Via email and posting

March 15, 2016

**TO:** NAESB Board of Directors, Gas-Electric Harmonization (GEH) Forum and Interested Parties

**cc:** NAESB Advisory Council

**FROM:** North American Energy Standards Board Office

**RE:** Work Paper for the GEH Forum Meeting – March 21-22, 2016

Dear Board Members, GEH Forum Participants and Interested Parties,

The matrix (<https://www.naesb.org/pdf4/geh032116w1.xlsx>) that is provided for this meeting was created using Excel. The data in the Excel worksheet is provided here in Word format for those of you that may be less comfortable navigating Excel. Due to the size of the worksheet, it is presented here in multiple tables, but all data in the tables are directly taken from the worksheet. The tables provided here are:

Page 1 Table 1: Description of Categories

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DESCRIPTION OF WORKSHEET FOR DISCUSSION MARCH 21-22

The Excel worksheet itemizes the issues in the order in which they were discussed on March 7-8, and places them in one or more of the twelve categories below. The worksheet is sorted by category and then by issue within each category. The discussion which was captured during the meeting is included by question (“#”) along with the wording provided at the time. Following the description of categories is a description of the questions. The questions and responses are columns in the worksheet. During out meeting the focus of discussion will be on the worksheet and any additional information that should be included.

Table 1

Table 1 is a listing of the categories and each issue is placed in one or more of the categories so that similar issues can be grouped for ease of consideration.

| Table 1 -- Description of Categories |
| --- |
| # | Title | Description |
| 1 | No-notice Service Offerings | Issues and discussion items pertaining to no-notice service offerings |
| 2 | Non-ratable Takes | Issues and discussions specific to non-ratable takes and best-efforts nominations |
| 3 | Observations | Facts or observations noted in the discussions on the presentations |
| 4 | Support for Multiple Versions of Standards | Issues and discussion items pertaining to support for multiple versions of NAESB standards, even though only one version is mandated by the FERC |
| 5 | Levels of Confirmations | Issues and discussion items pertaining to types and levels of confirmations, synchronization of processes and number of iterations, including those supporting best-efforts nominations |
| 6 | Additional Nomination Cycles | Issues and discussion items pertaining to the introduction of additional cycles for nominations and scheduling for a variety of services and the corresponding shorter processing time frames along with potential scheduling flexibility. This category may also address best-efforts processes and addressing changes to support renewable energy. |
| 7 | Scheduling Issues Surrounding Interconnects | Issues and discussion items pertaining to electronic scheduling and impacts at interconnect points |
| 8 | Access to Scheduling During Non-business Hours | Issues and discussion items pertaining to access to services during non-traditional business hours |
| 9 | Communications | Issues and discussion items pertaining to terminology used between trading partners and communication protocols |
| 10 | Inconsistencies in Electric-Industry Day-Ahead Markets | Issues and discussion items pertaining to different timing and processing of day-ahead electric markets and its impact on electronic scheduling |
| 11 | Data Issues, Data-Transfer Issues, Field Testing and Modeling | Issues and discussion items pertaining to the application of technology to electronic scheduling |
| 12 | New Service Offerings | Issues and discussion items that identified possible new service offerings that could enhance the electronic scheduling process and introduce flexibility |

Table 2

Table 2 is a listing of the “hashtags” or questions that were discussed for each issue. They are presented in the Excel worksheet as columns.

| Table 2 -- # Column Descriptions |
| --- |
| # | Description |
| 1a | This issue is within the scope of the Commission's request |
| 1b | This issue is within the scope of NAESB's purview |
| 2a | This issue could be pursued where more uniformity or streamlining would meet the Commission's request |
| 2b | This issue could be economically pursued |
| 2c | The issue could be pursued - but would benefit from waiting until more experience has been gained after the April 1st 2016 implementation of the changes to the nomination timeline |
| 3 | This issue would not benefit from a national standard, and is rather best addressed by pipelines through services individually tailored to customers' needs in light of the inherent individual operational requirements of a pipeline |
| 4 | This issue would not benefit from additional uniformity and is a potential area where, for example, tools could be used to address the Commission's request |
| 5 | This issue has policy implications that would require Commission direction before NAESB (or others) were to proceed further, or where there are other issues that stand in the way of moving forward at present |
| 6 | This issue has been identified as a statement of fact or an observation |

Notes on Table 2:

The “# Columns” are directly related to the questions posed during the discussions of each issue on March 7-8, with questions 1 an 2 separated into parts:

1. Is a discussion of this issue within the scope of the Commission’s request that “… gas and electric industries, through NAESB, explore the potential for faster, computerized scheduling when shippers and confirming parties all submit electronic nominations and confirmations, including a streamlined confirmation process if necessary?” and “… natural gas and electric industries, through NAESB, begin considering the development of standards related to faster, computerized scheduling”?
2. Is it an issue that could be pursued where more uniformity or streamlining would meet the Commission’s request?  Would it be economical and efficient to do so?  Should consideration of this issue be postponed until we have more experience and a better understanding of the impact of changing the nominations timeline which is to be implemented April 1?
3. Is this an issue where a national standard is not helpful, and it best addressed by services individually tailored to customer’s needs and reflecting individual inherent operational requirements?
4. Is this issue a topic where tools can be used to address the Commission’s request and uniformity is not helpful or is more detrimental than beneficial?
5. Is this an issue where the Commission itself should consider addressing the issue (without presuming a conclusion that the Commission would actually decide to introduce policy changes, but still entertaining the possibility that additional action may be warranted after a full record is developed)?
6. Is this an issue better described as a statement of fact or an observation?

