



ACE Diversity Interchange (ADI)

ADI Pilot Project

ADI or ACE Diversity Interchange is the pooling of Area Control Errors (ACE) to take advantage of control error diversity (momentary imbalances of generation and load). The ADI pilot project has been developed by British Columbia Transmission Corporation (the Host) and the four control areas (Participants) operated by Idaho Power Company, NorthWestern Energy and PacifiCorp (Eastern and Western control areas).

ADI Agreement

The ADI project was formally agreed upon through the execution of the ACE Diversity Interchange Agreement on November 13, 2006. This Agreement established two groups charged with overseeing the effort and implementing ADI:

ADI Agreement Group:

- Rohan Soulsby, BCTC
- Chuck Durick, Idaho Power Company (Chair)
- Ray Brush II, NorthWestern Energy
- Rich Bayless, PacifiCorp

ADI Operating Group:

- Thomas Fung, BCTC (Chair)
- Greg Travis, Idaho Power Company
- Richard Setterstrom, NorthWestern Energy
- Robert Williams, PacifiCorp

ADI Benefits

By pooling their ACEs, the participants expect to be able to:

- Reduce control burden on individual control areas;
- Reduce sensitivity to resources with potentially volatile output such as wind projects;
- Reduce unnecessary generator control movement; and,
- Realize improvements in Control Performance Standards.

ADI Project Discussions

The ADI Participants and BCTC, the ADI Host, have been thoughtful in the design and implementation of ADI. Although no formal approvals were required in order to implement ADI, the project has been discussed with:

- Western Electricity Coordinating Council (WECC) management (meeting in Salt Lake City, Utah on December 13th).
- FERC (conference call January 12th).
- The WECC Performance Workgroup (meeting in Phoenix, Arizona on January 24th).
- The Pacific Northwest Security Coordinator (on-going discussions)

In addition, due to the Northwest Power Pool's (NWPP) interest in ADI, approaches similar to the ADI pilot project have been discussed by the NWPP Regulation Sharing Task Force.

ADI Evaluation

ADI operations are not intended to maximize benefits; instead, ADI is a pilot project that is intended to capture some incremental operating benefits at a relatively low cost. Because the ADI proposal is being treated as a pilot project, the ADI Participants are committed to evaluating the project, once implemented.

Addition of Parties

ADI operations started March 31, 2007. In accordance with the ACE Diversity Interchange Agreement, once ADI is operational, "any control area operator whose electric control area is within the Western Interconnection, adjacent to and interconnected with one or more Participating Control Area Operations may join as a Party to [the] Agreement." [Section 4.]

ADI Suspension

Implementation of ADI is being done in a safe and conservative manner. In fact, ADI will be suspended whenever there are concerns about system reliability and suspension of ADI means that each control area operator is operating in a "status quo" manner. Below are the Suspension Protocols for the ADI project:

ADI Suspension Protocols:

The flags "Participant_AOFF" and "Participant_UOFF" drive the Global and the Participant suspension from ADI.

The "Participant_ARSN" values received by the Host from each Participant will only be used for the purpose of logging the defined messages and propagating the reason for suspension through the "GLOBAL_GRSN" (Global reason) value and the "Participant_ARSN" (Participant reason) values that are sent back to all participants.

It is noteworthy that the smallest number will prevail, i.e., the smaller number has higher priority. Also, note that the gaps in the numbering allow for the addition of

reasons in the future. Finally, the lines starting with " " are interpreted by the software as comments.

ARSN: Participant reason for suspend

GRSN: Global reason for suspend

GLOBAL_GRSN includes reasons 00] through 05] and will be sent back to all participants.

00] ADI processing normally.

'Host reasons for local ADI suspension.

01] ADI Suspended Manually by Host.

05] ADI Suspended: Minimum number of Participants not reached.

GLOBAL_GRSN includes reasons 10] through 25] and will be sent back to all participants.

'Participant Global Suspend requires "Participant_AOFF" flag to be set.

10] ADI Suspended Manually by Participant.

15] ADI Suspended Automatically during NWPP Reserve Sharing event.

20] ADI Suspended Manually for frequency deviation exceeding +/- .3 hertz (59.7 - 60.3).

25] ADI Suspended Manually, as directed by the Pacific Northwest Security Coordinator or the Reliability Coordinator.

'Individual Suspend includes reasons 80] through 89] and will not be reflected in the GLOBAL_GRSN sent back to all participants.

'Individual Suspend requires "Participant_UOFF" flag to be set.

80] Participant Suspended (Manual or Automatic) for Path when OTC limit is exceeded (Grid Operator determination).

83] Participant Suspended (Manual or Automatic) for two, consecutive CPS 2 violations.

84] Participant Suspended (Automatic) for AGC paused or not in tie-line bias control.

86] Participant Suspended Manually for internal system operating conditions.

89] Participant Suspended Manually, as directed by the Pacific Northwest Security Coordinator or the Reliability Coordinator.

GLOBAL_GRSN sent back to all participants.

99] ADI Suspended by Participant with undefined reason.

Other Pertinent Documents:

- ADI Agreement (Implementation Protocols) – updated
- Documentation
- PowerPoint Presentation to UWIG