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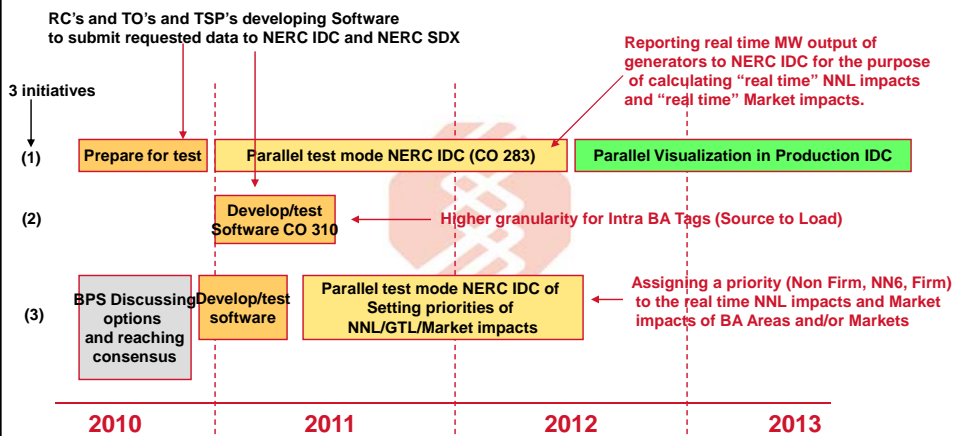
# Parallel Flow Visualization project NERC / NAESB

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## Parallel Flow Visualization/Mitigation Proposal

- **The Parallel Flow Visualization/Mitigation Project consists of 3 initiatives:**
  - **Reporting real time MW output** of generators to NERC IDC for the purpose of calculating “real time” NNL impacts (Gen to Load impacts of Non-Markets) and Market impacts. (NERC / NERC IDC WG initiative)  
Update frequency of real time data submission to IDC 15 minutes.  
OATI developed software based on NERC IDC Change Order CO 283 to be completed and implemented in pilot mode Fall 2010.
  - **Higher granularity for Intra BA Tags (Source to Load)** that will allow NERC IDC to assign a relief obligation and curtailment to Intra BA Tags.  
Covered by NERC IDC Change Order CO 310 to be implemented in 2011.
  - **Reporting the priority of the MW output** of resources to IDC for purpose of assigning a priority (Non Firm, NN6, Firm) to the real time NNL impacts and Market impacts of BA Areas and/or Markets on flow gates.  
Three possible options of calculating priorities are considered by NAESB Business Practices Subcommittee (BPS). No resolution yet.

## Parallel Flow Visualization/Mitigation Proposal Anticipated Time line



Impact of Parallel Flow Visualization Project on Joint Operating Agreements (JOA) and Congestion Management Process (CMP)

- The Parallel Flow Visualization/Mitigation Project once implemented in production, **will replace parts** of the JOA/CMP related to the calculation of Market Flows, calculation of NNL Firm Buckets, splitting up Market Flow in priorities.
- There is even discussion amongst JOA/CMP Entities to **completely remove the Allocation process** from the JOA/CMP and rely for the evaluation of TSR's on accurate AFC calculations performed by each TSP in compliance with MOD Standards that will be enforced by FERC Order 729 and 676E effective 1/1/2011.
- The MOD Standards by itself will replace parts of the data exchange requirements of the JOA/CMP.

# Overview Parallel Flow Visualization project NERC / NAESB

## Parallel Flow Visualization/Mitigation Proposal

### Current situation.

- **Markets (SPP, PJM, MISO)** report real time Market impacts and next hour Market impacts to NERC IDC for all their flow gates and for the identified Reciprocal flow gates. NERC IDC calculates relief obligations for Markets based off the reported Market Flow impacts in case of TLR event.
- For **non-Market BA's** NERC IDC calculates the NNL impacts based off a static power flow model. All NNL impacts are **considered Firm**.

### New situation.

- Markets and non-Markets report their **real time** and next hour (best estimate) **generation levels (MW)** to NERC IDC with the priority of the resource specific MW or priority of flow gate impacts and NERC IDC will translate the real time and next hour generation levels into Market Flow impacts and NNL impacts on flow gates.
  - Reporting of real time output of generators will be a requirement of the RC function.
  - Reporting of the priority of the MW of resources and/or priority of the impacts on flow gates will be a responsibility of the TSP.

