

# TEMPORARY CHANGE REQUEST

TCR NO. **TCR-ENG-026, R4-002**

(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: Scott Decker Phone Ext: 2542

Department Name: Facilities

Document Number: ENG-026 Revision No.: 5

Document Title: Fire and Life Safety Systems

**Reason for change:**

Three year Review.

Add Management Systems, Training and Records sections

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

Updated Standard Dates 2009 to 2015

Added NFPA 1

Updated DOE order 420.1C

Updated Doe Standard 1066-12

Added Uniform Fire Code of New Jersey

Added Management Systems, Training and Records Sections

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

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

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: \_\_\_\_\_

Incorporate this TCR into next revision of this document? YES:  NO:

<b>Subject:</b>  Fire and Life Safety Systems	<b>Effective Date:</b>  March 7, 2011	<b>Initiated by:</b>  Associate Director, Engineering and Infrastructure
	<b>Supersedes:</b>  Rev. 3, dated 2/28/06	<b>Approved:</b>   Director

**TCR-ENG-026, R4-002**

- Management System (Primary):** 08.00 Facilities
  - Management System Owner:** Head, Facilities
  - Management Process:** 08.17 Fire Protection & Life Safety
  - Process Owner:** Head, Facilities
  - Sub-Process:** 08.17.03 Fire Suppression/ Detection Systems
  - Sub-Process Owner:** Head, Facilities
  - Subject Matter Experts (SMEs):** Fire Protection Engineer
- TCR-ENG-026,R4-002

**Applicability**

This procedure applies to work performed by PPPL staff and subcontractors on fire and life safety systems at C and D Sites. The term "fire and life safety systems" as used herein designates any equipment (smoke detectors, sprinkler systems, Halon systems, FM-200 systems, CO<sub>2</sub> systems, fire dampers, etc.) used to detect, contain, control or suppress a fire and equipment such as emergency lights and exit signs that are necessary to assure safe building egress. It also applies to work activities that may affect fire systems such as welding, grinding and open flames. B Site fire detection and suppression systems are not included within this procedure because they are the responsibility of Princeton University, Main Campus. Fire extinguishers are also not included in this procedure.

**Introduction**

This procedure defines controls established to assure the functionality of fire systems. Reviews and approvals are imposed to assure that proposed additions, modifications, repairs and/or removals receive an appropriate technical evaluation and proper documentation to minimize the risk of impairing the existing system(s). Requirements are also specified for periodic testing, coordinating work and controlling impairments.

**Reference Documents**

- |                   |  |
|-------------------|--|
| NFPA              | National Fire Protection Association Standards and Codes |
| FM                | Factory Mutual Data Sheets                               |
| DOE Order 420.1B  | Facility Safety  |
| DOE Order 470.4   | Safeguards and Security Program                          |
| DOE Standard 1066 | Fire Protection Design Criteria                          |
| DOE Standard 1088 | Fire Protection for Relocatable Structures               |
| Building Code     | 2015 International Building Code, New Jersey Edition     |
| Fire Code         | 2015 International Fire Code, New Jersey Edition         |

ES&H 5008

2015 Uniform Fire Code of New Jersey  
Fire Safety (Section 5)  
Facilities procedures pertaining to specific tasks for the  
inspection, test and repair of fire systems

NFPA 1  
TCR-ENG-026,R4-002

**Abbreviations**

Some of the abbreviations used throughout this procedure are:

- ESU            Emergency Services Unit of the Site Protection Department
- ES&H        Environment, Safety & Health Department
- FPE           Fire Protection Engineer
- Facilities    Facilities and Site Services Division of the Engineering Department
- SPD         Site Protection Division of ES&H
- WO          Facilities and Site Services Work Order
- Fire Systems All Fire Detection, Fire Alarm and Fire Suppression Systems

**Procedure**

**A. Configuration Control and Documentation of Fire Systems**

Both the design and the documentation for fire and life safety systems are under configuration control as specified herein. New systems will not be installed nor will existing systems be modified without the design review specified below.

