DRAFT

Analytical Work on the Feasibility of Consolidating Traditional Control Area-Related Functions[1]

October 17, 2006

Goal:

Through investigation and analytical work provide sufficient information for the Parties to decide what aspects of those traditional control area operations that should be combined to improve reliability and enhance operating efficiencies. Initial focus should be on Balancing Authority/Transmission Operator tasks.

Traditional Control Area Operations:

For years, the operating entities called Control Areas were tasked with a variety functions to meet NERC and WECC standards and policies. Over the last five years the industry has sought to develop a flexible model that contains these functions which will allow entities to be responsible for performing only those functions they select. Called the Functional Model, this document describes tasks and interactions associated with the various functions. It should be noted that not all functions in the Functional Model were performed by the traditional control area.

Balancing Authority (BA)

1. Must have control of any of the following combinations within a Balancing Authority Area:
    a. Load and generation (an isolated system)
    b. Load and scheduled interchange
    c. Generation and scheduled interchange
    d. Generation, load, and scheduled interchange
2. Calculate area control error within the Balancing Authority Area.
3. Operate its Balancing Authority Area to maintain load-interchange-generation balance.
4. Review generation commitments, dispatch, and load forecasts.
5. Formulate an operational plan (generation commitment, outages, etc.) for reliability evaluation.
6. Approve interchange transactions from ramping ability perspective
7. Implement interchange schedules by incorporating those schedules into its ACE calculation.
8. Support Interconnection frequency.
9. Monitor and report control performance and disturbance recovery.

[1] "Consolidation" means aggregating systems; redefining responsibilities; and changing operating protocols via bilateral or multilateral contracts.

10. Provide balancing and energy accounting (including hourly checkout of interchange schedules and actual interchange), and administer inadvertent energy paybacks.
11. Determine needs for reliability-related services.
12. Deploy reliability-related services.
13. Implement emergency procedures.

Transmission Operator (TOP)

1. Monitor and provide telemetry (as needed) of all reliability-related parameters within the Transmission Operator Area.
2. Provide transmission maintenance schedules.
3. Develop system operating limits and operate within those limits.
4. Develop and implement emergency procedures.
5. Develop and implement system restoration plans.
6. Operate within established interconnection reliability operating limits.
7. Perform reliability analysis (actual and contingency) for the Transmission Operator Area.
8. Adjust flow control devices within the transmission area for those interchange transactions that include these facilities in the transmission path.
9. Deploy reactive resources to maintain transmission voltage within defined limits.

Market Operator (MO)

1. Administer a market that provides capacity, energy, balancing resources, and other reliability-related services subject to system requirements and constraints.
2. Arrange resources for congestion management.
3. Provide dispatch plans.

Transmission Service Provider (TSP)

1. Receive transmission service requests and process each request for service according to the requirements of the tariff.
    a. Maintain commercial interface for receiving and confirming requests for transmission service according to the requirements of the tariff (e.g., OASIS).
2. Determine and post available transfer capability values.
3. Approve or deny transmission service requests.
4. Approve interchange transactions from transmission service arrangement perspective.
5. Allocate transmission losses (MWs or funds) among Balancing Authority Areas.

Resource Planner (RP)

1. Consider generation capacity from resources both within and outside of the Planning Coordinator Area.
2. Monitor and report, as appropriate, on its resource plan implementation.
3. Maintain resource (demand and capacity) models to evaluate resource adequacy.
4. Collect or develop information required for resource adequacy purposes, including:
    a. demand and energy forecasts, capacity resources, and demand response programs,

b. generator unit performance characteristics and capabilities, and
c. long-term capacity purchases and sales.

5. Evaluate, develop, document, and report on a resource adequacy plan for its portion of the Planning Coordinator Area.
6. Assist in the evaluation of the deliverability of resources.

From the perspective that parties want ColumbiaGrid to study and report on the feasibility of ColumbiaGrid performing one or more of these tasks, ColumbiaGrid address each task, the infra structure and personnel required to perform it, and the associated costs to do so. Where possible, include potential savings and efficiency opportunities for parties willing to have ColumbiaGrid perform these tasks on their behalf.