## Parallel Flow Visualization/Mitigation Proposal Why this initiative?

- Replacing the current native and network load (NNL) calculation made in the IDC with the reporting of near real-time flows **addresses three major issues**:
  - NNL calculation made in IDC is used when Transmission Loading Relief Level 5 (TLR 5) is called requesting firm curtailments. Use of static data in NNL calculation produces **questionable results**, delays in calling TLR 5.
  - RCs in Eastern Interconnection (EI) **lack visualization** as to the source and magnitude of parallel flows when they experience congestion.
  - IDC NNL calculation currently assumes **all GTL impacts are firm** and can only be curtailed on a pro-rata basis during TLR 5.

## Parallel Flow Visualization/Mitigation Proposal Why this initiative?

- NNL calculation in the IDC relies heavily on operating information submitted to the SDX to model system conditions. There is **no NERC requirement that operating data** be submitted to the SDX.
- **Default assumptions** are used where operating information is missing (i.e. generator outages, load and net scheduled interchange).
- There must be a total of 20 MW or more generation at a bus in order to have NNL impacts determined. Current IDC logic **“ignores” impact of generation less than 20 MW.**
- Because NNL calculation is made on an on-demand basis, RCs must **adjust the static data to improve the NNL relief** obligation. This can delay calling TLR 5 anywhere from 30 to 45 minutes.
- Because NNL calculation is made on an on-demand basis, there is no real-time view of GTL parallel flows. There is **no historical archive** of NNL impacts that could be reviewed on an after-the-fact basis.

## Parallel Flow Visualization/Mitigation Proposal Why this initiative?

- For TSPs that are subject to an OATT, designated resources are considered firm use of the transmission system. Non-designated resources are considered non-firm use of the transmission system.
- The IDC is **unable to assign relief obligations to non-firm GTL impacts** during TLR. If a non-designated resource is below the 20 MW threshold, transmission usage is treated firmer than firm.
- Tagging these non-firm uses is **not effective since the IDC lacks the granularity to determine tag impacts of intra-BA transactions.**
- Instances where non-firm transmission service is used to serve load within the BA:
  - Non-designated resources that are being used to serve load inside the BA have the highest priority of non-firm service (Priority 6-NN).
  - Renewable resources that have elected to use non-firm transmission service to deliver to load inside the BA.
  - Qualifying facilities that are delivering to load within the BA.

## Parallel Flow Visualization/Mitigation Proposal NERC involvement

- A comprehensive **parallel flow motion was approved** at the May 6, 2009 ORS meeting. It provided direction to the IDC Working Group (IDCWG) to develop a final set of requirements, to seek revised vendor estimates and to prepare a recommendation that would be reviewed at the November 18, 2009 ORS meeting.
- The ORS addressed a number of issues on the approach to be taken:
  - A **single vendor** will make the GTL calculation for all RCs in the EI.
  - The three **RTOs** (Midwest ISO, PJM and SPP) that currently report their market flows to the IDC will **replace their own calculation** with the vendor calculation.
  - A staged implementation of the new software where it would **run in parallel test mode with the existing IDC for 12-18 months**. There will be a set of reliability metrics that demonstrate an improvement over the NNL calculation before changing to the new software.

## Parallel Flow Visualization/Mitigation Proposal NERC involvement

- The IDCWG has held a number of meetings on the parallel flow visualization process.
  - OATI developed IDC CO 283 (Rev 3) with the latest IDC changes for parallel flow visualization.
  - The IDCWG presented data requirements at the September 23, 2009, ORS meeting and OATI CO 283 at the November 18, 2009, ORS meeting.
- The ORS approved the following timeline for moving forward with the parallel flow visualization project:
  - February 1, 2010 – Functional Specification completed.
  - March 1, 2010 – Initial Face-to-Face meeting of the IT group.
  - March 1, 2010 – XSD Completed.
  - April 1, 2010 – Each RC will identify all submitting entities within their footprint.
  - May 1, 2010 – Open for registration and login.
  - Note: Testing will take place in parts (Application, Graphical User Interface and IT Teams).
  - May 10, 2010 – First entity begins submitting data at fifteen minute periodicity.
  - July 26, 2010 – All submitting entities (RC's or BA's under their purview) should be capable of submitting all data at the fifteen minute periodicity. (Can connect and establish a data interface. Validation of interface is established. Data quality evaluation can begin).
  - August 23, 2010 – Full Load Data Testing (All Entities are submitting all data correctly). Submittal of full data set at the fifteen minute periodicity. Test submittals would be made the existing hardware until the new hardware is procured.
  - September 20, 2010 – Training Begins (40-45 Day Allowance) / Training Environment CD Creation and Webex follow-up sessions.
  - November 1, 2010 – Parallel Operation Date.

