



Resources Subcommittee Meeting Resources Subcommittee Standards Meeting

April 25–27, 2007

Meeting Minutes

A regular meeting of the North American Electric Reliability Corporation's (NERC) Resources Subcommittee (RS) was held on April 25-26, 2007 and a Resources Subcommittee Standards Meeting was held on April 26-27, 2007 in Denver, Colorado. The meeting announcement, agendas, and attendance list are attached as **Exhibits A, B, and C**, respectively. Individual statements and minority opinions are affixed as **Exhibits D and E**. There was one individual statement and were no minority opinions.

Subcommittee Chairman Terry Bilke presided. The secretary announced that a quorum was present.

Antitrust Compliance Guidelines

Secretary Vandervort acknowledged the NERC Antitrust Compliance Guidelines.

Minutes of the Previous Meeting

The subcommittee approved the January 31-February 1, 2007 meeting minutes.

Task Force Reports

Control Criteria Task Force — Chairman Alan Oneal

Performance Standard Reference Document

The Control Criteria Task Force (CCTF) Chairman Oneal has incorporated the recommended CPS1, CPS2, and DCS edits recommended by the subcommittee, created individual documents for each performance measure contained within the Performance Standard Reference Document, and is ready to move these documents to a public domain. The subcommittee endorsed posting the CPS1 and CPS2 documents on the standards reference documents web site or on the RS web site. Mr. Oneal will continue enhancing the DCS document which will eventually be posted with the CPS documents. Mr. Bilke will discuss the reference documents with the NERC Standards Committee to determine where the documents will be posted.

Frequency Task Force — Chairman Raymond Vice

Confirmed Interchange Transaction Regarding Ramping

Mr. Vice led a discussion on the current requirements for interchange ramping. Two significant NERC Reliability Standards requirements were identified:

BAL-005-0, Automatic Generation Control

R11. Balancing Authorities shall include the effect of ramp rates, which shall be identical and agreed to between affected Balancing Authorities, in the Scheduled Interchange values to calculate ACE.

INT-006-1, Response to Interchange Authority

R1. Prior to the expiration of the reliability assessment period defined in the Timing Table, Column B, the Balancing Authority and Transmission Service Provider shall respond to a request from an Interchange Authority to transition an Arranged Interchange to a Confirmed Interchange.

R1.1. Each involved Balancing Authority shall evaluate the Arranged Interchange with respect to:

R1.1.2. Ramp (ability of generation maneuverability to accommodate).

The subcommittee believes that balancing authorities have an obligation to ensure and communicate that each confirmed interchange transaction has (1) agreed to source and sink ramping capabilities and (2) that the generating balancing authority must have the generation maneuverability to accommodate the designated ramping capabilities. The subcommittee also believes that if the BAL-005-0, R11 and BAL-006-1, R1.1.2 requirements were enforced, communicated and documented, then ramping problems would be reduced.

Secretary Vandervort will work with Mr. Vice to transmit the Frequency Task Force concerns to the NERC Readiness Audit group and request that the audits review how Balancing Authorities address their interchange transaction regarding the above "ramping" requirements. In addition, the Frequency Task Force will review the BAL-005-0 and INT-006-1 standards to ensure that the requirements, measures and compliance sections are adequate to address "ramping" parameters.

Turbine/Generator Torsional Resonance (Informational Discussion)

Mr. Vice has responded on behalf of the Frequency Task Force to recently received inquiries regarding turbine/generator torsional resonance. Most torsional resonance problems are associated with subsynchronous sinusoidal applied torque. Such torque's are caused by transmission series capacitor banks, AC/DC converter control action, and large-scale hot-strip steel mills.

