ERCOT System Protection Working Group

Meeting Minutes – November 21, 2013

Austin, TX

* 8:26 am: SPWG chair Danny Ee read the ERCOT Antitrust admonition. He then passed around the sign-in sheet, email list / roster, and the SPWG contact information list.
* 8:29 am: Review Previous Meeting Minutes – Discussions or carry-over topics included:
  + A discussion of RARF Workshop / RDWG– Peter and Jay discussed the RARF data requirements and the glossary that was reviewed during a conference call.
  + From previous meeting - reviewing SPS’s? We are not reviewing SPS’s with any regularity in SPWG, so we need to look at our procedures and possibly revise – “do what we say, or say what we do.”
  + Update procedures on SPWG web site – send current rev document to Jan. Need to get the current one on the web site.
  + Action item for Andrew: talk about tie line interactions (from previous SPWG meeting).
  + Comment about modeling wind turbines in ASPEN – possibly opening a discussion with ASPEN for improvements. Peter mentioned EPRI project for modeling wind for short circuit. Perhaps contact Evangelos Farantatos at EPRI – first attempt to use CAPE. Eventually extend to the short circuit programs.
  + New information: Saad Sayed is the new contact at ERCOT since Keith is now at TRE.
  + Andrew motioned to approve meeting minutes, Stan seconded. Meeting minutes were approved unanimously.
* 8:45 – Rich Bauer with NERC began presentation
  + 2013 Q2 Misoperation Data was presented on slides. Texas entities are doing a good job; misoperation rate is lower than most of the rest of the country. Running 7%-9%.
  + Misoperations were primarily lack of security, rather than lack of dependability.
  + Misop rate by voltage class. The highest percentage of misoperations were in the 138kV range. The majority of operations are in the 115-138-161 range – mostly the ground settings in the lower voltages are the biggest challenge.
  + Misop by cause codes – not seeing much difference in all of the data – seeing trends continue, nothing big to report. David mentions Q4 changes to misoperation reporting template, with additional cause codes – breaking up incorrect logic design - becoming available. Better granularity may allow for better reporting of misoperations.
* 8:54 David Penney began a discussion on the NERC Section 1600 Data Request – to continue reporting misoperations to NERC and TRE.
  + Showed survey results of utilities gauging effort for supplying data.
  + Question from Peter: What is the final effect of the collection of all of this data?
  + Rich: The real intent is to analyze data and look for higher areas to effect some type of change. Something NERC is trying to do is to get data in front of people who can use it and do something with it is something they are working on, and groups like SPWG are good places to start. How to get the data out there is what they are working on.
  + Rich mentioned a Misoperation conference / seminar, similar to the EMS / Situational Awareness in Denver – tie to committee meeting, have a one day conference. For example, share data regarding incorrect settings, look for industry entity participation. Present challenges and present methods for overcoming issues.
    - David Penney - Desire is to turn data in to something usable, and not just dumping data down in to a black hole.
    - Peter – How do you keep momentum going after these events (misop summit)?
    - How do you convince senior management in to believing these meetings are necessary and not associated with ‘fines’?
    - Rich – need support for budgeting to implement methods, engage upper levels of company. Want to avoid creating a standard, can be difficult to get upper management buy-in without penalties associated with it.
  + Rich reiterated that the 1600 Data Request aligns all regions for data reporting type and level. Data had been somewhat variable between regions.
  + David P – The 1600 Data Request takes a little of the control for misoperation reporting out of TRE’s hands. TRE will need to work through processes for reporting on one template so we don’t have to report 2 things in 2 formats.
  + Rich described a series of slides containing data on events.
    - Five categories of event
    - Category 1 is 3 or more transmission elements out of service by a disturbance
    - Category 1H – EMS type event
    - Category 2: EMS event, generation loss, island > certain size
    - Category 2B: Loss of EMS
    - Category 3,4: Generation loss above MW value
    - 85-90% are 1AI or 2B (loss of EMS)
    - 30 since November 2010
    - Slides contained breakdown of quantities for different categories.
    - NERC has 185 different cause codes that may be assigned to events.
  + Ben McMillan and James Merlo of NERC provide training on event root cause analysis. NERC is offering that at no charge. Provide a room, time, feed lunch, get training for free. Training covers different types of methods of cause analysis. Additionally, they introduce people to NERC process and cause codes.