Table 3

Table 3 is a listing of the issues by category. An issue may reside in more than one category.

| Table 3 – Issues by Category |
| --- |
| Category | Issue | Presentation |
| 1 | No-notice Service Offerings |
|  |  | 1 | No-notice needs for capacity to support anticipated usage of services purchased, which may or may not be scheduled (e.g., if no notice is not scheduled, such capacity can be made available to other shippers). This issue is one way to address the potential for greater flexibility. Pipelines forecast the amount of no-notice service they expect to provide on a next-day basis and then utilize any projected unused capacity on a interruptible basis to serve other shippers including gas fired electric generators with non-ratable demand. This is a foundational concept for Order 636. | NAESB WGQ Pipeline Segment |
|  |  | 29 | Generators rely on flexibility for a number of operational issues on the electric side. (Electric systems may require very-short periods of gas use to address perturbations on the systems, and electric systems also need to address forecasting error for flexible power-plant operations.) Interruptible services are needed because firm service doesn’t always provide for all of the flexibility attributes needed for reliability of power system operations. There are no-notice services, but they are limited. It is challenging to generators that flexibility elements of services are themselves interruptible.  | Aces Power |
| 2 | Non-ratable Takes |
|  |  | 2 | Non-ratable flexibility, both required to support services purchased and on a best efforts basis. Pipelines that offer no-notice service forecast the amount of no-notice service they expect to provide on a next-day basis and then utilize any projected unused capacity on a interruptible basis to serve other shippers including gas fired electric generators with non-ratable demand. This is a foundational concept for Order 636. | NAESB WGQ Pipeline Segment |
|  |  | 23 | For certain service types, the ability to provide a more granular (e.g., 24 hour) take pattern could alleviate/reduce reliance on intraday to achieve that take pattern. | NAESB WGQ Pipeline Segment |
|  |  | 40 | Some parties seek more opportunities to change the shape of flows over the course of a gas day so that the actual flows may differ from the 1/24th per hour rate. For example: use more nomination cycles and schedules to achieve non-ratable takes, instead of /in addition to using other tools like no-notice and hourly nomination services. | Skipping Stone |
|  |  | 42 | A field test for best-efforts scheduling may be able to give us information as to demand and utility of services supporting non-ratable service.  | Skipping Stone |
|  |  | 46 | Best-efforts scheduling could also be applied to day-ahead shaped flows. | Skipping Stone |
| 3 | Observations |
|  |  | 3 | Performance of receipt/delivery locations – off-rate (daily/hourly) | NAESB WGQ Pipeline Segment |
|  |  | 4 | Redirection of net scheduled flows resulting from nominations can occur through other portions of the pipeline | NAESB WGQ Pipeline Segment |
|  |  | 5 | Interdependent capacity changes due to location of receipts/deliveries | NAESB WGQ Pipeline Segment |
|  |  | 6 | Impact of weather on supply/demand and compressor efficiencies | NAESB WGQ Pipeline Segment |
|  |  | 7 | Pipeline line pack, pipeline storage, and third party storage(including LDC storage) levels/location in relation to supply/demand | NAESB WGQ Pipeline Segment |
|  |  | 8 | Gas quality fluctuation – heat content, etc. | NAESB WGQ Pipeline Segment |
|  |  | 9 | Backhaul/displacement reliability. Pipelines evaluate historic patterns of backhaul/displacement transactions to determine whether such transactions can be relied upon during evaluation of the following scheduling cycles. (E.g.: Can the backhaul happen? Can you keep relying on it and does it create space for forward haul?) | NAESB WGQ Pipeline Segment |
|  |  | 10 | Maintenance activities | NAESB WGQ Pipeline Segment |
|  |  | 12 | Order of applying reductions (optimization) – location v. segments, order of scheduling segments, timing of the balancing | NAESB WGQ Pipeline Segment |
|  |  | 13 |  Identification of opportunities for imbalance management | NAESB WGQ Pipeline Segment |
|  |  | 14 | Balancing of pools | NAESB WGQ Pipeline Segment |
|  |  | 15 | Flexibility of EPSQ, its level and when it should apply | NAESB WGQ Pipeline Segment |
|  |  | 24 | Operational risk assessment. Some grid operators take into consideration impacts of gas scheduling and nomination on the electric grid through routine risk assessments. | PJM |
| 4 | Support for Multiple Versions of Standards |
|  |  | 16 | Application of various NAESB versions and support provided by pipelines for several versions | NAESB WGQ Pipeline Segment |
| 5 | Levels of Confirmations |
|  |  | 17 | Levels of confirmation | NAESB WGQ Pipeline Segment |
|  |  | 19 | Manual confirmation processes | NAESB WGQ Pipeline Segment |
