REPORT ON DISCUSSIONS
DURING UL MEETINGS
WITH ELECTRICAL INSPECTORS
AT THE
2010 IAEI SECTION MEETINGS

April 19, 2011

TO: Attendees of Underwriters Laboratories Inc. Meetings with Electrical Inspectors at the 2010 IAEI Section Meetings

SUBJECT: Report of Meetings

Underwriters Laboratories held meetings with Electrical Inspectors during the 2010 IAEI Section Meetings. Historically, these meetings have provided for an open exchange between the electrical inspection community and UL regarding any subject of interest to authorities.

UL acknowledges the importance of this feedback. The electrical inspector is an integral part of the UL information loop. It is the inspector, who during the examination of the final installation, can judge under field conditions, the adequacy of the constructions and markings for proper installation. It is the inspector who can pass this installation information to UL for use in modifying product safety requirements.

The questions and answers in this Report present the items discussed during the meetings. This is not a verbatim transcript; only the pertinent points have been recorded. Each question has been identified with the designation of the Section meeting at which the subject was discussed.

UL appreciates all those who took the time to participate in these meetings and provided us with information important for our endeavors and goals toward public safety. I would appreciate hearing from you on any comments or suggestions you have on this Report or the UL/Inspectors meetings.

UNDERWRITERS LABORATORIES INC.

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FROM

UL MEETINGS WITH ELECTRICAL INSPECTORS

AT THE 2010

ANNUAL IAEI SECTION MEETINGS

This report contains questions and answers from the 2010 meetings. Where necessary, the answers have been expanded to include information that may not have been available during the meetings. Where specific actions have taken place in response to the Inspector's input, the status of the actions is indicated. This report may provide insights into UL's intent and efforts that are associated with the certification of electrical equipment so that it meets the purposes of the National Electrical Code® and is installable in accordance with it. The questions have been arranged by subject matter and are identified in the margin with an identifier for the IAEI Section where the question was raised.

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IAEI Section Identifier Legend

(E) Eastern Section
(NW) Northwestern Section
(S) Southern Section
(SW) Southwestern Section
(W) Western Section

1.0 UL LISTING, CLASSIFICATION AND FIELD EVALUATION INFORMATION

1.1 (S) **Q.** Is the new NFPA 790 and 791 standards related to the ACES (American Council for Electrical Safety) documents?

A. Yes, in 2007 ACES requested that NFPA formalize the ACES documents Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation and Recommended Competency Guideline into formal standards.

Currently these documents have completed the ROC stage with the Technical Committee and have also passed ballot with the TCC. These documents will be voted on at the NFPA Annual meeting in June 2011.

The final NFPA 790 and 791 documents are significantly different in look and content than the ACES documents mostly due to the need to fit the NFPA style of writing. However the general guidance and criteria of the original ACES documents is mostly unchanged.

The document titles are NFPA 790 *Standard for Competency of Third Party Field Evaluation Bodies and* NFPA 791 *Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation.*

1.2 (S) **Q.** There are new EPA requirements regarding spray paint booths. Should AHJ's be looking for three separate markings (Control Panel, Burner and NFPA 33) on the spray paint booth in addition to an overall Listing mark?

A. The International Fire Code (IFC) requires paint spray booths to be installed in accordance with NFPA 33, "Spray Application Using Flammable and Combustible Materials".

UL Listed paint spray booths are covered under two UL product categories. Paint Spray Booths Without Fire Protection Systems for Use in Hazardous Locations (QEFA), and also Paint Spray Booths with Fire Protection Systems for Use in Hazardous Locations (QEFY), both categories are located on page 307 of the 2011 UL White Book. These two can also be found on UL's Online Certification Directory at www.ul.com/database and enter QEFA or QEFY at the category code search field. Products covered by both QEFA and QEFY are evaluated using NFPA 33.

Burners intended to be field installed are required to bear a separate UL Listing Mark. However paint spray booths that include a burner as part of the factory-furnished assembly are covered by the UL Listing mark as required by either UL product category QEFA of QEFY and do not require any additional separate UL listing marks.

The control panel will be covered by the overall spray paint booth Listing and in most cases will also be UL Listed and marked in accordance with UL

product category Industrial Control Panels (NITW) located on page 243 of the 2011 UL White Book, or Control Panels and Assemblies for use in Hazardous Locations (NNNY) located on page 251 of the 2011 UL White Book. These categories can also be located on UL's Online Certification Directory at www.ul.com/database and enter NITW or NNNY at the category code search field.

1.3 (NW) **Q.** Does UL 1439 have sharp edge requirements?

A. UL 1439, The Standard for Tests for Sharpness of Edges on Equipment is a reference standard that covers the test equipment and procedure to determine the potential of personal injury related to the sharpness of edges that are part of or associated with appliances and equipment where edge compliance is in question. The equipment end use standard would reference UL 1439 to determine compliance with potential sharp edges.

The test procedure consists of the application of the sharp-edge tester to an accessible edge and shall not result in the cutting through of the two outer layers of the sensing tapes.

1.4 (SW) **Q.** There are many Listed products out there, however, AHJs are having increasing difficulty requiring Listing, due in part to pressure from city managers, problems occurring with Listed products in the field, and products that don't meet code due to standards lagging behind codes. There is also evidence of lax evaluations by UL's competitors, which contributes to loss of confidence in the Listing process. We are slowly losing the ability to require Listing. What can UL do to help AHJs in this regard?

