

SUMMARY OF ARC-FLASH WORKSHOP

Held on June 17, 2008, 1:00 PM - 3:00PM

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PUC Staff held this industry workshop, as required by Commission Order 07-179 (AR 513),¹ to allow the industry the opportunity to comment on the new arc-flash Rules adopted in the 2007 edition of the National Electrical Safety Code (NESC). These include NESC Rules 410A3 and 420I2, which will become effective on January 1, 2009. Staff will also take written input as well, and those comments are due no later than June 30, 2008. Written comments should address implementation issues associated with these new NESC rules with focus on the following:

- Issues in meeting the compliance effective date of January 1, 2009
- Implementation successes, impacts and costs (including utility costs, available resources, standards issues, system retrofit and worker protection issues)
- Any conflicts with Federal and Oregon OSHA regulations
- It should be emphasized per PUC Order 07-179, the new arc-flash requirements in NESC Rules 410A3 and 420I2 will become effective on January 1, 2009. To delay this effective date, industry needs to provide sufficient rationale backed up by relevant facts to justify a formal PUC rulemaking docket proposing to modify OAR 860-024-0010.

Jerry Murray – Staff called the meeting to order at 1:05 PM. The following introductory items were covered:

- Attendee introductions
- Purpose of workshop
- Commission Order 07-179 (AR513) which required review of new NESC arc-flash Rules
- Discussed employer/employee responsibilities
 - Employer has to perform arc analysis.
 - Employee has to wear protective clothing.

JR Gonzalez, Staff

- Emphasized Exception 2 of NESC Rule 410 A3: “For secondary systems below 1000 V, applicable work rules required by this part and engineering controls shall be utilized to limit exposure. In lieu of performing an arc hazard analysis, clothing or a clothing system with a minimum effective arc rating of 4 cal/cm² shall be required to limit the likelihood of ignition.”
- For 1 KV and above employers must perform analysis and mitigate hazards.

¹ See Conclusion in Order 07-179 at <http://apps.puc.state.or.us/orders/2007ords/07-179.pdf>.

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Gary Boswell – PGE

- PGE is not planning to use the excessive calcs exception (i.e., Exception 2) in generation plants because exposures levels up to 40 calcs/cm² have been identified.
- Network systems are a problem. Calculations indicate exposures in excess of 70 calcs. PGE is not sure which way to calculate.

JR Gonzalez – Staff

- Wants to put secondary exposure aside for time being.

Barbara Halle – PGE Legal Representative

- Wanted to know if there is a possibility of delaying adoption of this portion of code.

Michael Weirich - Oregon Department of Justice (ODOJ)

- The PUC Order has already adopted the arc-flash Rules when the 2007 edition of the NESC was adopted into OAR 860-024-0010; however, the Order required that this workshop occur. To do anything further (including delaying a portion of the code) would require an additional Commission Order.
- The Commission may not be able to adopt a portion of the code; the current statutory language (in ORS 757.035) suggests that the Commission may have to adopt the NESC code in its entirety.

JR Gonzalez - Staff

- The Order only mandated that the 2007 edition of the NESC be adopted, which requires that arc-flash analysis be preformed by January 1, 2009. Hazards if discovered must be dealt with.
- Employees must wear protective clothing.

Gary Boswell – PGE

- With what we have learned through the analysis process, PGE would like to eliminate the exposures where possible.
- PGE needs more time to develop and implement a training program.

JR Gonzalez – Staff

- Asked Boswell if PGE had completed its analysis. Boswell answered - for the most part.
- Asked Boswell what training do you need more time for (no response)

Jerry Murray – Staff

- Read from the sixth edition of Alan Clapp's NESC Handbook the following:
 - "A requirement was added in the 1993 Edition for employers to train employees working in the vicinity of exposed energized facilities on the

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- advantages and limitation of various types, combinations, and material of wearing apparel.”
- “The prescribed system of assessment of expected exposure and use of appropriate clothing, when combined with prescribed work methods is expected to both (1) limit the opportunity for an arc to occur and (2) limit the extent of any injury to levels that are not life threatening.”

Chuck Woodings – Anderson Wood Construction Company Inc.

- Is a member of the NESC SCC8 subcommittee, which wrote the arc-flash Rules in the NESC.
- There is some confusion between NFPA 70E and 2007 edition of the NESC.
- The intent of the rule is to protect the employee from catastrophic injury, minor injuries may still occur if a flash occurs.
- Within NFPA 70E there is no protection covered for exposures above 40 cal/cm².