**Responsibility            Action**

- Facilities FPE            1. Develops and maintains a list of controlled documents for fire systems. No revision, addition or deletion of these documents is allowed without review and authorization from the Facilities Division Fire Protection Engineer (FPE). The Facilities FPE will be the designated approval authority for all Engineering Change Notices (ECNs) involving fire protection drawings and the "approver" for all changed fire protection system drawings. The latest drawings and revisions shall be maintained in the Engineering Department Central Drafting Files except for Simplex system drawings that are maintained by SimplexGrinnell.
- 2. Assures fire detection and suppression system drawings and procedures are maintained current.
- 3. Exercises “Authority Having Jurisdiction” (AHJ) responsibilities and authority for fire and life safety systems as defined in the applicable NFPA documents.
- Cognizant System / Project Engineer        4. Forwards specifications, drawings, procedures and any other documentation for proposed fire system installations or modifications to

(COG) the appropriate reviewers. Design reviews and documentation will be conducted in accordance with ENG-032, Work Planning Procedure and ENG-033, Design Verification. Procedure writing and review will be conducted in accordance with EFA-001, "Preparation, Review and Approval of M&O Procedures".

Reviewers 5. Reviews work documentation and resolves comments with Facilities cognizant engineer (COG).

Facilities FPE 6. Determines if any additional existing fire protection system documentation needs to be updated.

Facilities COG 7. Updates design documents with as-built details and forwards to drafting. The as-built details may be shown manually or, in the case of work completed by subcontractors, revised drawings and/or disk files may be submitted to Central Drafting.

**B. Repair of Fire Systems**

Repair of inoperative systems is the highest priority fire system work. Facilities will assure that inoperative systems are repaired and returned to service as expeditiously as possible. When fire systems are impaired, but not inoperative, or when redundant systems exist, the FPE will provide guidance on the appropriate priority for the repair and the appropriate compensatory measures.

**Responsibility**

**Action**

Initiator 1. Identifies need to repair a fire system. Transmits information to Facilities by submitting a WO request.

Facilities Administrative Assistant 2. Issues WO and delivers WO to Maintenance Manager.

Facilities Maintenance Manager 3. Assigns work to appropriate trade or subcontractor, reviews for correctness and completeness, and forwards to Facilities FPE for review.

Facilities FPE 4. Provides guidance, as required, in deciding the proper response to the initiator's request. Reviews work order and attached documentation and provides additional information needed for task completion. In particular, the FPE will assure that proper procedures and testing are specified and that proper replacement parts are specified, if necessary.

- Facilities FPE 5. Transmits WO to Maintenance Manager or general trade supervisor in his absence. Advises manager/supervisor of the need for priority when a system is inoperative. Coordinates the need, specification and priority for replacement parts, if required.
- Facilities  
Maintenance  
Manager 6. Orders and expedites parts and supplies, as required.
7. Reviews WO for completeness and attaches procedures and other documentation as required by the FPE. Contacts FPE with questions or if additional documentation is needed.
- Facilities Trade  
Staff 8. Completes work in accordance with WO package, any applicable system procedures and other sections of this procedure, in particular Paragraphs D and E on Coordination and Impairments, respectively. Documents completion of work and, in particular, testing accomplished and results.
- Facilities  
Maintenance  
Manager 9. Tracks WOs to assure timely and proper completion of fire system repairs.
10. Reviews completed work order to ascertain if any history should be entered into the Computerized Maintenance Database and if any information should be given to the FPE.
- Facilities  
Administrative  
Assistant 11. Enters data, as required, into the Computerized Maintenance Database and files work order documentation.

### C. Periodic Inspection and Testing (Preventive Maintenance) of Fire Systems

Preventive maintenance (PM) of fire systems is accomplished per NFPA requirements except that the scheduled frequencies may be adjusted as allowed by DOE guidance. Various organizations are responsible for completing fire system PMs including SPD, MG Section and Facilities. The Facilities Division, however, is responsible for scheduling and record keeping except that the records for the MG CO<sub>2</sub> systems, other than the PM cards, are kept by the MG section.