A. This is an ongoing issue in many parts of the country, and one that we can help each other in trying to improve.

Many municipalities are suffering due to the difficult economy, and city managers are struggling with reduced revenues. In some cases, and unfortunately, drastic reductions in inspection staff (and potentially public safety) have been the result. Less than thorough product evaluations by some certifiers can result in loss of confidence in the entire certification industry.

There are a number of steps that can be taken by AHJs in this regard:

A. Reject a NRTL-Listed product if you have reason to believe that the product cannot be installed in accordance with the NEC, or something about the product leads you to believe that it may not comply with the product standard. Section 90.7 of the NEC allows you to accept the Listing Mark of a qualified testing laboratory. It does not require you to accept the installation or equipment based on a Listing Mark.

B. Contact UL or the certification organization involved if you have any question about the equipment or installation. UL has a dedicated staff of technical professionals ready to respond in our Regulatory Services Department at 800-595-9844.

C. UL can only take steps to resolve issues you have in the field if we know about them. We strongly encourage you to file a Product Incident Report (PIR) – previously known as a Field Report, if you have an issue with a UL Listed product, potential counterfeit product, improper installation, installation instruction, unauthorized reference to UL on a company website, etc. This can be done online at www.ul.com/ahjreport or by contacting a UL Regulatory Services representative for assistance.

D. Participate on a UL Standards Technical Panel (STP). While UL is a Standards Developing Organization (SDO), content of most UL Standards is determined by a balanced committee consisting of 8 interest categories, including:

1. Producers (or organizations that represent producers)
2. Testing and standards organizations (UL staff)
3. Supply chain (installers, distributers, retailers)
4. AHJs
5. Government (CPSC, FDA, DOE, etc.)
6. Consumers
7. General interest (consultants, academia, etc.)
8. Commercial/industrial users

As administrator of the standards development process, UL is always looking for AHJs willing to participate on STPs.

E. Insist on UL Field Evaluations for products that do not bear a Listing Mark, or for modifications made to products in the field. According to field evaluation deficiency statistics provided at the UL/AHJ meetings, in the last 5 years, UL has conducted Field Evaluations on approximately 50,000 pieces of equipment. Overall, the total percentage with issues requiring resolution is over 64%. Many issues relate to components, grounding or nameplate markings, and without correction, might result in fire or shock hazards. Deficiency statistics are broken down by state and year, and are useful information to present to city managers to clearly justify strong enforcement at the AHJ level.

F. Hold all certification organizations to the same high level of technical expertise and service to AHJs.

1.5 (E) **Q.** I recall seeing years ago some verbiage in a jurisdictional statute that prohibited the buying, selling, or offering for sale any unlisted product. Can UL refer me to some jurisdiction that has such a law?

A. There are likely similar requirements in many jurisdictions, but the following is an excerpt from the City of Los Angeles, Department of Building and Safety Codes, 2008 L.A. Amendment Electrical Code:

SEC. 93.0402. SALE, INSTALLATION AND USE.
No person shall sell, offer for sale, advertise, or display for sale, dispose of by way of gift, loan, rental, lease or premium, or install or use any "equipment," as defined in Article 100 of the C.E.C., unless that equipment has been approved by the Department.

EXCEPTION: Equipment listed by an approved laboratory, provided the label, symbol or other identifying mark of the approved laboratory is affixed to the equipment and further provided that the equipment is installed and used in conformance with its listing and this Code.

1.6 (E) **Q**. I understand that UL has a new Alternative Energy Marking Guide. I didn't see any at your booth. How can I get a copy?

A. In order to provide you with copies of all of our Marking Guides; UL has incorporated them into the UL White Book. The White Book includes all nine of UL's electrical Marking and Application Guides located in Appendix A. One of the latest is the "Alternative Energy Equipment and Systems Application Guide". By including all nine of them into the 2011 White Book, you can be sure to have the Guides, together with other important information in one convenient and easy to carry companion tool to the National Electrical Code.

1.7 (E) **Q.** I've heard a great deal about UL's PV classes. How are things going?

A. UL's PV installer training offered through UL University (ULU) has progressed at an appreciable rate. Related courses range from 1-5 days, and can be as basic as a one-day workshop, presented by UL and NFPA®, which provides the student with knowledge on the 2011 National Electrical Code NEC® for designing and installing photovoltaic systems. Courses of 5 days each include (1) an intensive hands-on exposure to the process of installing a photovoltaic system, and (2) a PV System Installer Certification, where an individual must pass an exam. The exam is intended to measure the competency of a qualified electrical professional with classroom training in

electrical construction and several years of hands-on experience in the field. Details can be found on the UL web page -http://www.uluniversity.com

1.8 (E) **Q.** Why is UL requiring holographic labels on so many cable categories? When do the products with the old labels have to be removed?

A. In an effort to prevent the unauthorized use of, and to further enhance the integrity of the UL Mark, UL is expanding its requiring holographic type labels to a wide variety of cable categories. The effective date of October 1, 2010 only applies to products manufactured after that date. Existing product that was manufactured prior to that date with the non-holographic Listing Marks may take a while to be cleared from the supply chain.