Parameters:

- Design Limits –
  - Goal for consolidation is voluntary (although ColumbiaGrid should identify where complete participation would be required for benefits to be realized)
  - To extent markets are part of design, goal is for voluntary participation (although ColumbiaGrid should identify where complete participation would be required for benefits to be realized)
  - To extent ColumbiaGrid performs a balancing function for current or next hour, all entities scheduling with ColumbiaGrid need to submit balanced schedules (all schedules net to parties' interchange and load)
  - ColumbiaGrid will not have physical operational control, e.g., will not perform any switching, although could direct or coordinate switching

- Design Considerations
  - Work within larger evolving framework of new reliability entities, roles and responsibilities; identify tasks that would benefit from consolidation under single entity
  - Include options regarding analytical tools that promote reliability and efficient operations
    - Options to provide operators and appropriate parties broad regional visibility of system operating conditions
    - Identify specific functions that might benefit from consolidation
      - Do preliminary cost/benefit or cost/effectiveness analysis on such functions
  - Be creative as to how functions might be consolidated and accomplished (See Appendix Design considerations)
  - Impacts to existing Transmission rights and business practice flexibilities should be identified
  - Services provided by CG should have identified benefits to the participants

- Considerable thought and evaluation should go into where the line should be drawn between ownership and operational responsibility (authority versus responsibilities versus delegation)
- Address confidentiality concerns, including critical infrastructure, market sensitive information, standards of conduct, and general access to information (who gets it and under what protections)
- Assume visibility
- Identify functions that might be consolidated

Deliverables:

- Work plan
  - Milestones/target dates
  - How ColumbiaGrid is going to accomplish services
  - Identify functions for detailed evaluation and study
  - Protocol for involvement of parties in development of proposals
  - Review and comment on work plan
- Develop conceptual proposal(s) of those functions that, if consolidated, would improve reliability and enhance operating efficiencies consistent with the stated goal. The conceptual proposals will include the following at a minimum:
  - Conceptual design documents of alternatives with sufficient detail to enable the parties to determine whether to move forward
    - Functions & services to be consolidated
    - Role to be performed by ColumbiaGrid
    - Business processes
      - Regulatory issues
    - Implementation timeline
    - Perceived benefits
    - Estimated cost
    - Roles & responsibilities of participants
    - Scope: hardware, software, wetware
  - Review design alternatives with parties – Parties determine whether to proceed as designed, rework, or discontinue work
- Should this be in Design Considerations?For each conceptual proposal agreed upon by parties, develop detailed proposal(s) (including any alternatives) to be studied further.
  - Technical design documents with sufficient detail to be used for RFPs to implement the conceptual design
    - Facilities
    - Systems
    - Telecommunications
    - Personnel
    - Other
  - Estimated costs for ColumbiaGrid and the potential consolidating parties
    - Startup costs
    - Annual Operating Expenses
    - Revenue requirements

        - Cost allocation options
    - Estimated benefits
        - Cost reductions
        - Reliability improvements
        - General economic benefits
    - Cost-effectiveness analyses, as appropriate
    - Identify impacts on third parties (e.g., adjacent control areas, embedded entities, loads, generators)
    - Plan for phased implementation, if appropriate. To extent possible, the plan should accomplish the following:
        - Beginning state should be a clear improvement over current state and responsive to the needs of the parties
        - Each stage should be workable in itself
        - Each stage should enable further solutions to remaining problems
        - No stage should be an obstacle to later stages
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Possible Problems with the current Status Quo to be addressed in the Design and Decision-Making Stages:[2]