Bruce Hall – Wasco Electric Cooperative

- There are several methods of assessment available. They all have a different methods of calculation and come up with different answers. Which one shall we use?

Gary Putnam – Staff

- The code is not specific as to which available method of calculation to use.
- Employers can use the tables (Tables 410-1 and 410-2) in the NESC or other computer software programs that are commercially available.

William Cullinane, Federated Rural Electric

- Can you use that defense in a court room?

Jerry Murray – Staff

- This is the same as pole testing. The code does not dictate which method you use to determine the strength of a pole; it just says you have to do it. Over the years there have been several different methods used by utilities.

Barbara Halle – PGE Legal Representative

- Regarding liability matters, if the code is not specific and allows for different methods of analysis, then the issue becomes “what is reasonable and prudent”?

Steve Alexanderson - Central Lincoln PUD

- There are four methods for doing analyses
 - Two only deal with single phase
 - Two only deal with three phase
 - One works with open air

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- One works with closed box
- Each utility must choose the best method for their system.

JR Gonzalez – Staff

- Discussed Table 410-1 footnote, which reads “These calculations were derived using a commercially available computer software program. Other methods are available to estimate arc exposure values and may yield slightly different, but equally acceptable results.”

Barbara Halle – PGE Legal Representative

- We’re dealing with two issues:
 - Regarding the liability issue, if an accident occurs, the utility would have to prove the utility used reasonable and prudent methods. (We will not be able to address liability in this forum.)
 - Code compliance is the only issue that can be addressed now.

K.C. Dors – Columbia REA

- Some of the charts in the NESC may not be correct and the FR Code Committee (which is NESC Subcommittee SCC8) will be meeting to discuss them. The REAs do not want to proceed with bad information which would result in the industry not meeting the deadlines. The adoption of the arc-flash rules should be postponed.

Barbara Halle – PGE Legal Representative

- Does PUC have authority to delay?

JR Gonzalez – Staff

- Staff needs to look at the options before we can answer.
- Staff needs a letter from the FR Code Committee identifying what the issues are with the charts. He asked Chuck Woodings or K.C. Dors if they would follow-up on this.
- K.C. said Jim Tomaseski who is chairman of the SCC8 subcommittee would be able to provide additional information.

Dave VanBossuyt – PGE

- What are contractors going to do? Every electric utility will have different calculations, what type of clothing will they wear?
- Who will provide the analysis: the utility or the contractor?
- Who has to provide the clothing: Employee or Employer?

JR Gonzalez – Staff

- NESC does not indicate who will provide the clothing, only that it shall be worn.

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- Per NESC Rule 410 A3, "If the assessment determines a potential employee exposure greater than 2 cal/cm^2 exists², the employer shall require employees to wear clothing or a clothing system that has an effective arc rating not less than the anticipated level of arc energy."

Peg Munsell OR-OSHA

- Clothing required to protect employee from a recognized hazard is considered to be PPE of which employer will provide.

Chris Meyers – PacifiCorp

- Has only performed analysis on substations and metal clad switchgear.
- Has not performed calculations associated with feeder analyses.
- Would like to have an extension to complete the work.

Herb Caballero – PGE

- PGE generation plants are doing one-line diagrams throughout the company to determine the cal exposure at any particular location. After analyzing the data, the company will be writing a formal program and that will take some time.
- This process needs to be completed prior to buying clothing.
- Also the company will need to develop a formal training program and train the affected employees.

CONCLUSION

JR Gonzalez – Staff

- Please submit written comments (Attention Jerry Murray, email: jerry.murray@state.or.us) by the end of June.
- Written comments need to have specific facts to document concerns.
- By mid-July Staff will identify issues and make available industry comments available on the PUC's website.
- After reviewing all the information Staff will make a decision if another workshop is necessary.

Jerry Murray – Staff

- If the parties want to propose delaying the arc-flash Rules, they need to provide written comments with sufficient rationale and facts that will justify the opening of a formal PUC rulemaking process, which would include a PUC Order.

² See Neal, Bingham, and Doughty reference [B59] found in Appendix E of the 2007 edition of the NESC.

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- If industry and Staff do not make the August 1 deadline to the Commission, Staff may have to ask for an emergency PUC rulemaking, if this option is possible.

JR Gonzalez – Staff

- Summarized the issues as follows:
 - Liability.
 - Accuracy of NESC Tables.
 - Correct method of calculations.
 - Training.
 - Availability of resource and reference material (i.e., ANSI signs, labels, standards, booklets, etc.)
 - Availability of Fire Resistant (FR) Clothing.

End of workshop