Los Alamos NATIONAL LABORATORY EST.1943

Conduct of Engineering
Request for Variance or Alternate Method

Assigned by SMPO or SMPOR: ☐ Alternate Method ☒ Variance Tracking number VAR-2014-046 -

1.0 Affected Document(s)

☐ Engineering Processes (e.g., P 341) ☒ Engineering Standards (e.g., P 342) ☐ Engineering Training & Qualification (e.g., P 343) If against P documents themselves, revision: _____	Subordinate (Functional Series) document if applicable (ESM Chapter, Master Spec, AP, etc.): Document Title/Number: LANL ESM Ch. 7 Revision: 5, 11/8/11
Section/Para Section D5020, Lighting & Branch Circuit Wiring, Para. 8.4	

Specific Requirement(s) as Written in the Document(s)

8.4 Non-Powered Exit Signs

A. After December 31, 2008 do not use self-luminescent (tritium) exit signs for any purpose except in structures that require exit signs but do not have electrical power.[145]

B. Use photoluminescent exit signs only in special circumstances such as the following:

1. Hazardous areas as defined in the NEC.
2. When existing self-luminous (tritium) exit signs fail or reach the end of their rated life.[146]

C. Photoluminescent exit signs can only be used at locations meeting the following criteria: [147]

1. The face(s) of the sign will be continuously illuminated to not less than 5 footcandles from a fluorescent or metal-halide source while the structure is occupied.
2. Illumination will be from a reliable source that is not controlled by automatic timers or occupancy sensors.
3. Manual controls and switches will be accessible only to authorized persons.
4. The ambient temperature will be between 50°F and 104°F.

D. Replace self-luminous (tritium) exit signs and photoluminescent exit signs with LED emergency exit signs when lighting systems are replaced or renovated. [148]

Footnotes

[145] Self-luminous exit signs contain radioactive tritium. Increasingly stringent accountability requirements and uncertainty of future disposal costs weigh against continued use of these devices at LANL. Using current procurement, operating, maintenance, and disposal costs, the 20-year life cycle cost of a LED emergency exit sign is about the same as that for a self-luminous exit sign. The 20-year life cycle cost of a photoluminescent exit sign is less that for a self-luminous exit sign.

[146] ESM variance request on self-luminous exit sign replacements approved on 3/31/04.

[147] Refer to UL 924 supplement SG.

[148] Recommended practice for signal reference grids in Chapter 8 of IEEE 1100.

2.0 Request

Brief descriptive title: Allow the Like for Like replacement of Tritium Emergency Exit Lights from a supplier that will provide for disposal of the existing Tritium Exit Sign		
NCR required (work has occurred)? ☐ Yes ☒ No	If Yes, NCR Number	
TA-Bldg-(Room) and/or Project Affected : UI FOD 7 / 8	System/Component Affected: Tritium Emergency Exit Lights	

Proposal:

Existing ESM requirements do not allow the like for like replacement of Tritium Emergency Exit lights. The proposed path forward is to replace existing Tritium Exit signs within the UI FOD using a graded approach, as the follows:

1. Evaluate the use of Photo luminescent (PL) exit signs on a case by case basis and use only where the location meets all the necessary requirements as stated in the ESM Chp. 7.
2. Where PL exit signs cannot be used, evaluate the cost-effectiveness (as determined by the FOD) of using LED emergency exit signs.
3. Installation of a new circuit for the LED Emergency Exit sign when lighting systems are not being replaced or renovated is not cost-effective with respect to like for like replacement of Tritium Emergency Exit signs.
4. Where the use of PL signs is not possible and the use of LED powered emergency exit signs is not cost effective, existing Tritium powered self-luminous Exit signs will be replaced in kind from a supplier that will provide for the disposal of the existing Tritium Exit sign.
5. Any evaluations conducted will be documented.

Justification/Compensatory Measures

Replacement of the existing Tritium Emergency Exit Lights will be implemented in a graded approach, considering Photo luminescent and LED Emergency Exit signs. There are no code restrictions in continuing to use Tritium Emergency Exit signs and LANL disposal costs will be minimized by using suppliers that will dispose of the existing Tritium Emergency Exit sign.

Duration of Request:	Start Date: 7-22-14		End Date:	☒ Lifetime
Requestor Zahid Khan	Z Number 240242	Organization ES-UI	Signature Signature on File	Date 22-Jul-2014
USQD/USID required (Nucl. High/Mod Hazard)? ☐ Yes ☐ No		If Yes, USQD/USID Number		
Design Authority Representative Gary Blauert	Z Number 098713	Organization ES-UI	Signature Signature on File	Date 7/22/14
LANL Owning Manager (FOD or Programmatic) Andrew Erickson	Z Number 141880	Organization ES-UI	Signature Signature on File	Date 7/22/14

3.0 Safety Management Program Owner (SMPO) Representative (SMPOR/PUC)

☐ Decline ☐ Accept ☒ Accept Labwide ☐ with Modification:

POC	Z Number	Signature	Date
DUANE E ADLER	101235	Signature on File	8-25-14

4.0 Additional Approval for P341 and APs; P342, ESM, Code, and Regulation Matters; and P343

☐ Accepted ☒ Accepted with comments ☐ Declined

Comments: Replacement of existing tritium emergency lights shall consider the following options in priority order: 1) LED; 2) Photoluminescent; and, 3) tritium.

Safety or Security Management Program Owner	Z Number	Signature	Date
Lawrence K Goen	106351	Signature on File	8-25-14

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