1.9 (E) **Q.** I understand that these holographic labels will appear on the tag, the reel, or the smallest unit container in which the cable is packaged. By the time we get to the site the packaging is gone or perhaps the same packaging is being shown to us over and over. Why can't this marking be required on the actual product?

A. Area on a cable to display markings is certainly at a premium and it is difficult to include holographic elements on a cable surface. In general, the complete UL Mark will appear on the product unless otherwise indicated in the General Guide Information for a specific product category. When a UL Listed product is of such a size, shape, material or surface texture that, in UL's opinion, the complete UL Mark is unlikely to be applied legibly on the product, UL may authorize the complete UL Listing Mark to appear on the smallest unit container in which the product is packaged. In these cases, UL may authorize the use of the UL symbol on the product in addition to the complete UL Mark on the package.

With regard to the missing packaging at the site, "Approval" of the installation requires acceptance by the AHJ. You may withhold approval on multiple occurrences involving missing packaging.

With regard to, the same packaging being shown to you over and over, many AHJs have held onto the packaging/marks, or mark them in such a manner so that the marking addresses the quantity used.

2.0 SERVICE EQUIPMENT, SWITCHBOARDS, PANELBOARDS, AND POWER DISTRIBUTION EQUIPMENT

2.1 (NW) **Q.** Does UL list complete wind turbine driven pumping systems including a wind turbine, pump controller, and pump?

A. UL does not presently have a category specifically dedicated for small wind powered pumping systems. However, UL does List wind turbines and packaged pumping systems that could be combined in the field.

The wind power generation portion of such a system could be Listed under the product category Small Wind Turbine Generating Systems (ZGEN) located on page 453 of the 2011 UL White Book, and also on UL's Online Certification Directory at www.ul.com/database and enter ZGEN at the category code search field. This category covers grid tied, stand-alone and multiple mode product small wind turbine systems. These systems are evaluated for risk of fire and shock, including safety related control system electrical performance and utility grid-interconnect performance for Utility Interactive models. The basic requirements used to evaluate large and small wind turbine generating systems, and large and small wind turbine assemblies, and safety related control systems, is Subject 6141, UL's "Outline of Investigation for Wind Turbine Generating Systems".

The pumping portion of the system could be Listed under the product category Packaged Pumping Systems (QCZJ) located on page 306 of the 2011 UL White Book and also on UL's Online Certification Directory at www.ul.com/database and enter QCZJ at the category code search field. These two systems could be combined in the field and if necessary the combination of the two could be field evaluated. For more information on field evaluations, go to www.ul.com/field or call 877-854-3577, prompt number 2.

3.0 CIRCUIT BREAKERS AND AFCIs

3.1 (S) **Q.** Are there problems with AFCI breakers tripping due to other products such as vacuum cleaners, luminaries and ceiling fans?

A. UL has received some sporadic reports of combination AFCIs tripping with certain products. UL has not heard of ceiling fans being a problem. Vacuum cleaners presented some problems initially when combination type devices were first used (and also earlier when branch feeder type devices were first used), but at UL we have not received any recent reports. Luminaires have not specifically been a problem but CFL's have generated some reports, as have big screen TVs and treadmills due to the non-linear current waveforms they present to the AC line and also potential high frequency noise they may place on the line.

One problem is that the contractors supply house may have earlier vintage AFCIs on the shelf, while recently manufactured units usually have updated detection software to make them more resistant to this type of tripping. Going back to the contractors supply house will typically result in another AFCI with the same detection software installed, which does not fix the problem.

The AFCI manufacturer must be contacted by the person having the problem and must be involved in the solution. The best way to do this if the occurrence and the potential source of unwanted tripping has been thoroughly verified is to file an unwanted tripping report on NEMA's website at www.afcisafety.org. The AFCI manufacturer will work with the party making the complaint to try to resolve the issue. An AFCI with updated software is usually provided. The manufacturers collect this information and use it to improve their products so that each generation can become more resistant to unwanted tripping.

There is an ongoing task group involving UL, AFCI manufacturers and Authorities Having Jurisdiction (AHJ's) that have been meeting to develop an approach to these issues. This has included developing training materials for contractors and inspectors regarding how to deal with these issues as well as the manufacturers making their contact information more available on the internet and through their regional reps. UL has been working with the manufacturers and some involved AHJ's to develop additional training material that can be widely distributed. Additional information may be located at www.afcisafety.org.

3.2 (S) **Q.** Are plug-on backfed breakers required to have retention devices installed when supplied by a utility interactive inverter?

A. No, the following information is taken from the 2008 NEC;
690.64(B) (6) Fastening. Listed plug-in-type circuit breakers backfed from utility-interactive inverters complying with 690.60 shall be permitted to omit the additional fastener normally required by 408.36(D) for such applications.

705.12(D)(6) Fastening. Listed plug-in-type circuit breakers backfed from utility-interactive inverters that are listed and identified as interactive shall be permitted to omit the additional fastener normally required by 408.36(D) for such applications.

Yes, if it is a stand-alone inverter, the following information is taken from the 2011 NEC.