The type of stress that results from relatively slow changes in frequency seems to be a function of the rate of change of frequency, the magnitude of the frequency excursion and the time spent at the reduced frequency. This can be more readily compared with the stress caused by generating unit trips rather than subsynchronous resonance. So far, the frequency excursions associated with system control, primarily at 0600 and 2200 hours, have been relatively mild compared to unit outage contingencies for all three variables. The observed rate of change of frequency has been about 10 mHz. per minute or less compared to 100 mHz. per minute or more during unit trips. The lowest observed frequency has been about 59.910 Hz. This does not mean that these frequency excursions are acceptable, only that they subject the turbine/generator shafts to torsional resonance stresses somewhere between "less than" and "about the same" as the background level of unit trip contingencies. Given that they are about three times more common, Mr. Vice estimates that the total increase in torsional resonance stresses on turbine/generator shafts has roughly doubled since the advent of the 0600/2200 hour frequency swings. This is not good, particularly since damage is cumulative, but not critically urgent either. As long as it doesn't push the shaft damage beyond the linear portion of their design tolerances, and there is little or no indication that it will, this should only result in roughly twice the number of failures due to unit trips, a relatively small subset of overall torsional resonance stress failures which are relatively rare, but extremely catastrophic, themselves. In Mr.

Vise's opinion, we, as an industry, definitely need to be aware of this problem caused by frequency transients, particularly since damage is cumulative, but so far, it is not a critically bad problem or urgent. Mr. Vice recommends that IEEE Power Engineering Society should look for any evidence of increased torsional stress failures in the industry.

Turbine/Generator Torsional Resonance References:

1. IEEE/PES "Proposed Steady-State Limits for Turbine-Generator Torsional Response" at URL:

<http://grouper.ieee.org/groups/harmonic/iharm/docs/ssr.pdf>

2. "TORSIONAL MONITORING OF TURBINE-GENERATORS FOR INCIPIENT FAILURE DETECTION" by Larry S. Dorfman and Miroslav Trubelja at URL:

<http://www.structint.com/tekbrefs/t99016r0.pdf>

Frequency Response – Obtaining and Measuring

The subcommittee discussed the probable software requirements implied by the FERC Order 693, Mandatory Reliability Standards for the Bulk-Power System, paragraph 375, item (3), which states:

375. Accordingly, the Commission approves Reliability Standard BAL-003-0 as mandatory and enforceable. In addition, the Commission directs the ERO to develop a modification to BAL-003-0 through the Reliability Standards development process that: (1) includes Levels of Non-Compliance; (2) determines the appropriate periodicity of frequency response surveys necessary to ensue that Requirement R2 and other requirements of the Reliability Standard are being met, and to modify Measure M1 based on that determination and (3) defines the necessary amount of Frequency Response needed for Reliable Operation for each balancing authority with methods of obtaining and measuring that the frequency response is achieved.

The subcommittee agreed that the Order identifies a process that is new and will require software development. BAL-003-0 will also need to be revised to address this directive. Secretary Vandervort stated that a request was submitted for 2008 NERC budget funding for this item, and that NERC needs to determine who has the lead to address this issue: the Standards Group or the Reliability Assessment or Performance Analysis Group (Resources Subcommittee). The subcommittee also agreed that this is very important and needs to be pursued.

Inadvertent Interchange Task Force — Chairman Don Badley

Inadvertent Interchange Monitoring Application

Mr. Badley reported that the migration of the inadvertent interchange application from SPP to NERC is progressing. Two issues need to be addressed: 1) From the NERC registry subscriptions to the inadvertent interchange application, it appears that the announcement has not been received by appropriate inadvertent interchange data entering staff; and 2) The criteria for the regional administrator and global administrator needs to be defined.

The Inadvertent Interchange Task Force will take action to address and resolve both issues.

Operating Reserves Task Force — Chairman Larry Akens

Operating Reserves White Paper

The Operating Reserves Task Force (ORTF) Chair Larry Akens reported that the task force's white paper on operating reserves supports all FERC Order 693, Mandatory Reliability Standards for the Bulk-Power System, BAL-002 requirements.