|  |  | 33 | Use of multiple confirmation methods in addition to traditional confirmations for intraday nominations. There is currently a~~s~~ good definition of Confirmation by Exception (CBE) in NAESB standards. CBE however, may not be available everywhere but there may also be additional confirmation methods that could benefit from standardization. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 34 | There are non-bumping best-efforts nomination opportunities with streamlined confirmations as an intra-cycle nomination subject to operating conditions of the pipeline. True-up processes at the end of the gas day are examples of best efforts. This may be necessary but not sufficient to effectuate a transaction that can be scheduled.  | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 35 | Lining up the processes and timeframes that occur within the confirmations/scheduling window to gain efficiency of data exchange.  | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 36 | Level of confirmations: there is a wide range of data elements that are exchanged, from a minimum amount to a very large set of data. In the "Art of Scheduling," pipelines confirm at different levels, with potential for disparities. Greater standardization could produce confirming efficiencies. (For example, confirm at the shipper-to-shipper level. Or, if there are confirmations at a lower level of detail, it would be driven by model type.) See issue 17 in the first presentation. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 37 | Investigate the need to define the number of iterations to support confirmation, including on a best-effort basis. Defined iterations needed to support confirmations, including best efforts. Taking a look at these issues does not necessarily presume there is a magic number of iterations, in part to changing market conditions and because of respecting the goal of maximizing flow.  | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 38 | Further standardize methods and processes (for example, standardizing time frames for the different elements of the processes) employed to support confirmations. Standardization could clarify the steps and expectations among parties surrounding default actions that may arise from different time periods in the process. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 39 | Addressing the communication of characteristics of the information in the confirmation process could require a fundamental redesign, with potential changes to make confirmations more efficient. (Reasonable) commercial confidentiality issues must be respected. Note that some pipeline practices already may include this kind of information in the confirmation process. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 56 | Compress confirmations by expediting verification of nominations. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 57 | Could eTag be applied to the gas industry to mimic the significant number of transactions processed on the power grid that use eTag in short processing windows, and if so, can it result in a streamlined scheduling process for natural gas? | OATI, Inc. |
|  |  | 58 | Are there “lessons learned” in the electric industry that could benefit the gas industry as it considers the feasibility of modifying the scheduling process to make it more efficient? | OATI, Inc. |
| 6 | Additional Nomination Cycles |
|  |  | 18 | Nomination errors requiring manual intervention for mismatches during the confirmation process | NAESB WGQ Pipeline Segment |
|  |  | 28 | Tight execution windows for gas markets | ACES Power |
|  |  | 30 | Decreasing operational flexibility provided by IT service when providing the possibility of more frequent opportunities for FT and IT through additional nominations/scheduling cycles. The status quo has certain rights and benefits that have been baked into expectations about the amount of flexibility that is available under different services. Changes ahead in either the gas or electric industries may disrupt the flexibility that has worked in the past and may not in the future.  | ACES Power |
|  |  | 31 | Coordination/timing challenges | ACES Power |
|  |  | 32 | Forcing pipelines to process quicker may decrease operational flexibility because there may be less time to determine if interruptible transportation is available. Shorter timeframes may inadvertently introduce too much rigidity. | ACES Power |
|  |  | 34 | Non-bumping best-efforts nomination opportunities with streamlined confirmations as an intra-cycle nomination subject to operating conditions of the pipeline. True up processes at the end of the gas day are examples of best efforts. This may be necessary but not sufficient to effectuate a transaction that can be scheduled.  | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 45 | Intra-cycle capacity releases may improve best efforts scheduling. Conversely best-efforts scheduling may improve the effectiveness of existing intraday capacity releases. | Skipping Stone |
|  |  | 47 |  Episodic analysis of daily flows suggests that more opportunities to schedule may provide additional flexibility to generators and electric consumers benefits.  | Environmental Defense Fund |
|  |  | 49 | As the electric system continues to evolve into a peakier and a more renewable grid, the need for enhanced scheduling and flexibility from the gas transportation system will grow.  | Environmental Defense Fund |
|  |  | 52 | How to address less time to validate nomination data that would not lead to errors or legal risks? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 53 | How to address tighter deadlines that hamper gas controllers ability to account for shifts in volume. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 54 | By adding more schedules, are tools available or currently in use that support both the gas controllers and the gas fired generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 58 | Are there “lessons learned” in the electric industry that can benefit the gas industry as it considers the feasibility of modifying the scheduling process to make it more efficient? | OATI, Inc. |
| 7 | Scheduling Issues Surrounding Interconnects |
|  |  | 11 | Physical assistance agreed upon between interconnecting parties. OBAs and similar type of arrangement (the implementing devices), seem to be working well. | NAESB WGQ Pipeline Segment |
|  |  | 20 | Availability of capacity at interconnection points. There is currently uncertainty as to impact of tighter timeframes on the scheduling of capacity for the later cycles. (At present, the schedules tend to come out early.) | NAESB WGQ Pipeline Segment |