690.10(E) Back-fed Circuit Breakers. Plug-in type back fed circuit breakers connected to a stand-alone inverter output in either standalone or utility-interactive systems shall be secured in accordance with 408.36(D). Circuit breakers that are marked “line” and “load” shall not be backfed.

Also you will also find Inverters Listed under the product category Static Inverters, Converters, and Accessories for Use in Independent Power Systems (QIKH) located on page 316 of the 2011 UL White Book and also on UL’s Online Certification Directory at www.ul.com/database and enter QIKH at the category code search field. You will also find Inverters Listed under the product category Wind Turbine Inverters and Converters (ZGFA) located on page 453 of the 2011 UL White Book and also on UL’s Online Certification Directory at www.ul.com/database and enter ZGFA at the category code search field.

4.0 DISTRIBUTED ENERGY SYSTEMS

4.1 (W) **Q.** How will UL Classified large wind turbines be marked? Will there be one label by the door at the base of the tower or will it be up at the nacelle?

A. UL offers two types of certifications for large wind turbines. Large Wind Generating Assemblies, Construction only, (ZGBP) and Large Wind Generating Systems (ZGEA) which comprises construction and safety controls. These are both located on page 450 and 451 in the 2011 UL White Book. The category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter ZGBP or ZGEA at the category code search field.

These are both Classifications for electrical shock and risk of fire. There is no US national standard for wind turbine structural and mechanical safety at this time. For both categories the marking will be on the tower at the base and will detail the UL symbol, the word "CLASSIFIED" above the UL symbol and the following additional information:

LARGE WIND TURBINE GENERATING ASSEMBLY

For ZGBP

LARGE WIND TURBINE GENERATING ASSEMBLY
IN ACCORDANCE WITH UL SUBJECT 1640
+ SUBASSEMBLY
++ OF +++ TOTAL SUBASSEMBLIES
Control No.

+ Name of subassembly (e.g., **NACELLE**, **BLADE**, **TOWER SECTION**)
++, +++ Indicates the number of assemblies included in the complete wind turbine (e.g., 1 of 5, 2 of 5, 3 of 5)

For ZGEA it will state:

LARGE WIND TURBINE GENERATING SYSTEM
IN ACCORDANCE WITH UL SUBJECT 6140
+ SUBASSEMBLY
++ OF +++ TOTAL SUBASSEMBLIES
Control No.

+ Name of subassembly (e.g., **NACELLE**, **BLADE**, **BASE SECTION**, **TOWER SECTION**)

++, +++ Indicates the number of assemblies included in the complete wind turbine (e.g., 1 of 5, 2 of 5, 3 of 5)

4.2 (W) **Q.** Do small wind turbine poles need a hand hole for inspection of conductors and grounding?

A. It depends on how they are constructed and whether or not they are UL Classified. UL Classifies small wind turbines under the product category Small Wind Turbine Generating Systems, (ZGEN), located on page 452 in the 2011 UL White Book. The category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter ZGEN at the category code search field.

The new NEC Article 694 Small Wind Electric Systems, does not require openings in a tower to inspect wiring, but if wiring is field installed inside the tower, it seems reasonable for an inspector to demand to see it. Most of these poles are "tilt up", so it is possible the wiring could be inspected by tilting the tower down. Also, it is conceivable that a UL Classified small wind turbine tower could be factory made with conductors pre-installed, so that their routing and terminations inside are covered as internal wiring of a UL Classified product and covered by the requirements in UL Subject 6140, the Outline of Investigation for Wind Turbine Generating Systems and not covered by the NEC.

4.3 (W) **Q.** Does UL List the actual generators in wind turbine/generators?

A. Yes, UL Lists electric generators (also referred to as generator heads) under the product category Generators (JZGZ), located on page 205 in the 2011 UL White Book. The product category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter JZGZ at the category code search field.

All generators are provided with installation instruction information, which indicate the proper methods to secure the generator, electrically connect the generator to the prime mover (engine, wind turbine, etc.), and connect it to the generator drive. The instructions also provide information concerning the load rating at which the generator can operate.

4.4 (W) **Q.** Is it permissible to stub up conduits into the bottom of a stationary generator enclosure and continue the conductors out of the conduit directly into the generator itself or do I need to continue the conduit to the generator termination box?

A. Stationary generators are evaluated for compliance with the Standard for Safety for Stationary Engine Generator Assemblies UL 2200 and Listed under the product category Stationary Engine Generators (FTSR), located on page 154 in the 2011 UL White Book. You can also access the Guide Information for FTSR on UL's Online Certification Directory at www.ul.com/database and enter FTSR at the category code search field.

UL 2200 requires that engine generators be provided with a complete enclosure. The bottom of the enclosure can be mounted on a non-combustible surface such as concrete, similar to an open bottom switchboard. Conduit stubs ups into the enclosure may expose conductors within the enclosure, however, connection to the generator terminations box must be in compliance with the installation instructions and the NEC and be accessible to the AHJ for inspection.

5.0 LUMINAIRES AND SIGNS

5.1 (NW) **Q.** Does UL List low voltage lighting systems with bare conductor wiring as permitted in the NEC for low voltage lighting?