## Parallel Flow Visualization/Mitigation Proposal NAESB involvement

- The NAESB Annual Plan included a line item on Future Path of TLR. An accompanying white paper described two phases of this initiative:
  - The first phase involves enhancements to the TLR reporting process to provide near real-time GTL reporting by all RCs in the EI similar to Midwest ISO, PJM and SPP.
  - The second phase involves enhancements to the TLR curtailment process to replace the “share the pain” approach with an approach that is more efficient in managing congestion. The second phase is dependent on completion of the first phase.
- The line item was originally included in the NAESB 2008 Annual Plan was carried forward into the NAESB 2009 and 2010 Annual Plans.

## Parallel Flow Visualization/Mitigation Proposal NAESB Involvement

- The NAESB Business Practices Subcommittee (BPS) was assigned responsibility for the development of a mechanism that assigns priorities to GTL.
- The BPS has been working closely with the IDCWG to make sure whatever mechanism is developed, it will be compatible with the data reporting requirements of the IDC.
- The BPS has held several meetings and conference calls to review alternate approaches on the assignment of GTL priorities. The goal is to have an approach ready by June 2010 to meet the parallel operation start date of November 1, 2010.
- The BPS passed a motion on December 8, 2009, stating a single approach (for both markets and non-markets) will be used during parallel operations. Acceptance criteria will be developed and data will be gathered during parallel operation to assess the appropriateness of the approach. Failing to meet the acceptance criteria could result in the creation of a new approach.
- The BPS is considering three alternate approaches to assign GTL priorities:
  - Generator prioritization approach. (Ed Skiba MISO is the lead of this Task force)
  - Flowgate allocations approach. (Tom Mallinger MISO is the lead of this Task force)
  - Tag everything approach (Jim Busbin, Southern is the lead of this Task force)

## Parallel Flow Visualization/Mitigation Proposal

- ***Problem Statement for each of the 3 task forces of the NAESB Business Practices Subcommittee (BPS) that need to work out an option to determine priorities of NNL, GTL, Market impacts:***
  - Each work group will develop a mechanism to assign **priorities of generation to load impacts** that will be used in the IDC to **assign relief obligations** during TLR. The NERC ORS has approved modifications to the IDC to collect data and make a centralized generation to load impact calculation. In order for the IDC to curtail these impacts on a pro-rata basis along with tags, appropriate priorities must be assigned to these generation-to-load impacts.

## Parallel Flow Visualization/Mitigation Proposal NAESB Involvement

- **Anticipated time line NAESB Business Practices Subcommittee (BPS) effort:**
  - May – June 2010 working out details of the 3 possible options of assigning a priority to NNL and Market impacts and presenting the pro's and con's of the 3 options to the BPS.
  - July 2010 voting on the best option and developing requirements for OATI for Software development.



# Generator Prioritization Option

## Generator Prioritization Option

- The TSP will have to submit the break down of the priorities (Non Firm, NN6, Firm) of the MW Capacity of resources to NERD IDC through NERC SDX. (priority schedules for all resources: Resource name xx MW Firm, yy MW NN6, zz MW Non-Firm)
- The break down of the priorities of the MW Capacity of resources has to be based on studies that use criteria that are accepted by the Industry.
- NAESB will be asked to establish a working group that will be responsible to develop requirements for studies that can set the priority of the MW output of resources.

## Generator Prioritization Option

- The Task force is **considering different curtailment priorities** within Non Firm, NN6 and Firm for those situations where 2 adjacent TSP's **don't have Agreements** in place that regulate sharing the capacity of each other flow gates.
- In those situations where 2 adjacent TSP's don't have Agreements in place the **Firm impact of the neighboring TSP will be curtailed prior** to the Firm impact of the TSP that owns the flow gate that is in TLR in NERC IDC. The same rules apply to Non Firm impacts and NN6 impacts.