NERC Standards Review

The subcommittee agreed to devote the necessary time between meetings to work on subcommittee-sponsored SARs and to schedule monthly conference calls or face-to-face meetings to status the progress, request assistance, and determine any obstacles or road blocks that are impacting the progress of the SARs.

Frequency Response SAR

The subcommittee reviewed and responded to the Frequency Response SAR comments and recommends to the NERC Standards Committee that the SAR be moved to the standard drafting phase. Linda Clarke, NERC Standards Coordinator assigned to facilitate the RS SARs discussed the proposed SAR and the subcommittee's industry comments responses. With the needed enhancements to the comment responses, Ms. Clarke will forward the SARs and the recommendations to the Standards Group for processing.

Howard Illian made a presentation on the preliminary research, conclusions, and recommendations that he is undertaking to support the proposed frequency response methodology. When Mr. Illian's research is complete, it will be posted on the NERC Standards Frequency Response web site.

BAL-004, BAL-005, and BAL-006 Standards Revision Individual SAR

The subcommittee with Ms. Clarke's guidance, enhanced the BAL-004, BAL-005, BAL-006 Standard Revision SARs and comment responses. The standards process required that these SARs be revised and posted along with the comments responses, even though a new BAL-002, 004, 005, 006 Standards Revision SAR (that includes these four standards revisions into one SAR) has been submitted to revise these standards in accordance with the NERC 3 Year Standards Work Plan.

Time and Inadvertent Management SAR

Terry Bilke submitted a Time and Inadvertent Management SAR to the NERC Standards Process Manager on February 22, 2007, see the RS meeting agenda for a copy of the SAR. It is anticipated that NERC Standards Committee will review and authorize posting of this SAR for industry comment at its next meeting.

FERC Order 693, Mandatory Reliability Standards for the Bulk-Power System

FERC Order 693 recommendations and directives will be reviewed by the subcommittee and the RS task forces and given a high priority for current RS-related SARs in the standards process and for new SARs where deemed necessary. The task forces will focus on three parameters: 1) What is needed for reliability, 2) Who is going to provide it, and 3) How is it measured?

Balance Resources and Demand Draft Standards

The Balance Resources and Demand Draft Standards recirculation ballot ended on Thursday, April 26, 2007. The ballot body did not approve the Balance Resources and Demand standards. The results were announced to the subcommittee on Friday morning. The Balance Resources and Demand field test that is currently in progress will be terminated in accordance with the field test implementation plan. This means that any Balancing Authority ACE Limits (BAAL) algorithms that were incorporated into the participating balancing authorities EMS for the field test, will be removed. This also means that the CPS2 requirements that were waived for the participating field test balancing authorities will be reinstated.

Questions on BAL Standards

The RS has received a number of informal questions for clarification on RS-related standards. With compliance sanctions on the horizon, the subcommittee anticipates receiving additional informal questions and formal interpretations of standards requirements. The subcommittee will address and respond to these requests as they are received.

Projects

The subcommittee agreed to devote the necessary time between meetings to work on subcommittee-sponsored projects and to schedule monthly conference calls or face-to-face meetings to status the progress, request assistance, and determine any obstacles or road blocks that are impacting the progress of the projects.

Real-Time Resource Adequacy (ACE-Frequency) Application, Project 2000-03

Carlos Martinez, Consortium for Electric Reliability Technology Solutions (CERTS) reported that FRCC is ready to start submitting balancing authorities frequency and ACE data to CERTS for the Resource Adequacy application. However, there are three balancing authorities within FRCC that are not able to submit data at this time. After discussion, the RS authorized CERTS to proceed with incorporating FRCC balancing authorities data (without the three balancing authorities). It is assumed by the RS that FRCC will pursue, in good faith, the establishment of data communication links from the three balancing authorities through the NERC ICCP system to the Resources Adequacy application.