A. Yes, UL Lists low voltage lighting systems under the product category Low-voltage Lighting Systems, Power Units, Luminaires and Fittings (IFDR), located on page 174 in the 2011 UL White Book. This category covers low-voltage luminaires, low-voltage lighting power units, and low-voltage luminaire systems. The product category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter IFDR at the category code search field.

This category also covers low-voltage bare conductor lighting systems (sometimes referred to as "trapeze lights") incorporating luminaires which may be repositionable along the bare supply conductors that also support the luminaire. The power unit for these systems is provided with integral protection that de-energizes the output upon overloading or inadvertent shorting of exposed uninsulated live parts of the system. These luminaires and fittings are rated 30 V (42.4 V peak) or less and are intended for connection to an isolating type power unit, in accordance with NEC Article 411. Sets of low-voltage luminaires may include the power unit and interconnecting cabling to make up a low-voltage luminaire system.

5.2 (NW) **Q.** Does UL list sign conversions and is the transformer in a LED sign conversion kit covered by UL's evaluation? How do inspectors allow them? What should do we do?

A. Yes, UL Lists sign conversions under the product category Sign Conversions, Retrofit (UYWU), located on page 389 in the 2011 UL White Book. The product category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter UYWU at the category code search field.

Light-emitting diode (LED) kits consist of the power source, the LEDs and the LED mounting means necessary to change the type of illumination originally contained in the sign to LED illumination. The kit installation instructions specify the type of sign in which the kit is intended to be installed.

These retrofit sign conversions have been investigated to determine that, when used in accordance with the manufacturer's instructions provided with the retrofit device, they do not adversely affect the operation of the complete electric sign.

The Classification Mark of Underwriters Laboratories Inc. on the product is the

only method provided by UL to identify products manufactured under its Classification and Follow-Up Service. The Classification Mark for these products includes the UL symbol, the word "CLASSIFIED" above the UL symbol, and the following additional information:

RETROFIT SIGN CONVERSION LED KIT

:

RETROFIT SIGN CONVERSION
FOR USE ONLY WITH SIGN
MODEL ____ MANUFACTURED BY ____
Control No.
or
RETROFIT SIGN CONVERSION LED KIT
FOR USE ONLY IN ACCORDANCE WITH KIT INSTRUCTIONS
Control No.

5.3 (SW) **Q.** I am inspecting LED luminaires. There are no markings on the product, but the driver has a mark from another certification agency. The manufacturer has indicated that UL has told them that Listing is not necessary because it is low voltage. The company also has indicated that the product can be used for emergency lighting. What is UL's position on this?

A. Starting in the 2008 NEC, Section 410.6 requires all luminaires that are installed in accordance with Article 410 to be listed. This NEC installation requirement would apply to the LED luminaire that you have described, whether it were to be used for general lighting or in an emergency lighting application.

UL has a number of product categories that are specific to LED luminaires and their associated components. A tabulation of these product categories is provided on page 33 of the 2011 UL White Book.

Emergency Lighting and Power Equipment (FTBR) is covered on page 150 of the White Book. The product category Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter FTBR at the category code search field.

While each LED lamp generally operates at a very low voltage, due to the light output level, each LED module may produce a significant amount of heat. It is not uncommon for the core temperature of an LED to reach 150 degrees centigrade. The luminaire requires a carefully designed thermal management system to dissipate the heat and to reduce the risk of fire. So, despite the low voltage levels for each LED, evaluation and evidence of Listing is needed to make sure that the LED modules operate safely.

5.4 (E) **Q.** Are compact fluorescent lamps (CFLs) listed as double-ended lamps? I'm trying to see if they require a disconnecting means for the ballast, per 2011 NEC Article 410.130(G)?

A. No. In order for the disconnecting means requirements of the 2011 NEC Sec. 410.130 (G) to apply, the product must be a fluorescent luminare and utilize double ended lamps and contain ballast(s) which can be serviced in place. Whenever the term CFL (compact fluorescent lamp) is used, it is probable that one of the following products is being referred to.

a) SELF-BALLASTED LAMP- a device provided with a lamp base, a non-replaceable light source, and any additional elements necessary for starting and stabilizing operation of the light source, which cannot be dismantled without being permanently damaged.

b) SELF-BALLASTED LAMP ADAPTERS are similar, except that the light source is replaceable.

c) The term "Compact Fluorescent Lamp" is widely used when referring to the "bulb". In UL 935, The Standard for Safety for Fluorescent Lamp Ballasts, UL defines it as follows: "Compact Fluorescent Lamp" a fluorescent of a small compact shape (such as a folded construction) with all contacts terminating in a single base that performs the entire mechanical support function. Since only a single lampholder is utilized, it is not considered a double ended lamp.

5.5 (E) **Q.** 2011 NEC 410.136(B) requires a surface-mounted luminaire containing a ballast installed on combustible low-density cellulose fiberboard to be marked for this condition or be spaced at least 1 1/2 inches from the surface. In looking through the UL White Book and the Luminaire Marking Guide, I see no reference to this at all. Can we assume that there are no luminaires marked for this type of installation?

A. Presently, there are no luminaires Listed for this type of installation. UL stopped offering certification services to evaluate luminaires for installation on low-density cellulose fiberboard surfaces, in January 2000. This decision was made due to the lack of interest and requests for this type of evaluation. The Luminaire Marking Guide was revised to remove reference to these types of luminaire designs. Additionally, the acceptability of UL Listed luminaires installed on low-density cellulose fiberboard surfaces can be judged with regard to determining if the ballast is spaced a minimum of 1-½ inch from the surface.