## Generator Prioritization Option

- NERC IDC will assign>NNL relief based on >5% impacts. Details that need to be worked out, how flexible are the rules for providing relief assigned by NERC IDC.
  - Is a BA allowed to provide **Non Firm GTL relief** with **<5% Non Firm GTL impacts**, or should it be **>5% Non Firm GTL impacts**.
  - Is BA allowed to provide **Non Firm GTL relief** with **>5% Firm GTL impacts**
  - Is BA allowed to provide **Non Firm GTL relief** with **<5% Firm GTL impacts**.
- The majority of the group prefers rules that allow for maximum flexibility. A BA will provide adequate relief if:
  - The >5% net GTL impacts are decreased with the amount of assigned >5% relief, or
  - The >0% total net GTL impacts are decreased with the amount of assigned >5% relief.

# Flow gate Allocation Option

## Flow gate Allocation Option

- The TSP will have to submit the **list of resources that have Firm** transmission rights to NERC IDC using NERC SDX.
- The TSP will have to submit **merit order and/or block loading** of the Firm resources to NERC IDC using NERC SDX.
- The TSP will have to submit the Day Ahead Load forecast and Hour Ahead Load forecast to NERC IDC using NERC SDX.
- **OATI will calculate the Firm flow gate Allocations** for all Coordinated flow gates for all Entities using the CMP/JOA allocation logic based on the Confirmed set of Firm Reservations of Day Ahead. (CMP is based on historical set of Reservations, this option is based on current set). The TFC –TRM of each flow gate will be fully allocated as Firm.
- The **Firm Allocations** are then used by OATI to **assign priorities** to the real time GTL impacts also calculated by OATI.

## Flow gate Allocation Option

- The total capacity of a coordinated flowgate will be allocated to Aggregate Entities on a day-ahead basis using estimated next-day conditions.
- Aggregate Entities refers to a group of BAs and TSPs that can be “rolled-up” for the purposes of the allocation process.
- Day- Ahead – 24 Hour Profile one-time run
  - Provides an opportunity to review results and make corrections, if needed.
  - On Day-Ahead the entities that do not have reservations (NY ISO, IESO, and ISO NE), they would not have reservations in the allocation run and they would not have to deduct allocations in real time for reservation impacts. In this case the allocations for the entities that do not have reservations would be based on Gen-to-Load only.

## Flow gate Allocation Option

- The Task force is **considering a second Hour-Ahead Allocation run** based on more accurate Hour-Ahead Load forecast, more accurate Outage information and either Next Hour Firm Tags or Next Hour Firm Confirmed Reservations. **The higher of Day-Ahead and Hour-Ahead run will be Allocation.**
- **Flagging a resource as a Firm Resource** by a TSP has to be based on studies that use criteria that are accepted by the Industry.
- NAESB will be asked to establish a working group that will be responsible to develop requirements for studies that can set the Firm priority of the MW output of resources

# Tag everything Option

## Tag everything Option

- Jim Busbin of Southern is leading this effort.
- Details of this option will be presented on June 23 and June 24 to the NAESB Business Practices Subcommittee (BPS)
- Concerns that should be addressed:
  - Increase of the workload for Marketers, BAs, to Tag all individual transactions from generators to the BA Load.
  - Accuracy of Tagging. What if real time output deviates from Tag. Is excess considered Non Firm.
  - Markets (SPP, MISO, PJM) are adjusting dispatch based on constraint economic dispatch every 5 minutes. Market resources will deviate from Tags. Will that be considered Non Firm or Firm impacts?
  - If a Non Firm Tag is curtailed in TLR Level 3, is there any flexibility to provide the Non Firm relief with other resources, maybe a resource that has Firm Tags.
  - Markets provide relief with high cost resources first that have a high shift factor. Markets don't adjust the resource that has his Tag curtailed by NERC IDC, they pick a set of resources that minimizes the costs of accomplishing relief. Do they get credit for that.

## Tag everything Option

- **The determination of what Intra-BA and/or Intra-Market Tags that represent GTL/NNL/Market Impacts can be submitted Firm and which Tags need to be submitted Non Firm has to be based on studies that use criteria that are accepted by the Industry.**
- **NAESB will be asked to establish a working group that will be responsible to develop requirements for studies that can set the priority of the MW output of resources.**