| 8 | Access to Scheduling During Non-business Hours |
|  |  | 21 | Computerized scheduling and confirmations for nomination of subscribed services during non-traditional business hours. | NAESB WGQ Pipeline Segment |
| 9 | Communications |
|  |  | 22 | It would be desirable to have a set of terminology agreed upon by participants to characteristics shapes, profiles, ratable, non-ratable, and so forth to facilitate discussion. | NAESB WGQ Pipeline Segment |
|  |  | 25 | Communication protocols with LDCs, gas generator operators and natural gas marketing companies | PJM |
|  |  | 26 | Improve efficiency of critical information sharing (related to items 1 and 2) | PJM |
| 10 | Inconsistencies in Electric-Industry Day-Ahead Markets |
|  |  | 27 | Timing and Processing Times for Day Ahead energy markets are different across electric markets | ACES Power |
| 11 | Data Issues, Data-Transfer Issues, Field Testing and Modeling |
|  |  | 35 | Lining up the processes and timeframes that occur within the confirmations/scheduling window to gain efficiency of data exchange.  | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 36 | Level of confirmations: there is a wide range of data elements that are exchanged from a minimum amount to a very large set of data. In the Art of Scheduling, pipelines confirm at different level with potential for disparities; greater standardization could produce confirming efficiencies. (For example, confirm at the shipper to shipper level, or if you do it as a lower level of detail it would be driven by model type.) See issue 17 in the first presentation. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 38 | Further standardizing methods and processes (for example, standardizing time frames for the different elements of the processes) could be employed to support confirmations. Standardization could clarify the steps and expectations among parties surrounding default actions that may arise from different time periods in the process. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 39 | Addressing the communication of characteristics of the information in the confirmation process could require a fundamental redesign for potential changes to make confirmations more efficient. (Reasonable) commercial confidentiality issues must be respected. Note that some pipeline practices already may include this kind of information in the confirmation process. | Fidelity National Information Services (FIS - formerly SunGard) |
|  |  | 42 | A field test for best-efforts scheduling may be able to give us information as to demand and utility of services supporting non-ratable service.  | Skipping Stone |
|  |  | 50 | How to support through efficient scheduling, a better coordination of gas supplies, transport services, ISOs and RTOs needs and needs of power generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 51 | Through efficient nominations and scheduling, addressing service interruptions in the supply chain. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 52 | How to address less time to validate nomination data that would not lead to errors or legal risks? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 53 | How to address tighter deadlines that hamper gas controllers ability to account for shifts in volume? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 54 | By adding more schedules, are tools available or currently in use that support both the gas controllers and the gas fired generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 55 | Need for role playing. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 56 | Compress confirmations by expediting verification of nominations. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. | Coalition of Energy Technology Firms - EnCORE Partners, RBN Energy for support |
|  |  | 57 | Could eTag be applied to the gas industry to mimic the significant number of transactions processed on the power grid that use eTag in short processing windows, and if so, could it result in a streamlined scheduling process for natural gas? | OATI, Inc. |
| 12 | New Service Offerings |
|  |  | 41 | Would the ability to reserve current contracted primary FT capacity for use tomorrow, address issues related to inability to use FT contracts to serve intermittent electric generation? | Skipping Stone |
|  |  | 43 | Observation: the current set of firm offerings is not meeting the demands of generators in some parts of the country. The suggestion is that it is not necessary to change the existing services, but rather to add new services (for example, one could add a block of capacity, e.g. a seasonal block in which a shipper could take x quantity and y quantity for day). This is similar to the type of offering that some pipelines now offer (e.g. revenue banking). Of course physical capabilities of pipeline systems must be taken into account. | Skipping Stone |
|  |  | 44 | Volumetric service to support electric generation akin to SGS (Small Generation Service) on a best-efforts basis may meet expressed needs. | Skipping Stone |
|  |  | 48 | There could be benefits that flow from better matching the efficiency of gas scheduling to the provision of electric-market ancillary services (e.g., addressing short term imbalances, frequency regulation, flexible capacity) by gas generators. Because scheduling of gas is a process and electric ancillary services are products, it would be helpful to analyze what components of the scheduling process could be helpful in accommodating the provision of ancillary service. | Environmental Defense Fund |
|  |  | 49 | As the electric system continues to evolve into a peakier and a more renewable grid, the need for enhanced scheduling and flexibility from the gas transportation system will grow.  | Environmental Defense Fund |

