

# TEMPORARY CHANGE REQUEST

TCR NO. **TCR-ENG-041,R0-004**

(e.g., TCR-ENG-021,R0-001)

The Temporary Change Request (TCR) Form is to be used to process urgent or minor changes for PPPL Policies, Organization/Mission Statements and Procedures. The TCR should be used when changes are:  
1) urgent, and can not wait the 2-4 week period for Department Head review/comment, or  
2) minor, and do not warrant Department Head review.

Person Requesting Change: Erik Perry

Phone Ext: 3016

Department Name: Engineering

Document Number: ENG-041

Revision No.: 0

Document Title: Electrician Qualification

**Reason for change:**

3 year review, updated titles and reference documents.

**Change description:** (Summarize and attach changed pages, with changes clearly indicated)

Replaced ADEI with Head, Engineering Department

Replaced Electrical Engineering Division Head with Electrical Engineering Group Head

Updated refereneces

1. Does this TCR significantly alter the intent or scope of the document? YES:        NO: **X**       

2. Does this TCR significantly impact **ES&H**? YES:        NO: **X**       

If 1 or 2 is **YES**, Explain why the changes should not be routed for Department Head review:

\_\_\_\_\_  
**Department/Division Head Approval**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Head, Quality Assurance/Quality Control**

**Date**

Release/Effective date of this TCR: 9/18/17

Incorporate this TCR into next revision of this document?

YES: **X**        NO:       

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<b>PPPL</b>	<b>Princeton Plasma Physics Laboratory</b>	<b>PROCEDURE</b>	<b>ENG-041 Rev 0 page 1 of 2</b>
	<b>Subject:</b>  <b>Electrician Qualification</b>	<b>Effective Date:</b>  January 22, 2009	<b>Initiated by:</b>  Engineering Department Head
	<b>Supersedes:</b>  NEW	<b>Approved:</b>  Director	

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### Applicability

This procedure applies to the training and qualification of all PPPL electricians and all persons, including subcontractors, working on electrical distribution systems at PPPL with voltages above 50 volts. Persons who have a valid, State issued Qualified Journeyman Electrician ID card, or equivalent, are considered to be Qualified Electricians and do not need to qualify per this procedure. This procedure applies to PPPL staff at all locations.

### Introduction

This procedure identifies the skills required to perform as a qualified electrician at PPPL. Meeting the requirements of this procedure identifies an electrician as having the “skills of the trade” and he/she is therefore authorized to perform work accordingly. Electrician apprentices must work under the direct field supervision of a qualified electrician. No one can perform work involving the skills listed under “Additional Expertise Areas” unless they have been qualified for that specific skill per this procedure or they are working as an apprentice under the direct field supervision of an electrician who is qualified per this procedure to work in that expertise area.

### References

National Electric Code (NEC)  
 NFPA – 70E  
 Procedure TR-001, Laboratory Training Program  
 Procedure TR-006, Establishing Qualification and Certification Requirements  
 PPPL ESHD 5008 section 2, chapters 2 and 3  
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### Definitions & Acronyms

Apprentice – Someone who is working under the direct field supervision of a qualified electrician  
 EUT – Electrical Utilization Training  
 LOTO – Lockout / Tagout  
 NEC – National Electric Code  
 Qualified Electrician – Someone who has been qualified by this procedure

**Procedure**

**Responsibility**

**Action**

- |   |  |
|---|--|
| Electrician Candidate   | 1. Take the training listed on the Electrician Qualification Checklist (Attachment 1) and pass each test with a score of at least 80%.   |
| Supervisor of Electrician   | 2. Fill out an Electrician Qualification Checklist for each person who is to be qualified as an electrician.<br><br>3. Attach documentation showing that the individual has current training for each of the four courses listed on the checklist.<br><br>4. Attach documentation supporting the fact that the individual has obtained the required skills.<br><br>5. Attach documentation supporting the fact that the individual has obtained the additional expertise skills which have been checked off on the checklist.<br><br>6. Attach documentation that the individual has completed the required on-the-job training for the basic skills.<br><br>7. Attach documentation that the individual has completed the required on-the-job training for the specialty areas which have been checked off on the checklist.<br><br>8. Perform a requalification every three (3) years consisting of a review of the individual's proficiency and knowledge with respect to the proper operations and safety requirements for this qualification. The requalification will be recorded on Attachment 1. |
| Training Specialist   | 9. Upon successful completion of the qualification requirements, assembles the qualification file.<br><br>10. Reviews the package for compliance with this procedure and any applicable DOE Orders, and prepares the Statement of Qualification.<br><br>11. When the package is complete, signs the Statement of Qualification and forwards the package to the Head of the Electrical Engineering Group. <b>TCR-ENG-041,R0-004</b>   |
| Head of the Electrical Engineering Group<br><b>TCR-ENG-041,R0-004</b> | 12. Reviews the package and decides whether to convene a panel to interview the electrician candidate and his supervisor in order to verify that requirements have been adequately met.<br><br>13. Approves the package or notifies the electrician candidate and his supervisor of the areas which need further attention before the qualification can proceed.<br><br>14. When the package has been approved, forwards it to the Head, Engineering Department. <b>TCR-ENG-041,R0-004</b>   |
| Head, Engineering Department<br><b>TCR-ENG-041,R0-004</b>             | 15. Reviews and approves the package.<br><br>16. Returns the completed, signed-off package to the Office of Certification and Training for filing.   |