NERC IT Department is in progress to incorporate ERCOT ICCP data into the Resources Adequacy application. Technical difficulties need to be resolved before ERCOT data can be incorporated into the application. NERC IT projects manager, will coordinate the necessary infrastructure, hardware, and software modifications to include ERCOT into the ACE-Frequency Monitoring application.

Resource Adequacy (ACE-Frequency) Application, Release 4.0

The Resources Adequacy (ACE-Frequency) application release 4.0 is scheduled for production during the last week of May 2007. A letter will be sent to each BA that has subscribed to the application with instructions on how to download the web-based application.

Subscribing to the Resources Adequacy (ACE-Frequency) Application

Reliability coordinators, balancing authorities, and transmission operators that are signatories to the NERC confidentiality agreement can subscribe to the Resources Adequacy (ACE-Frequency) application by contacting Tom Vandervort at tom.vandervort@nerc.net or Carlos Martinez at martinez@electricpowergroup.org.

Intelligent Alarms

The Intelligent Alarms (IAs) have received recognition from the Reliability Coordinators, the Balancing Authorities, and the Transmission Operators. The RS intends to enhance the IAs by focusing attention to details on the significant balancing authorities, regions, and interconnections views and perspectives that the reliability coordinators (RCs) consider significant. The subcommittee also intends to eliminate unnecessary insignificant data that will not be beneficial or will not be used by the RCs.

Mike Potishnak put 10 IAs together and analyzed the data. There seemed to be a strong correlation between Balancing Standard field trial participation and being listed as a causal in the field trial, but other explanations are possible. Mr. Potishnak also presented a spreadsheet and an analysis of the impact of BAAL limits vs. CPS2 limits on constrained interfaces.

Subscribing to the Intelligent Alarms

Reliability coordinators, balancing authorities, and transmission operators that are signatories to the NERC confidentiality agreement can subscribe to the Intelligent Alarms by contacting Tom Vandervort at tom.vandervort@nerc.net or Carlos Martinez at martinez@electricpowergroup.org.

CPS1 & BAAL Monitoring Application, Project 2001-38

This application is being used by NERC Balance Resources and Demand (BRD) standard drafting team and the BRD field test participating balancing authorities for BAAL alarming and performance analysis. The BRD standard drafting team has the lead to recommend changes to this application. Since the BRD recirculation ballot body did not approve the draft standards, the BRD standard drafting team will determine the future use of this application.

AIE Monitoring Application, Project 2000-04

The Area Interchange Error (AIE) monitoring Application will initially be a balancing authority manual entry collection tool to identify balancing authorities that cause large or long-term frequency deviations, and help reliability coordinators and balancing authorities to assess the situation and recommend alternative actions. The application is intended to allow AIE surveys to be completed upon demand in a timely manner. BAs will submit the specified hourly data into an electronic Web-based data entry form. In the future, the RS hopes to automate the process to receive hourly data automatically to avoid the time delays associated with the manual entries.

The AIE Application will be distributed to the RS members to field test the application during the last week in May, 2007.

Inadvertent Interchange Application, Project 2001-37

The NERC Inadvertent Interchange Application is the replacement for the SPP Inadvertent Interchange tool.

The migration of the inadvertent interchange application from SPP to NERC is in progress. Two issues need to be addressed: 1) From the NERC registry subscriptions to the inadvertent interchange application, it appears that the announcement has not been received by appropriate inadvertent interchange data entering staff; and 2) The criteria for the regional administrator and global administrator needs to be defined. The Inadvertent Interchange Task Force will take action to address and resolve both issues.

Subscribing to the Inadvertent Interchange Application

Balancing authority staff that enter inadvertent interchange data into the SPP inadvertent interchange tool are encourage to subscribe to the NERC Inadvertent Interchange application by contacting Tom Vandervort at tom.vandervort@nerc.net or Carlos Martinez at martinez@electricpowergroup.org.