  + June 2014 – possible Misop Conference – NERC would like feedback if possible on what protection folk really want to see or hear from NERC.
* 9:33 David Penney presents TRE misoperation reports
  + 4 were failure to reclose
  + Overtrip during construction, incorrect breaker failure wiring, incorrect polarizing setting, incorrect jumper setting on relays – things like this are showing up every quarter – it’s an ‘attention to detail’ issue that needs addressing to improve the misop rates.
  + Discussion on length of corrective action plans – average is 30 days, some are much longer, some are much shorter.
* 9:45 David Penney – Changes to misoperation template – plan on posting new spreadsheet in December. Emphasize the minor changes in misop category. Failure to trip other than fault – have relays trip for non-fault – OOS blocking, for example. Now logic design is broken down to categories for setting errors.
* 9:55 David Penney – SPS Reporting Template – RAPA group would like to collect Operation / Misoperation Reporting (from NERC SPCS).
  + Clarifying language for any definitions is encouraged – redline today’s meeting materials and submit to David if you have suggestions.
  + No proposal for regional criteria for SPS reporting. DP intends to report to NERC based on information received from Texas entities.
* 10:06 David Penney – FERC order 754 (Single Points of Failure) – some entities did not provide data on time, and there were some errors, so no summary available right now.
* 10:08 David Penney – 2 PRC standards out for comments – PRC-027 out for comments/ballots. PRC-002 disturbance monitoring and reporting standard – new language for where we need fault recorders, where they should be located.
* Bret: Questions: should SPWG or ERCOT designate which buses will have disturbance monitoring equipment? Based on fault duty? How does one determine the list of buses? Split, duplicated buses? Who owns those buses?
  + DP - NERC supplies minimum requirements
  + ERCOT has to define DDR requirements.
  + Bill Blevins – synchrophasors can serve as DDR for PRC standard.
* David Penney: PRC-002-2 out for comment until December 16
* Perry – Case Building Question for number of case builds for steady state. TPL or MOD standard? Have to look at standard.
  + David Penney: MOD standard 32 out for draft – requirement R1 planning coordinator determines requirements; R2 leaves modeling up to planning coordinator – this includes short circuit model as well.
  + No clear answer on this for now.
* 10:25 – Bill Blevins / ERCOT update
  + DME survey and 5 year review – ERCOT is compiling information for October submission, it’s been put in to spreadsheet. 1563 reported devices; analysis based on guides of stations that met criteria, right now the list is 290 different stations where devices should be. Next phase is to cross locations to those devices that meet the criteria. There may be questions that come out of that review.
  + Relay misops and NOGRR 123 – OWG proposed changes to form for reporting
    - If NERC were to eliminate the reporting, ERCOT may want to keep it; don’t want any changes at NERC to create a gap at ERCOT.
    - Action Item Andrew: Work with OWG and figure out what is going on with NOGRR 123 revision.
    - Trying to allow for reporting to continue and not tied to what NERC has going forward.
    - Brian Clowe: In Operating Guide Section 5 – evaluation of performance – Rules under 1600 – NERC method is different from k-factor.
  + 10:47 – Bill Blevins discussed event reporting at ERCOT – he uses the data to look at the impact of misoperations on the system.
  + NOGRR 123 – ERCOT will modify OWG comments to put back in the form and allow for entities to supply ERCOT with same reports you’re giving to TRE. Alternatively they could use the guide form, they can do that as well. Kris K – as long as it can be in TRE format it would be OK.
  + Last comments from OWG regarding NOGRR 123 are deletion of form – ERCOT would put comments back in but with verbiage that states that the TRE format is acceptable.
  + 10:50 - Operations issues with SSR. Some things may be able to be done on transmission side, and protection can also be applied at the generation resource.
    - Kris K – SSR is best solved at the generating unit, and the GO should not be relying on the TSP for mitigation or fix.
    - Bill B – encourage SPWG members to discuss SSR issues at meetings.
  + Synchrophasor Task Force – Email list now active. Kris K is chair, Bill is vice-chair. Working on how the ERCOT region can make use of synchrophasors, and building case for synchrophasor justification. Bill intends to bring a “what will ERCOT use synchrophasors for?” to the January STF meeting.
* 11:05 – Commence a 15 minute break
* During break, David Penney recalculated event for 2013 Q1 & Q2, based on K-factor versus NERC:

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| 2013 | Q1 | Q2 |
| K-Factor | 6.67% | 9.02% |
| NERC | 6.3% | 8.35% |

* 11:20 back from break.
* David Penney - If SPWG wants to submit comments to NOGRR 123 – do we want to continue to track Failures to Reclose? What is the reliability benefit?
  + From a planning perspective, it’s the loss of a single element – it’s planned and accounted for. Is it something we need to worry about?
  + Stan – No, it’s of no use and it’s hard to keep up with.
  + David – taking it out would line up with what NERC is doing.
  + Glenn – No… TRE at the time wanted it though.
  + Mark – Reclosing has not and won’t likely ‘save the system’.
* Group revision of NOGRR section
  + Get Section 5 to read similar to Section 6.
  + Action item for Andrew: Delete reference to the old methodology – update changes are stored on Danny’s flash drive. Get with Bill / OWG for SPWG comments.
* 11:45 – discussion on failure to reclose, updating guide questions.
* 3 Scenarios for NERC – David Penney - PRC-005-3 Maintenance Standarsds – automatic reclosing at generator buses or 1 station away from gen bus or as part of an SPS. Those are the only instances where NERC really considers tracking autoreclosing.
* 11:55 – Sam Francis – NERC or FERC don’t deem reporting of autoreclosing misoperations as necessary… TSP’s do look at it, but don’t want to make everyone in NERC to have to do it.
* Automatic reclosing (Kris K):
  + Extra reporting burden
  + No benefit
  + Nobody’s using data
  + NERC not required
* Vote: Strip all automatic reclosing out of OWG NOGRR 123 Reporting document. Stan made the motion, Peter seconded, motion carried.
* Selection of 2014 Chair & Vice-Chair
  + Andrew Mattei nominated as Chair for 2014, motion carried
  + Brian Clowe nominated for Vice-Chair for 2014, motion carried.
* 12:03 – SPWG procedures – Automatic Reclosing verbiage?
  + SPS review? As requested.
  + 345kV Model Validation – review by the November meeting. Are we doing this? What are we checking against? Should be a standing November agenda item. This is of particular importance in the area of tie lines.
  + Kris K-MOD 33 may change the model validation piece.
  + We can delay changing SPWG procedures on Automatic Reclosing until NOGRR 123 changes take place.
* At 12:15, meeting adjourned for lunch
* Reconvened at 1:30, Roy Moxley of Siemens gave a presentation on multi-terminal lines. Discussed the challenges of covering up to six terminals.
* 2:30, Sam Francis discussed SPCS committee activities (System Protection Coordination Subcommittee). Detailed information is available in his slides.
  + FERC PRC-005-2 on way to being approved
* 3:35, John Schmall of ERCOT gave a Panhandle Renewables Study Update
* 4:12 – Kris K – Question regarding guidelines for mutual coupling calculations – any standards used? Comes in to play when interacting with other utilities. Use CAPE, calculate mutual impedance and put in to model? Is there benefit to that? Look at SC Case Building Procedure Manual, no mention of mutual coupling in there. Seems like a bit of an oversight, or lacking?
  + Mark C: Something needs to be mentioned to that effect. They do model extensively for mutuals in same right of way.
  + Capture minimum length to cover? Some right-of-way as guideline? Have as a should, but not a mandatory. Percentage of the line?
  + Required if above some per unit value?
  + What if mutually coupled lines are two different voltages? Need to have a methodology for that.
  + Situation with two TSP’s who may have mutual coupling – who handles the inclusion of the coupling values? TSP’s need to agree on what value is.
  + Peter B – only calculate for lines on the same structure. Mutual with different line MVA ratings.
  + Kris K – SPWG case building manual: Short circuit case data submitted reflecting the following conditions – perhaps put a bullet for mutual coupling in there?
  + Peter B – also see if any RTOs have language of their own.
* 4:25 - Kris K – Slow Trip Misoperation – clearing ends up being slower than expected – carrier problems, etc – instead of clearing in 6 cycles, clear in 10-12 cycles. Is that really a slow trip misop?
  + It may not reportable because backup systems still operated (trip on time instead of carrier), but internally it may be a misoperation.
* Discussion on scheduling case builds.
* Some discussion on scheduling for March. Decided to delay date selections until Tuesday.
* At 4:49 pm, meeting adjourned.

Day 1 Attendees:

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| Danny Ee  Austin Energy  Andrew Mattei  Brazos Electric  Kristian Koellner  LCRA  Peter Belkin  AEP  Mark Chronister  Oncor  Stan Ginsburg  Brazos Electric  Glenn Hargrave  CPS Energy  James Wang  LCRA  Bret Burford  AEP | Ivan Ivanov  Garland  Dung Nguyen  STEC  Bill Tucker  AEP  David Penney  TRE  Brian Clowe  Centerpoint Energy  Matt Boecker  LCRA  Keith Calle  CPS Energy  Saad Syed  ERCOT | WebEx:  Derek Merta – BTU  Rich Bauer  Tim Cook (CTT)  Perry Brown  Armin Klusman  Joshua York (CTT)  Sam Francis  Larisa Loyferman  Bill Blevins |