Art of Scheduling”
* Some process = Iterative
  + Does that equate to manual?
* Process types: Do pipelines allow multiple options?
* Is there any pipeline company with entirely automated processes?
* “time is needed” before moving to further automation:
* How do practitioners of “The Art of Scheduling” remember all of the factors and variables, recognizing that not all factors and variables have to be considered if issues are resolved?
* What are the easiest versus harder parts of the process?

**PJM**

* PJM and GEH issues
  + Short-term operational issues
  + Strategic considerations
* Short-term
  + Daily review of the dispatch schedule for that day, and compare to natural gas considerations and conditions
* Changes to PJM relative to FERC Order 787
  + Earlier PJM offer deadlines
  + One impact = positive, and that’s the ability of generators to have more cycles to nominate during the later part of Gas Day.
  + Goal is to improve the reliability of gas-fired generation.
    - #1 – 42,000 MW in NG generation in the queue
    - #2 – 2,000 MW of wind in the queue
  + PJM has lots of NG-fired capacity to replace coal retirements.
  + Question about extent of automation in the electric system.
    - Highly automated optimization/scheduling with human check points
  + Evolution of the GEH issues over time:
    - Looking at curtailment priorities within zones (i.e., working with LDCs serving generators)
  + Question of whether RTOs think that more nomination cycles versus more timely/faster/automated scheduling is more important for NG availability to power plants?
    - Hard to say
    - Speed and services and more nominations all help.
  + If the timely nominations process involves 80% of the volumes then is the focus of speedier/more automated process just looking at the 20% remainder?
    - Not necessarily because the 80% is all customers. The more volatile parts of the demand actually may fall into that 20% part of the nomination process.
  + Order 787: one concern was whether early access to information could lead to market distortions.
    - Need to be careful about who receives what info and how they could use it.
  + The experience in 1/2014 was different than 2015 and now in 2016. How much are we looking ahead, or still reaching to 2014?
    - 4/2016 changes on NG side and on electric side: we need to see these play out.
  + FERC’s authorization of multi-party contracts: have generators been interested?
    - Looking for opportunities for innovative service options.
    - Generators take transportable services under various approaches (e.g., firm v. interruptible).
  + Re: gas curtailment issues and LDCs:
    - Subject to state PUCs.
    - Curtailment policies are priority of customers and system reliability.
  + Marcellus supply is game-changing
    - But generating capacity needs to come on line
    - Also flow patterns on pipeline system are changing.

**ACES Power**

* Afternoon period during which Day-Ahead awards are made on electric side and then timely cycle nominations are due is very tight.
* Rebid period (e.g., PJM) is note only tight, but also in evening, which is tough to transact gas.
* In FERCs order, the words “if necessary” should be highlighted.
* Incremental pipeline capacity is much more driven by producer demand (needing flexibility) than in the past (almost entirely LDC driven)
* In electric dispatch curve (across a day), the issue to solve is getting NG between 7am to end of day ramp down around 9-10 pm with ups?? In 4-6pm (PJM).
  + Nomination cycles are mismatch with generation output shapes and times.
  + Generators need quick start and non-ratable takes. Also need some certainty about pressures. Expect lots of variability in takes after hours. But typically, these are not firm rights on firm transport.
  + So even firm-transport contract holders need interruptible flexibility.
  + No notice is better fit, but limited and expensive offers.
* How much will the market solve this problem?
  + No analyses/studies.
* Question of whether generators provide a lot of ancillary services. Not sure how that affects demand for ‘ancillary’ gas.
* Impact of renewables?
  + Fall off of wind or solar, leads to quick drop-off of output
* Proceed with Caution.
* Past highly reliable interruptible services have been there. But as go forward, absent a solution to the interruptible issues, a 24-hour nomination cycle isn’t enough. So, there may be a gap between some changes to the nomination cycles and market responses. That would be a worry.
* Ultimately, may need to address the disconnect between generators’ requirements to maintain flexibility and the drivers of incremental capacity additions.
* Generators will still need operational flexibility on the pipeline systems –
  + Not clear whether quicker scheduling will help or hurt.
  + So the ‘if necessary’ part of the FERC Order is key. Can’t allow the loss of generators’ operational flexibility.