Table 4

Table 4 is a listing of responses to the questions or “hashtags” for each issue within a category. The Excel worksheet includes notes for some of the responses, which are included in Table 5.

| Table 4 – Hashtag Responses |
| --- |
| Category | Issue | #1a | #1b | #2a | #2b | #2c | #3 | #4 | #5 | #6 |
| 1 | No-notice Service Offerings |
|  |  | 1 | No-notice needs for capacity to support anticipated usage of services purchased, which may or may not be scheduled (e.g., if no notice is not scheduled, such capacity can be made available to other shippers). This issue is one way to address the potential for greater flexibility. Pipelines forecast the amount of no-notice service they expect to provide on a next-day basis and then utilize any projected unused capacity on a interruptible basis to serve other shippers including gas fired electric generators with non-ratable demand. This is a foundational concept for Order 636. | X | X | X | X | X | X |  |  | X |
|  |  | 29 | Generators rely on flexibility for a number of operational issues on the electric side. (Electric systems may require very-short periods of gas use to address perturbations on the systems, and electric systems also need to address forecasting error for flexible power-plant operations.) Interruptible services are needed because firm service doesn’t always provide for all of the flexibility attributes needed for reliability of power system operations. There are no-notice services, but they are limited. It is challenging to generators that flexibility elements of services are themselves interruptible.  | X | X | X | X | X | X |  |  | X |
| 2 | Non-ratable Takes |
|  |  | 2 | Non-ratable flexibility, both required to support services purchased and on a best efforts basis. Pipelines that offer no-notice service forecast the amount of no-notice service they expect to provide on a next-day basis and then utilize any projected unused capacity on a interruptible basis to serve other shippers including gas fired electric generators with non-ratable demand. This is a foundational concept for Order 636. | X | X | X | X | X |  |  | X |  |
|  |  | 23 | For certain service types, the ability to provide a more granular (e.g., 24 hour) take pattern could alleviate/reduce reliance on intraday to achieve that take pattern. | X | X | X | X | X | X |  |  |  |
|  |  | 40 | Some parties seek more opportunities to change the shape of flows over the course of a gas day so that the actual flows may differ from the 1/24th per hour rate. For example: use more nomination cycles and schedules to achieve non-ratable takes, instead of /in addition to using other tools like no-notice and hourly nomination services. |  |  |  |  |  |  |  |  | X |
|  |  | 42 | A field test for best-efforts scheduling may be able to give us information as to demand and utility of services supporting non-ratable service.  |  |  | X | X | X |  | X |  |  |
|  |  | 46 | Best-efforts scheduling could also be applied to day-ahead shaped flows. |  |  |  |  |  | X |  | X |  |
| 3 | Observations |
|  |  | 3 | Performance of receipt/delivery locations – off-rate (daily/hourly) |  |  |  |  |  |  |  |  | X |
|  |  | 4 | Redirection of net scheduled flows resulting from nominations can occur through other portions of the pipeline |  |  |  |  |  |  |  |  | X |
|  |  | 5 | Interdependent capacity changes due to location of receipts/deliveries |  |  |  |  |  |  |  |  | X |
|  |  | 6 | Impact of weather on supply/demand and compressor efficiencies |  |  |  |  |  |  |  |  | X |
|  |  | 7 | Pipeline line pack, pipeline storage, and third party storage(including LDC storage) levels/location in relation to supply/demand |  |  |  |  |  |  |  |  | X |
|  |  | 8 | Gas quality fluctuation – heat content, etc. |  |  |  |  |  |  |  |  | X |
|  |  | 9 | Backhaul/displacement reliability. Pipelines evaluate historic patterns of backhaul/displacement transactions to determine whether such transactions can be relied upon during evaluation of the following scheduling cycles. (E.g.: Can the backhaul happen? Can you keep relying on it and does it create space for forward haul?) |  |  |  |  |  |  |  |  | X |
|  |  | 10 | Maintenance activities |  |  |  |  |  |  |  |  | X |
|  |  | 12 | Order of applying reductions (optimization) – location v. segments, order of scheduling segments, timing of the balancing |  |  |  |  |  |  |  |  | X |
|  |  | 13 |  Identification of opportunities for imbalance management |  |  |  |  |  |  |  |  | X |
|  |  | 14 | Balancing of pools |  |  |  |  |  |  |  |  | X |
|  |  | 15 | Flexibility of EPSQ, its level and when it should apply |  |  |  |  |  |  |  |  | X |
|  |  | 24 | Operational risk assessment. Some grid operators take into consideration impacts of gas scheduling and nomination on the electric grid through routine risk assessments. |  |  |  |  |  |  |  |  | X |
| 4 | Support for Multiple Versions of Standards |
|  |  | 16 | Application of various NAESB versions and support provided by pipelines for several versions |  |  |  |  |  |  |  |  | X |
| 5 | Levels of Confirmations |
|  |  | 17 | Levels of confirmation | X | X | X | X | X | X |  |  | X |
|  |  | 19 | Manual confirmation processes | X | X | X | X | X |  |  |  | X |
|  |  | 33 | Use of multiple confirmation methods in addition to traditional confirmations for intraday nominations. There is currently a~~s~~ good definition of Confirmation by Exception (CBE) in NAESB standards. CBE however, may not be available everywhere but there may also be additional confirmation methods that could benefit from standardization. | X | X | X | X | X |  |  |  | X |
|  |  | 34 | There are non-bumping best-efforts nomination opportunities with streamlined confirmations as an intra-cycle nomination subject to operating conditions of the pipeline. True-up processes at the end of the gas day are examples of best efforts. This may be necessary but not sufficient to effectuate a transaction that can be scheduled.  | X | X | X | X | X | X |  |  |  |