**Electrician Qualification Checklist****Attachment 1**

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Electrician Qualification Checklist for: \_\_\_\_\_

**Minimum Education:**

- High School / Vocational School Diploma or G.E.D.

**Training / Course Requirements:**

- Basic Electrical AC/DC Theory (*waived for licensed electrician*) date: \_\_\_\_\_
- National Electric Code Update Course (*every 3 years*) date: \_\_\_\_\_
- Lockout / Tagout training date: \_\_\_\_\_
- Electrical Utilization Training date: \_\_\_\_\_

**Skill Requirements:**

- Proper performance of Lockout/Tag Out (LOTO)
- Conduit bending and installation
- Wire and cable pulling
- Blueprint reading
- Control/schematic diagram reading (basic)
- Practical Application of the National Electric Code
- Familiarity with NFPA 70E
- Basic troubleshooting techniques
- Performing equipment preventative maintenance
- Familiarity with PPPL ESHD 5008 Section 2, Electrical Safety

Supervisor witness: \_\_\_\_\_

**Additional Expertise Areas (not all required):***Note: Individuals can only work in these areas if their qualification includes the area*

- Basic Electronics including but not limited to:  
Electronic sensors  
Lighting controllers  
Programmable Logic Controller (PLC) testing and troubleshooting
- Control / schematic diagram reading including but not limited to:  
Controls for air conditioning  
Electric furnaces  
Machine control logic (i.e. motor controls, relays, control devices, etc.)  
Protective relaying
- Computer fiber optic installations and terminations
- Familiarity with Local Area Networks (LANs)
- Fire Alarm and Life Safety systems
- PLC programming
- Performing Preventative Maintenance and replacement of battery systems
- Proper techniques for operating and troubleshooting switchgear
- Transformer connections and testing

Supervisor approval: \_\_\_\_\_

**Electrician Qualification Checklist****Attachment 1**

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**Electrician Qualification Checklist for:** \_\_\_\_\_**On the Job Training:**

Electrician shall complete 8,000 documented hours working as an electrical trainee. These documented hours must include a minimum of 4,000 documented hours working on:

- Conduits and raceways
- Conductors and insulators
- Electrical blueprint reading
- Electrical schematic diagrams and power single-line diagrams
- Electrical boxes
- Electrical distribution and power transformers
- Electrical equipment connections
- Grounding
- Industrial panels
- Industrial fuses and circuit breakers
- Industrial plugs, receptacles, and switches
- Industrial relays, contactors and solenoids
- Local distribution of electrical power
- Motors, AC and DC installations, testing, troubleshooting
- Transformers installations, testing, troubleshooting

- Every three years perform a requalification to ensure that individual is current and proficient with the proper operations/safety requirements of this qualification.

Supervisor approval: \_\_\_\_\_

date: \_\_\_\_\_

In addition, a minimum of 1,000 documented hours working on a specialty area is required in order to be qualified for that area:

- Basic Electronics including but not limited to:
  - Electronic sensors
  - Lighting controllers
  - Programmable Logic Controller (PLC) testing and troubleshooting
- Control / schematic diagram reading (advanced) including but not limited to:
  - Controls for air conditioning
  - Electric furnaces
  - Machine control logic (motor controls, relays, control devices, etc.)
  - Protective relaying
- Computer fiber optic installations and terminations
- Familiarity with Local Area Networks (LANs)
- Fire Alarm and Life Safety systems
- PLC programming
- Performing Preventative Maintenance and replacement of battery systems
- Proper techniques for operating and troubleshooting switchgear
- Transformer connections and testing

Supervisor approval: \_\_\_\_\_

Reviewed: \_\_\_\_\_

Electrical Engineering Group Head TCR-ENG-041,R0-004

date

Approved: \_\_\_\_\_

Head, Engineering Department

TCR-ENG-041,R0-004

date