5.6 (E) **Q.** Are compact fluorescent lamps (CFLs) supposed to be marked: “base up”, or “base down”?

A. UL Lists Compact fluorescent lamps under the product category Lamps, Self-Ballasted, and Lamp Adapters (OOLR), located on page 269 in the 2011 UL White Book. The product category Guide Information can also be located in UL’s Online Certification Directory at www.ul.com/database and enter OOLR at the category code search field. The basic standard used to investigate products in this category is UL 1993, The Standard for Safety for Self-Ballasted Lamps and Lamp Adapters. The standard requires that these products be tested under the worst case orientation. Accordingly, such markings are not required. Some older product still in the field may be found with such restrictive markings

5.7 (E) **Q.** Is UL aware of any problems with multiple (3) compact fluorescent lamps (CFLs) located in a single, enclosed luminaire lamp compartment?

A. No. The Listing of the 3 lamp enclosed luminaire would have included testing the luminaire with (3) 60W, “A” incandescent type lamps. The temperatures likely to result from incandescent lamps would be greater than the CFL’s. UL Lists CFL’s under the product category Lamps, Self-Ballasted and Lamp Adapters (OOLR) located on page 269 in the 2011 UL White Book. Guide Information can also be located in UL’s Online Certification Directory at www.ul.com/database and enter OOLR at the category code search field. The Guide Information for OOLR states that “These products have been investigated for use in the smaller of a 6- or 8-in. diameter, totally enclosed, recessed luminaire, if they will physically fit, unless marked not for use in a totally-enclosed luminaire.” So unless the CFLs are marked not for use in totally enclosed luminaires, they should be fine.

6.0 WIRING SYSTEMS AND WIRING DEVICES

6.1 (S) **Q.** Can sealing locknuts be used to close openings in the enclosure of a 300 amp service rated disconnect?

A. Yes, if properly installed. This question did not identify a couple of key factors such as; Are we asking about the line side service conductors or the load side feeder conductors?

If we are talking about the line side conductors, NEC Section 250.92(B) would not permit sealing type locknuts to be the sole means for bonding the raceway to the enclosure. However a sealing type locknut could be used on the exterior of the enclosure. UL Lists sealing type locknuts under the product category Conduit Fittings (DWTT), located on page 112 in the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter DWTT at the category code search field. Sealing locknuts are intended for use with threaded rigid metal conduit and intermediate metal conduit with one sealing locknut on the outside or the inside and either an ordinary locknut or sealing locknut on the inside of the enclosure for wet locations or liquid-tight applications. Sealing locknuts may also be used with Listed wet location or liquid-tight fittings where so marked on the fitting carton and used on the inside of the enclosure. UL Lists Grounding type locknuts and grounding bushings under the product category Grounding and Bonding Equipment (KDER), located on page 208 in the 2011 UL White Book.

If we are talking about the load side conductors, the Guide Information for DWTT under the heading of grounding states that all metal fittings for metal cable, conduit and tubing are considered suitable for grounding for use in circuits over and under 250 V and where installed in accordance with the NEC, except as noted for flexible metal conduit fittings and liquid-tight flexible metal conduit fittings.

6.2 (S) **Q.** Should an AHJ accept terminals that are field installed inside a NEMA type 3R junction box that is 36 inches square or is it a violation of the UL listing?

A. The acceptance of electrical equipment is the sole responsibility of the AHJ as described in NEC 90.4. However NEC 90.7 permits the AHJ to approve listed equipment without inspecting the internal wiring or construction, except to detect alterations or damage.

Once UL listed equipment has been modified from its original manufactured condition, UL has no way to determine if the product continues to comply with UL's the safety requirements used to certify the product without investigating the modified product. UL can neither indicate that such modifications "void" the UL Mark, nor that the product continues to meet UL's safety requirements,

unless the field modifications have been specifically investigated by UL. It is the responsibility of the Authority Having Jurisdiction (AHJ) to determine the acceptability of the modification or if the modifications are significant enough to require one of UL's Field Engineering Services staff members to evaluate the modified product.

However some field modifications may be authorized by UL if the product has specific replacement markings. For example, a switchboard may have specific grounding kits that are permitted to be added in the field. The switchboard is marked with a list of specific kit numbers that have been investigated for use in that particular switchboard. Only the grounding kits that are included on the marking on the product have been investigated for use in that product.

If it is determined by the AHJ that the field modification is not one that has been authorized by UL, the AHJ should then use NEC Section 110.3(A) as well as any other applicable NEC section to determining acceptability of the modified electrical equipment. If the parties involved wish UL to determine if the modifications made to a UL Listed product comply with UL requirements, the appropriate Field Engineering Service can be initiated to investigate the modifications. This investigation will only be conducted after UL consults with the AHJ to ensure that UL's investigation addresses all areas of concern and meets all of the AHJ's needs.

For more information on UL's Field Modification Policy, please see page 41 in the 2011 UL White Book. If you have any questions or would like to inquire about a Field Evaluation, contact Field Services at +1-877-UL-HELPS, prompt #2 (+1-877-854-3577) or visit http://www.ul.com/field/.