|  |  | 35 | Lining up the processes and timeframes that occur within the confirmations/scheduling window to gain efficiency of data exchange.  | X | X | X | X | X | X |  |  |  |
|  |  | 36 | Level of confirmations: there is a wide range of data elements that are exchanged, from a minimum amount to a very large set of data. In the "Art of Scheduling," pipelines confirm at different levels, with potential for disparities. Greater standardization could produce confirming efficiencies. (For example, confirm at the shipper-to-shipper level. Or, if there are confirmations at a lower level of detail, it would be driven by model type.) See issue 17 in the first presentation. |  |  | X | X | X | X |  |  | X |
|  |  | 37 | Investigate the need to define the number of iterations to support confirmation, including on a best-effort basis. Defined iterations needed to support confirmations, including best efforts. Taking a look at these issues does not necessarily presume there is a magic number of iterations, in part to changing market conditions and because of respecting the goal of maximizing flow.  | X | X | X | X | X | X |  |  |  |
|  |  | 38 | Further standardize methods and processes (for example, standardizing time frames for the different elements of the processes) employed to support confirmations. Standardization could clarify the steps and expectations among parties surrounding default actions that may arise from different time periods in the process. | X | X | X | X | X | X |  |  |  |
|  |  | 39 | Addressing the communication of characteristics of the information in the confirmation process could require a fundamental redesign, with potential changes to make confirmations more efficient. (Reasonable) commercial confidentiality issues must be respected. Note that some pipeline practices already may include this kind of information in the confirmation process. | X | X | X | X | X | X |  |  |  |
|  |  | 56 | Compress confirmations by expediting verification of nominations. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 57 | Could eTag be applied to the gas industry to mimic the significant number of transactions processed on the power grid that use eTag in short processing windows, and if so, can it result in a streamlined scheduling process for natural gas? | X | X | X | X | X |  | X |  |  |
|  |  | 58 | Are there “lessons learned” in the electric industry that could benefit the gas industry as it considers the feasibility of modifying the scheduling process to make it more efficient? |  |  |  |  |  |  | X |  | X |
| 6 | Additional Nomination Cycles |
|  |  | 18 | Nomination errors requiring manual intervention for mismatches during the confirmation process | X | X | X | X | X |  |  |  | X |
|  |  | 28 | Tight execution windows for gas markets |  |  |  |  |  | X |  |  | X |
|  |  | 30 | Decreasing operational flexibility provided by IT service when providing the possibility of more frequent opportunities for FT and IT through additional nominations/scheduling cycles. The status quo has certain rights and benefits that have been baked into expectations about the amount of flexibility that is available under different services. Changes ahead in either the gas or electric industries may disrupt the flexibility that has worked in the past and may not in the future.  | X | X | X | X | X | X |  |  | X |
|  |  | 31 | Coordination/timing challenges | X | X |  |  |  |  |  |  | X |
|  |  | 32 | Forcing pipelines to process quicker may decrease operational flexibility because there may be less time to determine if interruptible transportation is available. Shorter timeframes may inadvertently introduce too much rigidity. | X | X | X | X | X | X |  |  | X |
|  |  | 34 | Non-bumping best-efforts nomination opportunities with streamlined confirmations as an intra-cycle nomination subject to operating conditions of the pipeline. True up processes at the end of the gas day are examples of best efforts. This may be necessary but not sufficient to effectuate a transaction that can be scheduled.  | X | X | X | X | X | X |  |  |  |
|  |  | 45 | Intra-cycle capacity releases may improve best efforts scheduling. Conversely best-efforts scheduling may improve the effectiveness of existing intraday capacity releases. |  |  |  |  |  | X |  | X |  |
|  |  | 47 |  Episodic analysis of daily flows suggests that more opportunities to schedule may provide additional flexibility to generators and electric consumers benefits.  | X | X |  |  |  |  |  |  | X |
|  |  | 49 | As the electric system continues to evolve into a peakier and a more renewable grid, the need for enhanced scheduling and flexibility from the gas transportation system will grow.  | X | X | X | X | X |  |  | X |  |
|  |  | 52 | How to address less time to validate nomination data that would not lead to errors or legal risks? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 53 | How to address tighter deadlines that hamper gas controllers ability to account for shifts in volume. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 54 | By adding more schedules, are tools available or currently in use that support both the gas controllers and the gas fired generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 58 | Are there “lessons learned” in the electric industry that can benefit the gas industry as it considers the feasibility of modifying the scheduling process to make it more efficient? |  |  |  |  |  |  | X |  |  |
| 7 | Scheduling Issues Surrounding Interconnects |
|  |  | 11 | Physical assistance agreed upon between interconnecting parties. OBAs and similar type of arrangement (the implementing devices), seem to be working well. |  |  |  |  |  | X |  | X |  |
|  |  | 20 | Availability of capacity at interconnection points. There is currently uncertainty as to impact of tighter timeframes on the scheduling of capacity for the later cycles. (At present, the schedules tend to come out early.) | X | X | X | X | X |  |  |  |  |
