

Atlanta Trip Report
Meeting Dates: January 31 and February 1, 2006

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Submitted to: Fran Cummings, MTC

The IEEE P1547.6 working group who are attempting to develop a Recommended Practice Standard for the interconnection of DR to spot and grid networks met February 2nd and 3rd at the Georgia Power Company Headquarters in Atlanta, GA. Preceding that meeting the IEEE P1547.3 working group met on January 31 and February 1, 2006 to finalize a guide on communication requirements for DR interconnections.

The February 1st meeting of P1547.3 was attended to see what communication guidance might be forth coming that would be useful in the network interconnection issue. Unfortunately the group had already decided to exclude any discussion of protection and control communication requirements.

The meeting of the P1547.6 working group on the 2nd and 3rd may prove to be more fruitful, but not in the immediate future. It is unlikely that any useable document will emerge from the P1547.6 effort for at least two years. This meeting was beneficial in getting all of the specific issues on the table but not in getting any agreement on resolutions.

The prospect for grid interconnections seems to be very low. The only obvious technical fix would require the installation of a grid-wide, protection-speed communication and automatic adaptive control scheme. While conceptually feasible, the implementation cost appears to be well beyond any justification that can be envisioned.

The prospect of developing a recommended practice for spot network interconnections, at least where time delay tripping for low reverse power is allowed, appears to be achievable-eventually. Guidance on how to compute the low reverse power setting for various types of DR has not been discussed. Guidance on how to select the minimum necessary time delay to avoid false tripping of the network protectors has not been discussed. Any necessary cautions on using the time delay technique, or on which types of distribution systems the time delay technique may be more problematic have not been discussed.

While attending and contributing to these meetings, it was possible to have very productive side meetings. Attached are the minutes of a meeting with GA Power on their extensive network interconnection experience. Also attached are the minutes of a meeting with one of the two network protector relay manufacturers who had representatives attending the P1547.6 meeting. Other useful contacts were preliminary meeting with two DR manufacturers to set up future meetings and discussions with the key network engineer at Con Ed who agreed to a meeting in New York in late February.

Minutes of the dinner meeting with Cutler Hammer engineers in Atlanta

Prepared by W.E. Feero, PE

Date: February 1, 2006

The purpose of the meeting was to discuss the MTC's desire to advance the acceptance of DR interconnections with networks. MTC sponsored meetings and studies have suggested that future developments in the network protector relaying and controls may significantly improve the DR acceptance.

Points of concern expressed by many utilities are:

1. The determination of abnormal system conditions and protection actions should be controlled and maintained by the utility.
2. Adding intentional time delay to provide coordination time intervals between independently acting relays (utility's and DR's) may adversely impact the utility system.

To alleviate these concerns, analysis and monitoring of a test system suggest the following possible solutions if network protector relaying with low reverse power time delayed settings were also capable of providing:

- a. A means of computing the power import by each protector and sending a trip signal to the DR if the import dropped below a selectable level such as 6% of the transformer's rating. To prevent cycling of the DR, this relay would also have to have an over power setting to be exceeded before the DR could be connected online.
- b. For spot networks with more than two transformers, the above call for trip would have to be modified by some form of instantaneous acting AND circuit to only trip the DRs when more than 50% of the protectors were calling for a DR trip (note an open protector is in the under power region and therefore calling for a DR trip).
- c. For utilities who do not wish to set any intentional time delay, a network relay system that could issue a DR trip command and then trip itself, if required, after receiving a confirmation signal that the DR had tripped; a form of permissive tripping. This ability will also require some development by the DR manufacturers.
- d. A variation on item c. might be to block any network protector tripping if all network protector relays were calling for a trip. This would guard against dumping the network bus when DRs are operating and all the network relays call for a trip for utility system fault. If the DRs were not online there would be no source to cause a reverse power flow.

All of these ideas are presented to stimulate thinking and are not considered complete. Consideration of relaying reliability and security will almost certainly require modifications and maybe even rejection of some or all of these suggested solutions.

In the meeting it was made clear that a similar meeting would be held with the other network protector manufacturer, select utilities and DR manufacturers. During this meeting it was made clear that the manufacturer should identify any company confidential information that might need to be divulged in responding to my inquires into their interest in being involved in any future development RFP that may come out of these discussions. If any RFPs were to be issued, it was suggested that one mode of response might be some form of cooperative arrangement between a network protector relay manufacturer, a utility, and one or more DR manufacturers.

It was pointed out that any such RFP would most likely be funded and administered by more states than just Massachusetts (possibly New York, California and others). It was also discussed that any such RFP would probably require prototype devices with testing in either an actual utility vault or in a full mock-up two transformer vault such as may be available at the DUIT facility later this year.

It was suggested that the engineers get management concurrence to continue any necessary follow on discussions. Also, at this preliminary stage, it would be helpful to receive from the manufacturer a ballpark guess at the funding requirements that may be required to carry out the above suggested effort.

Minutes of meeting with Georgia Power to discuss their experience with DR interconnections with their spot networks.

Prepared by W.E. Feero, PE

Date: February 1, 2006

The meeting was to be held with Walter McCannon from protection and control and James Dance from the network group. At the last minute, Mr. Dance cancelled without notice. However, Mr. Mc Cannon had compiled interesting statistics on how prevalent network interconnections were in the Atlanta Metro area. At present there is over 56 MW of synchronous generating capacity that can be paralleled with various spot networks to serve as peak shavers or back-up generation. With over 10 years of experience, Georgia Power is not aware of any adverse problem caused by these systems.

The following day a brief discussion was held with Scott Burchette who is in the network group. He stated that the low reverse power time delay settings were not always brief. More than one second was not unusual. The largest installation was over 3 MW on a four transformer spot network (3MVA per transformer).

Most installations were synchronous generators tied to a customer load bus, or critical load, with a breaker connecting to the network bus. The flow in this tie breaker was monitored to assure that a selectable minimum facility load was maintained.