**Fidelity National Information Services (FIS)**

* Options for cleaning-up the confirmation process.
* Best-Efforts Nominations = in between the formal cycles on best efforts.
  + So, accept and confirm intra-cycles on best efforts. Any time in gas say until a specified time. This would be in addition to the formal cycles, not instead of…
  + Ideally, only true up in confirmations might need to be where constraints occur.
  + Standards confirmations for this.
* One single set of data for confirmations
* Fine-tune confirmations-and-scheduling windows.
  + This might reduce the efficiencies on the pipelines, but if combined with best efforts nominations, it could leave efficiencies the same.
* Remove the unsolicited confirmation option (which impedes automation and can lead to disruptions in the process anyway). The suggestion is that the Best-Efforts confirmation would eliminate the need for this.
* Create standard list of Best-Practice confirmation methods.
* Upgrade confirmation datasets to XML
  + The industry has evolved toward incorporating XML.
  + Difference of opinion about whether XML is value added.
    - Too bulky as a language
  + Not sure if it should be an opt-in v. mandate.
  + Perspective that the pipelines would see this as an extra risk in terms of one more type of data transfer that needs to be supported.
* Question: would a clean-up cycle address these issues?
  + Maybe, but if a clean-up process took place at different times on different systems, it might not be as good as a Best-Efforts approach that could be used during the day.
* Purpose of the Nomination.
  + The shipper states what he/she wants to do.
  + It’s not to true things up after the fact.
* Issue: what is the scope of what we’re doing here?
  + How does software language affect the speed and automation issues that FERC asked us to look at?
  + Response: 17 years ago, there was a suggestion that we eventually look at communications languages.
  + But already have to support three languages.

**Skipping Stone**

What are the things standing in the way of quicker nominations/scheduling process?

* 85% of Transportation contracts are ratable flows. (i.e., 1/24th of your nominated volumes in each hour)
  + Most of intraday nominations are to change from ratable to non-ratable.
* Absent vary exceptional circumstances, primary-to-primary flows = delivered.
* Most gas-fired generation is not at same level of output across 24 hours of day.
  + Small percent operates above 85% capacity factor.
* Observations
  + More gas-fired generation likes to take non-ratable service when it’s available (and to get it for free).
  + A peakier system leads them to need non-ratable service, and more intraday cycles could accommodate that.
  + Pipelines aren’t compensated for non-ratable service. When its not priced, then competitors can’t emerge. Until you get a price, you don’t have ‘products.’

Possible solutions:

* Allow pipelines to charge an hourly rate for non-ratable service (on top of firm transportation charges)
  + May not be many entities that offer it or that demand it.
  + But the option will enable discovery of whether there’s a market (with solutions maybe occurring on the electric system or gas system, or both.)
* Require pipelines to schedule non-ratable flows within hourly blocks. (With provisions for priority for secondary service). So there’s a price signal for that time block.
  + The pipeline would have to honor capacity release of shippers within these time blocks, for scheduling non-ratable flows.
* Allow the projection of pipeline-provided no-notice service across adjoining pipelines to the extent feasible.
* Allow pipelines with certain characteristics to make these new revenue stream.
  + If there are at least 500 MW of connected gas-fired generators, then they meet the test.

Greg’s Bottom line recommendation:

* Tell FERC that there’s a Fundamental gap between (A) ratable firm transportation and (B) electric generators’ demand for gas on a non-ratable basis.
  + There needs to be some way to fill in that gap.
  + This issue is more important than addressing automated process issues.
* So politely tell FERC that it asked us to answer the wrong question.
  + This other question about how to address the gap is something that should be done before automated-process questions.

Reactions:

* If people currently are contracting for a firm service but can’t get the service in practice due to lack of automated processes (e.g., after normal business day). This shouldn’t wait to be addressed.
* Some pipelines can and are offering services designed for power generation.
* Pipelines accommodate interruptible service through multiple strategies (e.g., more compression, use of storage) – but these tools that allow flexibility today won’t be there if there are not more assets brought on line through firm service.
* LDCs have issues releasing capacity obtained through no-notice services.
  + This should be addressed along with new services.
  + Not sure that NAESB should be addressing this level of change, or this subject matter as there could be administrative costs experimentation or the current services could be degraded.
* Question about whether the proposal is for mandatory offerings with regard to the number of nomination cycles in a day, or service offerings?
  + Greg: initial experiment = not grid wide. Pipelines could elect this offering including get $ for doing so. Then after some years of experience, we could figure out whether standardization is needed.
* Conceivably, the forum could identify this as a field test.
  + But other perspective is that this is out of the scope for this forum.
  + Perhaps identify this as a policy issue that FERC could address. But note this is not a standards question.
  + Perhaps these suggestions should have an airing to FERC before there’s work to standardize automation issues.
  + Experimentation with these other new services would help reveal what additional things are needed to be pursued at NAESB.
  + “If necessary” words of FERC
  + There’s some real urgency around the topic FERC asked us to focus on. So expanding the scope (as suggested by Greg) distracts from that set of urgent issues (even if people are intrigued by Greg’s ideas)
  + Strong pushback from power generators on the implicit characterization of power sector as Free Riders, in light of the plant owners’ paying for services they use.

**Day 2 Whiteboard Notes:**

**Environmental Defense Fund**

Presenter Notes:

|  |  |  |
| --- | --- | --- |
| Now | Future | PL System |
| 32% throughput on pipelines which is electric generation = 16% firm | 40% throughput on pipelines which is electric generation = 13% firm | 5% 4% |

Discussion:

* Customer orientation directs attention towards improved price formation
* Movement toward a lower carbon generating sector will lead to gas providing electric ancillary services.
* Market refinements in Eastern organized power markets are moving to financial incentives for firm fuel supply but not necessarily firm transportation.
  + Alternatives = LNG, dual fuel capacity.
* Examples for PJM regarding flows on pipelines and contracted quantities during Polar Vortex.
  + Timely quantities were lower than end-of-day quantities.
  + Delivered quantities were below contracted amounts, on some pipelines.
  + Observation that more-frequent scheduling allowed greater utilization of pipeline capacity, because of improved price formation.
* Trying to analyze the relationship between pipeline utilization levels and gas prices
  + Greater scheduling flexibility leads to lower prices
* Gas-fired generators are well situated to be able to provide ancillary services
  + So they need access to supply
  + This is occurring in a context in which electric systems (in much of the country) are becoming peakier.
  + Ancillary services are becoming more valuable while firm capacity is becoming less valuable.
* Implication for pipeline lives.
  + Renewable resources are eroding useful life of pipeline assets.
* In organized power markets, generators can’t include fixed costs into energy market
* Potentially greater opportunities for revenue in ancillary services
* Gas market needs to better harmonization with the changes in electric system

Reactions:

* Do not observe that generators are asking for more frequent scheduling because they’re being served by no-notice and non-ratable flexibility

Further reactions:

* More renewables won’t relieve the generators’ needs to have access to firm supply (especially in the traditional power systems).
  + Proceed with caution with scheduling changes
* Compressed scheduling times will lead to more conservative scheduling on some pipelines, with the implication of lower utilization.
  + Caution about the pipeline data about available capacity in PJM = there may not have been generators at that part of the system.
* Right now, many pipelines do have flexible services
* Power sector: there may be need for greater liquidity in gas transportation.
  + Also, many generators in some RTO markets (ERCOT, MISO) are in cost-of-service systems for whom firm transportation service is valuable.

LDC Reaction:

* During Polar Vortex, LDCs’ had to make choices about inventories in real time as well as over the entire system.
* So the under utilized capacity shown in data may reflect use of storage. This fact introduces noise in the data.
* Utilization levels reflect many factors besides frequency of nominations and scheduling.
* Why are the outcomes in organized electric markets the fault of gas-industry conditions?
* Why shouldn’t the RTO markets allow recovery of fixed costs?
* FERC is focused on market efficiency, and scheduling is a means.
* Examples of pipelines with extra scheduling cycles, and there’s not much use of them.

Concern that this may be scope creep but it’s still educational.

Concern about the apparent premise (in EDF’s analysis) that commercial entities aren’t responding appropriately.

* EDF recognizes that many pipelines are responding.
* But without price signals that show up to the generators, the market many not be as efficient as it could be.

Re: Scope creep

* FERC asked us for specific things to explore
* NAESB can’t address compensation or pricing issues
* This discussion focuses on policy issues, not standards.
* This group should address what it can control (i.e., NAESB’s work)
* Observation that some of these standards’ issues are affected by what the bigger policy issues. This discussion of policy issues informs whether standards are needed.