Frequency Monitoring and Analysis Application (Project 2005-6)

NERC Projects Group needs clarification on the Frequency Monitoring and Analysis (FMA) application specifications. The critical specification that needs to be clearly defined is where each interconnection's frequency one second data will reside. The specifications call for each interconnection to have three distinctly separate PMU frequency data points and the scheduled frequency to be recorded each second. Currently the project specifications do not specify if the data will reside on the interconnections' specified data warehouses or if the data will reside on a NERC server.

The Frequency Task Force will review and address the FMA application specifications to ensure that the specifications are clear and the location of the data is specified to move the project forward.

Study Scope Proposal: Large Generator Loss during Frequency Excursions

Typically when an interconnection's frequency exceeds the interconnections frequency trigger limit for five minutes or more, the reliability coordinators take action to bring the frequency back to within acceptable levels. If one or more large generator(s) in the interconnection experience a forced outage when the frequency was significantly below the interconnection's FTL, the consequences could be severe.

Bob Cummings made a presentation to the RS on performing a study on the possibilities, risk factors, and consequences of losing a large generator(s) during frequency excursions. NERC as the electric reliability organization and the Resources Subcommittee as the custodian of frequency and generation-load balancing standards needs to consider the possibility of this scenario happening and to study the negative potential capabilities in order to determine how severe the consequences would be. The NERC Reliability Assessment and Performance Analysis group will put together the study parameters and will share the study proposal with the RS for comment and participation.

The RS highly endorses the study and will support the endeavor however it can.

WECC Interchange Tool Update

John Tolo gave the subcommittee an update on the WECC Interchange Tool (WIT). The WIT has been in field test since January 1, 2007 and is scheduled to go into production on May 30, 2007. Due to the complexity of the WIT, it is being phased into operation in three phases with the first phase requiring all interchange transactions required to have WIT electronic tags: no tag means no transaction (no tie line flow).

Performance Monitoring

CPS1 Review

The subcommittee reviewed and discussed the monthly and 12-month rolling average CPS1 reports.

The NERC compliance program determines CPS1 violations, penalties, and monitors corrective actions. The RS reviews the CPS1 report for performance analysis purposes. The subcommittee reviews the data to identify generic problems, inform subcommittee regional representatives when balancing authorities' scores are close to violation, and to assess why balancing authorities have scores below or near the acceptable 100% score.

CPS2 Review

The Resources Subcommittee reviewed and discussed the monthly CPS2 reports.

The NERC compliance program determines CPS2 violations, penalties, and monitors corrective actions. The Resources Subcommittee reviews the CPS2 report for performance analysis purposes. The subcommittee reviews the data to identify generic problems, inform subcommittee regional representatives when balancing authorities' scores are close to violation, and to assess why balancing authorities have scores below or near the acceptable 90% score.

Time Error Corrections

The following interconnection time error corrections from January 1, 2007 were reported:

2007	Fast TEC	Slow TEC	Total TEC
Eastern Interconnection, January–March	51	0	51
Western Interconnection, January–March	6	16	22
ERCOT, January-March	16	0	16
Hydro-Québec, January-March	Unavailable	Unavailable	Unavailable

Resources Subcommittee Action Item List

Each subcommittee member is to review, take action for their items, and update the action item list, which is affixed as **Exhibit G**.

Dates and Locations of Future Meetings

1. April 25–26, 2007 Denver, CO
2. July 18–19, 2007 Calgary, Canada
3. October 24–25, 2007 Portland, OR
4. January 30-31, 2008 Phoenix, AZ, Alternate Location: Miami or Tampa
5. April 30-May1, 2008 Washington, DC Alternate Location: Miami/Ft. Lauderdale
6. July 30-31, 2008 To Be Determined
7. October 29-30, 2008 To Be Determined

Respectfully submitted,

Tom Vandervort

Thomas J. Vandervort
Resources Subcommittee Secretary