6.3 (E) **Q.** I heard some talk about "Snap Switches" failing because they were controlling compact fluorescent lamps (CFLs). Has UL investigated any such reports?

A. We have not heard of any such incidents. Without knowing the details surrounding the event, it is difficult to comment. However, Snap Switches (WJQR) Guide Information on page 410 of the 2011 UL White Book provides rating information. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter WJQR at the category code search field.

AC General-Use Snap Switches are the most widely used. An AC general-use snap switch has a marked current and voltage rating only for alternating current and is intended for installation in a flush device box (flush snap switch), mounting on an outlet box cover, or surface mounting (surface snap switch). AC general-use snap switches are tested for the control of resistive, inductive (including electric discharge lamp) and tungsten-filament lamp loads at 120 V up to the full current rating of the switch, and for motor loads up to 80% of the amp rating of the switch, but not exceeding 2 hp as long as the switch is being used within its ratings, there shouldn't be any issues controlling CFL loads.

6.4 (E) **Q.** Are any listed isolated ground GFCI receptacles available?

A. We are not aware of any listed, isolated ground, GFCI type receptacles at this time. However, such products would be permitted to be Listed by the Standard for Safety for Ground-Fault Circuit-Interrupters, UL 943 and covered under the category of Ground-Fault Circuit Interrupters (KCXS), on page 206 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter KCXS at the category code search field.

6.5 (E) **Q.** Are any listed Weather Resistant, GFCI receptacles available?

A. Yes. Such products are covered under category of Ground-Fault Circuit Interrupters (KCXS), on page 206 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter KCXS at the category code search field. The basic standard used to investigate products in this category is UL 943, The Standard for Safety For Ground-Fault Circuit-Interrupters. Receptacle-type GFCIs for use in wet and damp locations in accordance with Article 406 of the 2011 NEC are identified by the words ''Weather Resistant'' or the letters ''WR'' where they will be visible after installation with the cover plate secured as intended. Weather-resistant receptacle-type GFCIs installed in wet locations are intended to be installed with an enclosure that is weatherproof, whether or not the attachment plug cap is inserted.

6.6 (E) **Q.** Are any Listed single receptacle, GFCI receptacles available?

A. We are not aware of any Listed, single receptacle, GFCI type receptacles at this time. However, such products would be permitted to be Listed by the Standard for Safety for Ground-Fault Circuit-Interrupters, UL 943 and covered under the category of Ground-Fault Circuit Interrupters (KCXS), on page 206 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter KCXS at the category code search field.

6.7 (E) **Q.** I have a listed outlet box, a listed receptacle, and a listed receptacle cover, can I install this in a floor?

A. No, the code requires a listed assembly. It appears that you are only providing an assembly of Listed parts. The 2008 NEC 314.27(C) and 2011 NEC 314.27(B) (Outlet Boxes, Floor Boxes) requires: Floor Boxes listed specifically for this application shall be used for receptacles located in the floor.

Exception: Where the authority having jurisdiction judges them free from likely exposure to physical damage, moisture, and dirt, boxes located in elevated floors of show windows and similar locations shall be permitted to be other than those listed for floor applications.

Such products are covered under the category Metallic Outlet Boxes (QCIT) on page 303 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter QCIT at the category code search field. The basic standard used to investigate products in this category is UL 514A, The Standard for Safety for Metallic Outlet Boxes. Nonmetallic floor boxes are covered under the category Nonmetallic Outlet Boxes (QCMZ), also on page 303 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter QCMZ at the category code search field. The basic standard used to investigate products in this category is UL 514C, The Standard for Safety for "Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers," and UL 514D, ''Cover Plates for Flush-Mounted Wiring Devices."

Floor boxes designed for floor installation as covered in the NEC are provided with covers and gaskets to exclude surface water and sweeping compounds that might be present in floor cleaning operations. Covers with gaskets may be shipped separately from the boxes. Both products are provided with installation instructions. Those boxes intended for installation in concrete floors are frequently provided with leveling screws, threaded hubs or both, and are provided with a marking on the carton to identify boxes of this type such as ''Floor Box Cover,'' ''Floor Box'' or ''Floor Box, Concrete Tight'' as appropriate.

6.8 (E) **Q.** Has UL investigated the effects of spray-on foam insulation on Type NM Cable jackets or individual conductor insulation?

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A. UL has not specifically investigated the effects of spray-on foam insulation on the jacket or insulation materials of NM cable. We are not aware of evidence that would suggest chemical corrosion. Once cured, these spray-on foam

materials are inert solids and are not expected to effect the PVC insulation or jacket. While the curing process varies with the type of spray-on foam, the curing process usually begins immediately after application, with the foam being fully cured in 1 to 12 hours. Since the majority of these products do not contain Volatile Organic Compounds (VOCs) or formaldehyde, these foams, in the non-cured state, are currently considered compatible with cable insulation.

There have been noted cases of conductor insulation damage in installations where spray-on foam was applied in direct contact with insulated cables. It is possible that the damage noted is from incorrect application of the insulation, applying more spray-on foam in a single pass than recommended. Not following the manufacturer's recommendations, and applying the spray-on insulation too thick results in higher curing temperatures that may damage building materials, including electrical insulation. Damage that is a result of thermal heating due to the curing process is consistent with the type of damage reported.