Viewpoint:

The NAESB Board will have choices

* Do nothing
* Do nothing, except to frame the issues as a message to FERC so that FERC can consider addressing them.
* Suggest to FERC that there may be opportunities for addressing standards.

Viewpoint:

* This has been helpful in building a record on these issues.
* But need to focus on the urgent issues associated with electric reliability, which underlies FERC’s discussion of scheduling.
* This is helpful to inform the question of whether standards are needed.

**Coalition of Energy Technology Firms**

Defining the Problem =

* The amount of judgment that needs to be applied in the “Art of Scheduling” is valid, but there could be aspects of the pipelines’ scheduling processes that could benefit from data analytics and automation.
* Potential for simulation-modeling approaches that could be tools that capture judgment-related factors.
* Precedents for using simulation tools for improving efficiency of operations. Examples:
  + Evacuation of Gulf workers in advance of a hurricane (with simulation to improve the collective evacuation of people given assets/practices of different producer companies).
  + Football team’s offense and defense strategies in 1st and 2nd halfs of games.
* One consideration with respect to improving scheduling is the reality of an aging workforce
  + The judgment and experience that now exists in the workforce will retire.
  + The next generation of people are computer savvy – and used to analyzing data in the context of rules/standards.
* To develop analytic model:
  + Start with the elements of the process that are in the “Art of Scheduling”
  + Then build a diagram of process, with communication links, information flows, points where judgment is applied.
  + Visualization
* Simulation tools allow for robust stress-testing to identify possible negative consequences and then use that knowledge to design approaches that avoid those outcomes.
* “Management flight simulators” can help immerse participants in a system and then let them learn how to react to changing information and conditions.
* Examples now used in the electric industry and in the gas industry.
  + Gas systems = visualized
  + Electric systems = visualized

Reaction:

* Concerns that if the industries were to rely on shorter and more frequent scheduling process, then the system might end up being operated more conservatively.
* What’s different about use of operational simulators in the electric industry and gas industry
  + The grid operator can require behaviors from the participants
  + In gas industry, you need to have the parties agree to do things.

**OATI, Inc.**

* How could the electric industry’s e-tag system work for the gas industry?
* E-tags (standards are set by NAESB for common information protocols)
* Typically used when there’s a transaction across Electric balancing areas.
* Creates a single master record to inform decisions about electric transactions across/between balancing areas.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Agent Service | → | Authority Service | → | Approval Service |
| (Human inputs) |  | (Automated record) |  | (Human decisions) |
| ↑ |  | ↑ |  | ↑ |
| Service Requester |  | Electronic Gas Scheduling |  | Entities that need to approve (parties to the transactions) |

Potential benefits of “G-tag”

* transparency
* standardization
* efficiency
* interoperability

Reaction:

* Perhaps only 10% of transactions in the gas industry have sources and sinks that are known by the confirming/scheduling parties.
* 90% of the transactions are blink to the ultimate source and sink.

Reaction:

* No pipelines can give to another party approval authority over what happens on its system.
* Liquidity is critical

Lessons learned from the electric industry:

* 20 years ago, when FERC wanted open access and greater transparency, the participants came up with myriad reasons why it couldn’t happen
* FERC said “thanks” but this is where we are going, so get on board.
* Seems to foreshadow what FERC might be looking to do in the gas industry
  + One thing, though, is in gas industry, FERC doesn’t control either the producers or the shippers and marketers.

In the electric system, the e-tag is not used to schedule flows, but rather a common communications system. It’s about uniformity of information.

How could e-tag keep up with the complexities of the electric industry’s transaction? It does, and there are parallels of complexities in the gas industry. This confidentiality involves entities that are not subject to FERC jurisdiction.

Reaction:

* e-tags are very transparent
* In gas industry, concerns about making confidential information transparent. Also, the gas industry depends on many iterative processes.
* In the gas industry, there’s gas shrinkage. (Also true in the electric side.)

Reaction:

* There could be merits about the type of approach, but it seems like there would be high transition costs. Seems like an attempt to restructure the gas industry, with real costs to customers.
* These ideas (e.g., simulation modeling, “g-tags”) are ideas for things that could help with efficiencies.

1. Each of the presenters have up to 25 minutes for presentations, followed by 30 minutes for clarifying questions, and a five minute period for transition to the next speaker. [↑](#footnote-ref-1)