| 8 | Access to Scheduling During Non-business Hours |
|  |  | 21 | Computerized scheduling and confirmations for nomination of subscribed services during non-traditional business hours. | X | X | X | X | X |  |  |  |  |
| 9 | Communications |
|  |  | 22 | It would be desirable to have a set of terminology agreed upon by participants to characteristics shapes, profiles, ratable, non-ratable, and so forth to facilitate discussion. | X | X | X | X | X |  |  |  |  |
|  |  | 25 | Communication protocols with LDCs, gas generator operators and natural gas marketing companies |  |  |  |  |  |  |  |  | X |
|  |  | 26 | Improve efficiency of critical information sharing (related to items 1 and 2) | X | X | X | X | X | X |  |  |  |
| 10 | Inconsistencies in Electric-Industry Day-Ahead Markets |
|  |  | 27 | Timing and Processing Times for Day Ahead energy markets are different across electric markets |  |  |  |  |  |  |  |  | X |
| 11 | Data Issues, Data-Transfer Issues, Field Testing and Modeling |
|  |  | 35 | Lining up the processes and timeframes that occur within the confirmations/scheduling window to gain efficiency of data exchange.  | X | X | X | X | X | X |  |  |  |
|  |  | 36 | Level of confirmations: there is a wide range of data elements that are exchanged from a minimum amount to a very large set of data. In the Art of Scheduling, pipelines confirm at different level with potential for disparities; greater standardization could produce confirming efficiencies. (For example, confirm at the shipper to shipper level, or if you do it as a lower level of detail it would be driven by model type.) See issue 17 in the first presentation. |  |  | X | X | X | X |  |  | X |
|  |  | 38 | Further standardizing methods and processes (for example, standardizing time frames for the different elements of the processes) could be employed to support confirmations. Standardization could clarify the steps and expectations among parties surrounding default actions that may arise from different time periods in the process. | X | X | X | X | X | X |  |  |  |
|  |  | 39 | Addressing the communication of characteristics of the information in the confirmation process could require a fundamental redesign for potential changes to make confirmations more efficient. (Reasonable) commercial confidentiality issues must be respected. Note that some pipeline practices already may include this kind of information in the confirmation process. | X | X | X | X | X | X |  |  |  |
|  |  | 42 | A field test for best-efforts scheduling may be able to give us information as to demand and utility of services supporting non-ratable service.  |  |  | X | X | X |  | X |  |  |
|  |  | 50 | How to support through efficient scheduling, a better coordination of gas supplies, transport services, ISOs and RTOs needs and needs of power generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 51 | Through efficient nominations and scheduling, addressing service interruptions in the supply chain. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 52 | How to address less time to validate nomination data that would not lead to errors or legal risks? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 53 | How to address tighter deadlines that hamper gas controllers ability to account for shifts in volume? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 54 | By adding more schedules, are tools available or currently in use that support both the gas controllers and the gas fired generators? Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 55 | Need for role playing. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 56 | Compress confirmations by expediting verification of nominations. Using simulation to recreate “The Art of Scheduling” tools of software models could support more efficient and effective decision making. |  |  |  |  |  |  | X |  |  |
|  |  | 57 | Could eTag be applied to the gas industry to mimic the significant number of transactions processed on the power grid that use eTag in short processing windows, and if so, could it result in a streamlined scheduling process for natural gas? | X | X | X | X | X |  | X |  |  |
| 12 | New Service Offerings |
|  |  | 41 | Would the ability to reserve current contracted primary FT capacity for use tomorrow, address issues related to inability to use FT contracts to serve intermittent electric generation? |  |  |  |  |  | X |  | X |  |
|  |  | 43 | Observation: the current set of firm offerings is not meeting the demands of generators in some parts of the country. The suggestion is that it is not necessary to change the existing services, but rather to add new services (for example, one could add a block of capacity, e.g. a seasonal block in which a shipper could take x quantity and y quantity for day). This is similar to the type of offering that some pipelines now offer (e.g. revenue banking). Of course physical capabilities of pipeline systems must be taken into account. |  |  |  |  |  | X |  | X |  |
|  |  | 44 | Volumetric service to support electric generation akin to SGS (Small Generation Service) on a best-efforts basis may meet expressed needs. |  |  |  |  |  | X |  | X |  |
|  |  | 48 | There could be benefits that flow from better matching the efficiency of gas scheduling to the provision of electric-market ancillary services (e.g., addressing short term imbalances, frequency regulation, flexible capacity) by gas generators. Because scheduling of gas is a process and electric ancillary services are products, it would be helpful to analyze what components of the scheduling process could be helpful in accommodating the provision of ancillary service. | X | X | X | X | X | X |  | X |  |
|  |  | 49 | As the electric system continues to evolve into a peakier and a more renewable grid, the need for enhanced scheduling and flexibility from the gas transportation system will grow.  | X | X | X | X | X |  |  | X |  |