6.9 (E) **Q.** The 2008 NEC and 2011 NEC, Section 680.26(C) Article 680 requires that the water of a pool be bonded to the Bonding grid. Are there any Listed components listed for this, and does the code require that Listed parts be used?

A. There are a couple of Listed pipe fitting type products for this application that are available, and are covered under the product categories of Swimming Pool and Spa Equipment, Miscellaneous (WDUT) on page 402 of the 2011 UL White Book and Grounding and Bonding Equipment (KDER), on page 208 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter WDUT or KDER at the category code search field.

The 2008 NEC, Article 680.26(C) Pool Water. REQUIRES: An intentional bond of a minimum conductive surface area of 5806 mm^2 (9 $in.^2$) and 2011 NEC, Article 680.26(C) Pool Water. REQUIRES: An intentional bond of a minimum conductive surface area of 5800 mm^2 (9 $in.^2$) shall be installed in contact with the pool water. This bond shall be permitted to consist of parts that are required to be bonded in 680.26(B).

7.0 APPLIANCES AND UTILIZATION EQUIPMENT

7.1 (SW) **Q.** While inspecting a rolling shutter, I can't tell if the overall assembly is Listed. The Online Certification Directory shows that this manufacturer's product is Listed, but I can only find Recognized Component markings on the product components. The paperwork provided with the product indicates Listing. What's missing?

A. Evidence of UL Listing would be the UL Listing Mark on the product. For a complete system that utilizes a number of individual components, some of the components may bear the UL Recognized Component marking, and it is important to note that the installation manual for the system will indicate all of the components that are intended to be used for the Listed assembly. Inspection by an AHJ would normally be limited to verifying Listing of the overall equipment and checking to make sure that the instructions were followed as appropriate for the installation.

Recognized Component markings on the individual components (such as photo sensors) do not signify UL Listing of the overall product or assembly, only that the components have been subjected to a limited investigation. These components have conditions of acceptability that would have to be evaluated by UL as part of the overall equipment. The Listed assembly would be covered by the UL Product Category for Door, Drapery, Gate, Louver, and Window Operators and Systems (FDDR). Guide Information for this product category is located on page 134 of the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter FDDR at the category code search field.

This manufacturer may be authorized to apply UL Listing Marks to their product in the factory, but did not, for unknown reasons. It could have been an oversight at the manufacturer's facility, or perhaps the product was not constructed in accordance with the Listing. At the request of the manufacturer, UL could conduct a Field Investigation of the equipment as installed in the field, and if constructed in accordance with the Listing, the product could be labeled in the field, but only in the presence of a UL representative.

7.3 (S) **Q.** I have a pool with swimming pool light marked Fresh Water Only, and a salt water chlorinator. Is that acceptable?

A. UL Lists Swimming pool luminaires under the product category Luminaires and Forming Shells (WBDT), located on page 397 in the 2011 UL White Book. Guide Information can also be located in UL's Online Certification Directory at www.ul.com/database and enter WBDT at the category code search field.

The Guide Information for (WBDT) states: Luminaires are marked to indicate their suitability for use in fresh water, sea water, or both. Luminaires marked as suitable for use in fresh water are also considered suitable for use in salt-

treated water. Consideration was given to the vast difference in salt concentration between “salt treated water” and “sea water”.

8.0 COUNTERFEITING AND OTHER TOPICS

8.1 (S) **Q.** Does UL have a summary of violations and prosecutions for products bearing counterfeit or unauthorized UL certification marks?

A. UL anti-counterfeiting operations is constantly working hand in hand with law enforcement agencies from around the country in the determination, seizure of product and often prosecution of those found distributing or selling counterfeit UL labeled electrical products.

On a daily basis UL receives inquiries from U.S. Customs and Border Protection ports around the country with questions about suspiciously marked electrical products and when the UL certification marks are determined to be unauthorized we provide a letter to US Customs and Border Protection recommending the seizure and ultimate destruction of the product.

UL is currently involved with several cases of prosecution, however they are confidential until such time that the case is brought to trial.

The following link also shows some related activities or events that UL has taken part in.
www.ul.com/global/eng/pages/offerings/services/programs/anticounterfeitingoperations/action/

8.2 (S) **Q.** Is there a procedure for inspecting products marked only with the CE mark for compliance with the US safety standards before they enter the US?

A. Yes and No. Since there is no national requirement to have everything listed and labeled to US Standards and there is no prohibition from any product with or without a US certification mark from entering the country there is nothing to stop a "CE" only marked product from entering the U.S. and being installed.

Where there are local requirements and where the local AHJ put the local requirements forward at the beginning of any project, then the purchasing process can put into the purchase contract the requirement that "CE" is not acceptable and that the product must be listed and labeled or evaluated by a recognized testing laboratory such as UL. Then the manufacturer or supplier is notified that they need to do something and can either ensure a listed and labeled product is supplied or initiate a field evaluation early on so that the field evaluation is done concurrent with the manufacturing and shipping of the product.

Not following this path can cause the AHJ to turn down the product and possibly delay the installation or approval of the installation until the listing, labeling or evaluation requirements are met.