- Control area operators do not have a broad view of the system
- Control areas do not have the authority or mechanisms to achieve maximum efficiency on a system-wide basis
- Independent decisions by individual control areas can lead to impacts on other control areas
    - Addressed reactively, not proactively
    - Addressed on individual systems
- Transmission system no longer has flexibility sufficient to allow control areas to operate as independently (a "one utility" viewpoint may allow for more efficient/effective operation)
- Difficulty managing unscheduled flows on the Tx system, leading to reliability risks
- Difficulty reconciling physically available Tx capacity with that available on a contractual basis, resulting in potentially inefficient use of available Tx and generation capacity

Problems to Try to Avoid:

- Avoid losing the current control area operator's detailed on-the-ground knowledge of the area they are responsible for
- Avoid creating new and inefficient seams between embedded and adjacent entities
- Avoid affected entities not being sufficiently prepared for implementation

[2] The systems and processes today have good points, weak points and areas where enhancements are expected. Below are specific issues in each of these areas that the parties want the design team to consider.

    - Staff
    - Technology
- Avoid adverse impacts on people who do commerce (ability to complete transactions efficiently and with knowledge of transactional impacts, including final transactions costs before the deal is done)
- Avoid negative impacts on Automatic Generation Control such as oscillation, or frequency excursions
- Avoid complexity and timing requirements for model implementation (multiple layers of communication)
- Do not relieve operating responsibilities of individual entities without a thorough evaluation of the tradeoffs
- Design consolidation in a way that will accommodate performance under existing contracts (including amendments)
- Large consolidated control areas may lack in-depth knowledge of component systems *[critical to get into cost/benefit analysis]*
    - Lose advantage of local knowledge and control – in order to maintain reliability, will need to maintain existing prior control area operating staff and systems
    - Costs may increase due to large expense of new operating entity and no or little avoided costs
    - Reliability of the consolidated control area can often decrease as a result of the above factors

Existing Qualities to Maintain or Enhance:

- High reliability (OTC violations and outages have overall been minimal and reliability high)
- High [redacted]ibility
- Ability to trade freely in the bilateral market at costs that are known in advance of the transaction
- Minimal burden on participants to use the system
- System is relatively simple so re-tooling infrastructure and re-training staff of impacted entities is minimized
- Infrastructure is paid for and operating expenses are low

Staffing:

Will need one FTE and the equivalent funds needed to use a contractor to do the feasibility study

Need to develop timeline for what would be done in 15 months

Conceptual proposals in the first 8 months, then detailed design in the next 7 months

KMW will check on Structure; Linda Finley will check on Ralph –

Appendix

Design Considerations

- Options within changing framework (changing reliability entities, roles and responsibilities) *[Write this up as appendix and then reference it in the design limits – or put in the white paper]*
    - Virtual control area (and what functions could be consolidated within virtual control area)
    - Nested control area
    - New control center
    - Status Quo
    - Logical sequence of functions that may merit consolidation based on the outcome of reliability and cost/benefit or cost/effectiveness analyses of with and without consolidation of the various increments of consolidation. (This will facilitate reasoned decision making and staged implementation consistent with cost/benefit or cost/effectiveness and reliability analyses)
    - Other?
- Staged Design
    - First Stage – sufficiently detailed design (range of options) to enable parties to make decision on whether to proceed with consolidation design
        - Feasibility
        - Cost Effectiveness or Cost/Benefit (short-term and long-term), as appropriate
        - Reliability Analyses
        - Acceptability
    - Second Stage – after decision to go forward, detailed technical proposal capable of implementation
- Establish an open, public stakeholder process for developing the design
- Discuss potential limits on budget and authority of ColumbiaGrid and what to do when these limits are approached

Questions to be evaluated include:

- Would any new centralized markets be needed or useful in order to consolidate, in whole or in part, and, if so, what kind(s) and who would operate them?
- Transition plan (staged, all at once?), including proposals to address barriers
- What are the impacts to physical infrastructure and personnel
    - Can "virtual" consolidation be accomplished, providing the functionality required at lower cost than a conventional consolidation approach?

Obligations — commitment to support ColumbiaGrid
Control Areas provide ColumbiaGrid with current control center information/design (SCADA, etc.)