Table 5

Table 5 is a listing of the comments that were provided with the “hashtags” or question responses.

| Table 5 -- Comments Provided with # Responses |
| --- |
| Category | Issue | Hashtag | Comment |
| 1 | 1 | #1a | Different viewpoints about it being in scope |
|  |  | #1b | Different viewpoints about it being in scope |
|  |  | #2a | If scheduling were faster, there could be efficiencies - but at what cost? |
|  |  | #2b | If scheduling were faster, there could be efficiencies - but at what cost? |
|  |  | #2c | If scheduling were faster, there could be efficiencies - but at what cost? |
|  |  | #3 | This is a service-related issue |
|  |  | #6 | This is a statement of fact. |
| 1 | 29 | #1a | Different view points about it being in scope |
|  |  | #1b | Different view points about it being in scope |
|  |  | #2a | Caution may be appropriate about the timing of any NAESB discussions of this issue. |
|  |  | #2b | Caution may be appropriate about the timing of any NAESB discussions of this issue. |
|  |  | #2c | Caution may be appropriate about the timing of any NAESB discussions of this issue. |
|  |  | #3 | This may not be a NAESB issue. |
| 2 | 2 | #1a | In scope/out of scope. For example, for at least one shipper and one pipeline, even when firm non-ratable service is purchased from a pipeline a shipper cannot utilize it outside of business hours. |
|  |  | #1b | In scope/out of scope. For example, for at least one shipper and one pipeline, even when firm non-ratable service is purchased from a pipeline a shipper cannot utilize it outside of business hours. |
|  |  | #2a | Different pipelines have different tariff filings and offerings under the 636 framework, based on physical characteristics of the pipeline and other things. While standards development could facilitate a market mechanism for a price formation, there would need to be new policy articulated by FERC based on the degree of coordination between gas and electric industries. |
|  |  | #2b | Different pipelines have different tariff filings and offerings under the 636 framework, based on physical characteristics of the pipeline and other things. While standards development could facilitate a market mechanism for a price formation, there would need to be new policy articulated by FERC based on the degree of coordination between gas and electric industries. |
|  |  | #2c | Different pipelines have different tariff filings and offerings under the 636 framework, based on physical characteristics of the pipeline and other things. While standards development could facilitate a market mechanism for a price formation, there would need to be new policy articulated by FERC based on the degree of coordination between gas and electric industries. |
|  |  | #5 | Different pipelines have different tariff filings and offerings under the 636 framework. While standards development could facilitate a market mechanism for a price formation, there would need to be new policy articulated by FERC based on the degree of coordination between gas and electric industries. |
| 4 | 17 | #1a | In scope (due to potential for efficiencies). But anything that decreases operational control (for example, at the city gate, or at other interconnecting points of parties) may introduce complications and degrade reliability in other parts of the delivery chain. There are other issues similarly raised upstream/downstream with respect to level of services (for example, difference between firm and interruptible services at interconnections). |
|  |  | #1b | In scope (due to potential for efficiencies). But anything that decreases operational control (for example, at the city gate, or at other interconnecting points of parties) may introduce complications and degrade reliability in other parts of the delivery chain. There are other issues similarly raised upstream/downstream with respect to level of services (for example, difference between firm and interruptible services at interconnections). |
|  |  | #2a | Note that anything that decreases operational control (for example, at the city gate, or at other interconnecting points of parties) may introduce complications and degrade reliability in other parts of the delivery chain. |
|  |  | #2b | Note that anything that decreases operational control (for example, at the city gate, or at other interconnecting points of parties) may introduce complications and degrade reliability in other parts of the delivery chain. |
|  |  | #2c | Note that anything that decreases operational control (for example, at the city gate, or at other interconnecting points of parties) may introduce complications and degrade reliability in other parts of the delivery chain. |
| 5 | 19 | #1a | In scope |
|  |  | #1b | In scope |
|  |  | #2a | Let’s see what happens after considerable post April 2016 experience with respect to using that experience to determine the relative benefits of changing timeline vs. adding cycles. Any further scheduling frequency or opportunities outside of grid-wide opportunities are likely to be manual. There are many other considerations that do not involve additional cycles or manual processes. |
|  |  | #2b | Let’s see what happens after considerable post April 2016 experience with respect to using that experience to determine the relative benefits of changing timeline vs. adding cycles. Any further scheduling frequency or opportunities outside of grid-wide opportunities are likely to be manual. There are many other considerations that do not involve additional cycles or manual processes. |
|  |  | #2c | Let’s see what happens after considerable post April 2016 experience with respect to using that experience to determine the relative benefits of changing timeline vs. adding cycles. Any further scheduling frequency or opportunities outside of grid-wide opportunities are likely to be manual. There are many other considerations that do not involve additional cycles or manual processes. |
| 6 | 18 | #2a | Need to understand the implications of compressed time for the amount of time available for scheduling and confirmation (and the implication for errors) in order to answer the basic question of whether further efficiencies occur and whether efficiencies gained are sufficient to create an additional cycle. |
|  |  | #2b | Need to understand the implications of compressed time for the amount of time available for scheduling and confirmation (and the implication for errors) in order to answer the basic question of whether further efficiencies occur and whether efficiencies gained are sufficient to create an additional cycle. |
|  |  | #2c | Need to understand the implications of compressed time for the amount of time available for scheduling and confirmation (and the implication for errors) in order to answer the basic question of whether further efficiencies occur and whether efficiencies gained are sufficient to create an additional cycle. |
| 7 | 11 | #3 | In light of the practice in which parties provide collaborative physical assistance, national standards may not be helpful. In light of this collaborative assistance, when un-priced due to the current nature of OBAs, this may also frustrate standardization. On the other hand, when it is priced between pipelines it might not occur as often as under informal arrangements, with potential impacts on reliability. There are complex interactions and potential consequences for these trade-offs. Additionally there are regulations surrounding emergency situations and care should be taken to avoid disrupting those capabilities. |
|  |  | #5 | In light of the practice in which parties provide collaborative physical assistance, national standards may not be helpful. In light of this collaborative assistance, when un-priced due to the current nature of OBAs, this may also frustrate standardization. On the other hand, when it is priced between pipelines it might not occur as often as under informal arrangements, with potential impacts on reliability. There are complex interactions and potential consequences for these trade-offs. Additionally there are regulations surrounding emergency situations and care should be taken to avoid disrupting those capabilities. |