<b><u>Responsibility</u></b>	<b><u>Action</u></b>
Facilities FPE	1. Determines testing and inspection requirements based on applicable codes and transmits to Facilities Data Systems Coordinator.
Facilities Administrative Assistant	2. Enters requirements in the Preventive Maintenance Database.
	3. Generates work orders for inspections and tests in accordance with the frequency requirements established by the FPE.
	4. Distributes preventive maintenance work orders and applicable procedures to individuals or groups responsible for testing, inspection or maintenance activities. For Facilities PM items, issues a WO that is reviewed and accomplished in accordance with Section B of this procedure.
Personnel Assigned PM Work Orders	5. Performs actions required by preventive maintenance work orders, any applicable system procedures and other sections of this procedure, in particular Paragraphs D, E and F on Coordination, Impairments and Testing, respectively.
	6. Informs ESU of any discrepancies noted which impair system operation.
	7. Initiates work orders for items needing corrective action.
	8. Returns signed PM Work Orders to the Facilities Data Systems.
Facilities Administrative Assistant	9. Reviews completed work order to ascertain if any history should be entered into the Computerized Maintenance Database. Forwards completed Fire PMs to FPE for review.
	10. Enters data, as required, into the Computerized Maintenance Database and files work order documentation.

**D. Coordination of Work on Fire Systems**

<b><u>Responsibility</u></b>	<b><u>Action</u></b>
Facilities Personnel or Subcontractor in charge of work	1. Coordinate D-Site work in accordance with Procedure EFF-023 and any applicable D-Site procedures.
	2. Coordinates C-Site work with:

- a. ESU Duty Fire Captain
  - b. ESU Communications Center.
3. When work activities may result in alarms, radio communication should normally be established with the ESU Communications Officer.

**E. Impairment of Fire Systems**

A fire system "impairment" is any condition that affects or could affect the ability of the system to fulfill its intended function. Because of the importance of fire systems, all impairments, whether intentional or due to equipment failure, must be tracked by ESU and the systems must be restored to full capability as expeditiously as possible. Except for impairments necessitated by Hot Work Permits, all impairments must be reviewed and approved in advance by the Facilities FPE. For WOs this review is accomplished when the Facilities FPE approves the WO. Hot Work Permits are covered by other applicable directives. The intentional impairment of systems will be done by ESU except that Facilities personnel and their fire system subcontractors may impair systems for testing or repair when the concurrence of the ESU Captain is obtained.

Unplanned impairments may constitute a reportable occurrence. Therefore, they must be reported expeditiously so that a determination of reportability can be made.

**Case 1, Discovery of an Unplanned Impairment**

**Responsibility**

**Action**

Discoverer

- 1. Reports discovery of impairment to ESU.

ESU

- 2. Logs impairment.
- 3. Requests correction of impairment by Facilities. If the impairment is discovered by Facilities personnel, the discoverer may assume the responsibility of the corrective action request; however, the ESU officer must specifically determine and document that the discoverer has assumed that responsibility.
- 4. Places impairment tag on affected system.
- 5. In conjunction with the Facilities FPE, determines appropriate compensatory measures and implements them. (See also ESHD 5008, Section 5)

SPD (ESU or Security)

- 6. Evaluates report of malfunctioning fire detection and suppression system and, if possible, corrects deficiency within one hour of discovery. If deficiency exists more than one hour after discovery without permit, initiates correction of the deficiency and/or compensatory measures (roving fire watch, etc.) and informs Facility Manager of deficiency in

accordance with GEN-006.

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|-----|--|
| ESU | <ol style="list-style-type: none"> <li>7. At conclusion of impairment, places system back in service, if applicable.</li> <li>8. Removes impairment tag.</li> <li>9. Logs conclusion of impairment.</li> </ol> |
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**Case 2, Hot Work Permits**

**(Note: Only the impairment aspects of Hot Work Permits are covered here. See ESHD 5008, Section 5, Chapter 3 for other fire protection requirements and Section 9, Chapter 15 for safety and hygiene requirements.)**

