

Note From the Chief

I would like to introduce Tony Bierward as our new Plan Review supervisor. Tony has been with the Department since 1995, and has been a Lead Electrical Inspector in Tumwater since 2004. Prior to coming to L&I, Tony worked for 17 years as an electrician, foreman, and project supervisor on a wide variety of Commercial, Industrial, Manufacturing, and Residential jobs in Washington. Tony is a great asset to the electrical program and will do a great job of leading the Plan Review section as they transition to an electronic plan review process. I would also like to thank Bill Eckroth for his years of excellent service to the electrical program. Bill is retiring after almost 26 years with L&I, with 12 years as the Plan Review supervisor. Please join me in wishing Bill all the best for a well-deserved retirement, and congratulating Tony as he enters this exciting new phase in his career.

Safety Tip of the Month

School will soon be out for summer. Please use extra caution while driving and watch for children who may not be watching for you.

Reminder – Changes Coming Soon For Electrical Permit Fee Due Notices

As discussed in last month's [May 2015](#) newsletter, the electrical program is implementing changes to our electrical permit fee due notice and collection process beginning July 1, 2015. The program is making these changes to reduce the fee due processing time, collect fees in a timely manner, and be consistent throughout the state. Permit fees are due upon receipt of the notice. Please review last month's article for explanation of these important changes.

Arc Energy Reduction – 2014 NEC® 240.87

In 2011, a new requirement was introduced in NEC® 240.87 titled "Noninstantaneous Trip". This requirement was located in Section VII of Article 240 applying to circuit breakers. The intent was to provide a measure of protection for workers while working within an arc-flash boundary. It applied to circuit breakers not equipped with an instantaneous trip feature. These circuit breakers, commonly installed in systems requiring selective coordination, are equipped with an intentional delay, allowing additional time for a downstream circuit breaker to trip before the upstream breaker trips. This intentional delay creates greater incident energy at the upstream circuit breaker, and a greater arc-flash hazard for workers within the arc-flash boundary. The 2011 requirement allowed three methods to reduce arc-flash hazard for circuit breakers without an instantaneous trip feature.

For 2014, the title of 240.87 was changed to "Arc Energy Reduction", and now applies to circuit breakers where the highest continuous current trip setting for which the actual overcurrent device installed is rated or can be adjusted to 1200 A or higher. Two methods were added to the list of ways to accomplish the requirement. Here is a brief description of the five methods allowed:

- (1) Zone-selective interlocking – The upstream and downstream circuit breakers have circuitry to communicate with each other to determine the location of the fault. The location of the fault is sensed by the system, and the circuit breaker immediately upstream of the fault trips instantaneously. The circuitry overrides the intentional delay feature of the upstream device if the fault occurs in the feeder between the upstream and downstream devices, which lowers the incident energy at the upstream device.
- (2) Differential relaying – This method would usually be found in medium-voltage systems. Current transformers sense the amount of current flowing into the upstream device and compare it to the amount flowing out of the downstream device(s). If the two values are different, a fault is occurring ahead of the downstream device and the upstream device trips immediately.
- (3) Energy-reducing maintenance switching with local status indicator – A maintenance switch allows a worker to set the circuit breaker to "maintenance mode" while working within the arc-flash boundary. The switch alters the breaker's trip settings and allows the breaker to trip faster in the event of a fault, reducing incident energy.

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The status indicator, usually a light, alerts the worker to place the switch back in normal mode when the work is complete.

- (4) Energy-reducing active arc flash mitigation system – A system requiring specialized equipment that will sense an arc-flash event and create an alternate path for arc fault current, reducing incident energy.
- (5) An approved equivalent means – This method allows for future technology or a method acceptable to the authority having jurisdiction. A circuit breaker equipped with an instantaneous trip feature which is set to trip below the level of arcing current, is an equivalent means acceptable in L&I's jurisdiction. An arc flash study must be performed to determine the level of arcing current and the circuit breaker must be set to open instantaneously at a current level less than the minimum expected arcing current. Methods for determining expected arcing current can be found in Informative Annex D, 2015 [NFPA 70E®](#). If this method is used, you must provide documentation to the inspector showing the minimum expected arcing current and how it was calculated.

Enhanced worker safety is the goal of this requirement. Always follow guidelines found in NFPA 70E, Standard for Electrical Safety in the Workplace®.

Examinations Will be Based on 2014 NEC Beginning July 1, 2015

Over the past year, the department and our examination contractor, PSI, have been updating the electrical certification exam questions to the 2014 National Electrical Code (NEC®). Beginning July 1, 2015, all administrator candidates who take the exam for the first time, and all electrician candidates who are approved on or after July 1 will be given the updated exam. For more information, see the article in the [February 2015](#) Electrical Currents newsletter.

Last Chance to Grandfather Telecommunications Experience Toward (06) Certification

The opportunity to receive credit for previous unsupervised telecommunications work while working for a licensed (01) general or (06) limited energy electrical contractor will end on July 1, 2015. For more information, see the [May 2014](#) Electrical Currents newsletter. This opportunity began on June 12, 2014. All applications must be received before July 1, 2015. After that date, our legal authority to consider unsupervised telecommunications experience expires. If you have questions, call us at 360-902-5269. Do not miss out!

Pre-manufactured Floor Heating Mats

The placement of pre-manufactured heat mats in tile grout was added to Class A basic electrical work (i.e. work that does not require a permit) in a rule change that became effective November 25, 2005. [WAC 296-46B-901\(7\)\(b\)\(iv\)](#) says: *“Embedding pre-manufactured heat mats in tile grout where the mat is listed by an approved testing laboratory and comes from the manufacturer with pre-connected lead-in conductors. All listing marks and lead-in conductor labels must be left intact and visible for evaluation and inspection by the installing electrician and the electrical inspector.”* The placement of pre-manufactured heat mats is considered a Class A electrical installation. The setting of these “pre-manufactured” listed mats does not require an electrical permit or inspection, and the mat can be covered with grout by the tile setter. Laying these mats on the floor and covering them with grout is not an electrical installation. The installation of any wiring, including sensor installation, and routing the lead-in conductors to the thermostat or controller location, is an electrical installation and must be performed by appropriately certified electricians employed by licensed electrical contractors. We are beginning to see a type of floor heat mat, which has webbing between the heating cables that may be cut, allowing the heating cables to be repositioned to fit room contours. Any such alteration of the heating mat, or installation of a sensor, is an electrical installation requiring electrical permits, inspections, and proper licensing and certification for installers. To be eligible for the Class A permit exemption, the mat must be installed in its original factory pre-manufactured condition.

Ugly Picture: *Click on the picture to open a larger image.* This picture shows the results of splicing copper and aluminum conductors using standard wire nuts. NEC® 110.14 prohibits conductors of dissimilar metals to be intermixed in a terminal or splicing connector unless the device is identified for the purpose and conditions of use.



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