<u>Responsibility</u>	<u>Action</u>
Initiator	<ol style="list-style-type: none"> <li>1. Requests that hot work permit be issued by calling ESU (3166), or the ESU Communication Center (2536), if ESU cannot be reached.</li> </ol>
ESU	<ol style="list-style-type: none"> <li>2. Issues hot work permit in accordance with other directives for all open flame, grinding and welding activities once all applicable mandatory requirements have been met (hazardous activities curtailed, combustibles moved if possible, fire watch/patrol initiated, fire extinguishers in place, etc.).</li> <li>3. Disables, when appropriate, fire alarm, fire detection and suppression system(s) based on hot work permit requirements.</li> <li>4. Places impairment tag on affected system(s).</li> <li>5. Logs impairment(s) and estimated time at which the impairment will be cleared.</li> </ol>
Initiator	<ol style="list-style-type: none"> <li>6. Notifies ESU when work requiring Hot Work Permit has been completed.</li> </ol>
ESU	<ol style="list-style-type: none"> <li>7. Restores impaired system(s).</li> <li>8. Removes impairment tag.</li> <li>9. Logs conclusion of impairment.</li> </ol>
ESU Supervisor or Designee	<ol style="list-style-type: none"> <li>10. If the estimated time passes without notification that the work is completed, contacts initiator to obtain a new estimated completion time or, if work is no longer in progress, restores the system(s) per steps 7 to</li> </ol>



9 of this section.

**Case 3, Impairments for Maintenance or Testing**

The Facilities Person in Charge of Work may be an FPE, an Electrician for electrical systems or a Plumber for mechanical systems.

<u>Responsibility</u>	<u>Action</u>
Facilities Person in Charge of Work	<ol style="list-style-type: none"> <li>In addition to the coordination requirements of paragraph D, coordinate with ESU, specifically, the impairments to be made and the estimated time at which the impairment will be cleared.</li> <li>Arranges to meet the firewatch requirements of other directives, if applicable.</li> </ol>
ESU	<ol style="list-style-type: none"> <li>Logs impairment(s) and estimated time at which the impairment will be cleared.</li> <li>Verifies that firewatch requirements of other directives are met, if applicable.</li> <li>Places impairment tag on affected system(s). <b>EXCEPTION:</b> For short duration impairments (8 hours or less) with a worker remaining at the impaired alarm panel or suppression system, tagging is at the ESU Captain’s discretion. ESU responsibility to track the impairment is unchanged.</li> </ol>
Facilities Person in Charge of Work	<ol style="list-style-type: none"> <li>Notifies ESU when impairment(s) are cleared.</li> </ol>
ESU	<ol style="list-style-type: none"> <li>Logs impairment(s) cleared and removes tag, if applicable.</li> <li>If the estimated time passes without notification that the impairment has been cleared, contacts Facilities person in charge and obtains a new estimated time in service.</li> <li>Uses recall list to reach a Facilities manager if the Facilities person in charge can not be contacted.</li> </ol>

**F. Testing Following Repairs or Modifications**

<u>Responsibility</u>	<u>Action</u>
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- Facilities FPE
  1. Establishes testing requirements.
  2. Annotates WOs with the testing requirements. This may be done by designating an established functional test procedure or portion thereof or a special test procedure, as appropriate to the scope of the work being performed.
  3. Provides requirements for specifications, statements of work, etc. for subcontract work.
  4. Indicates when testing must be directed or witnessed by an FPE or by QC.
- Facilities FPE
  5. Develops any test procedures needed to accomplish the requirements of step 2 of this section.
- Facilities Person in Charge of Work
  6. Performs required testing.
  7. Documents testing completed.

**Training** TCR-ENG-026,R4-002

Fire protection Engineer

**A. Target Audience:** RLMs, Facilities Tradesmen and Supervisors, ESU

Instructor: Fire Protection Engineer

Training Method:

Read only

Email distribution only

Frequency:

Once only

Other: Upon changes to this procedure

**Records Requirements Specific To This Procedure** TCR-ENG-026,R4-002

Records Custodians must assure records are maintained as follows:

Record Title	Record Custodian	Location	Retention Time
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*Not Applicable - No records are generated as a result of this Policy*