

**ENGINEERING STANDARDS UPDATE**

Standards are serious business, but this newsletter isn't.

**Topics this month:**

- **Report National Standards Work**
- **ESM Chapter 20 Systems Engineering — NEW!!!**
- **Engineering Processes Changes**
- **Training & Qual**
- **LANL Standards Issued in September**
- **Standards Program FY17 Work Summary**
- **DOE Technical Standards Action**
- **National Standards Action**
- **When Good Conduct of Engineering Isn't Followed**

The Standards Homepage: <http://engstandards.lanl.gov/>

**REPORT NATIONAL STANDARDS WORK**

If you're a Lab employee serving on a committee maintaining or writing a national code or standard for which I am not aware, please contact me (same when work stops). Examples are ASME, ASTM, NFPA, etc. About 50 employees do such committee work which we must report to DOE-HQ per the contract. Those in last year's submission:

Mark C. Anderson	Donald J. Dudziak	Alan L. Justus	Jose E. Rodriguez
Michael E. Bange	Ernest P. Elliott	Douglas D. Kautz	Christopher Romero
Luiz Bertelli	David A. Fry	Brett R. Krueger	Mark S. Rosenberger
Ramona Biggs	David P. Fuehne	Paul O. Leslie	Scott R. Salisbury
Sherri A. Bingert	Milan S. Gadd	Benjamin R. Lopez	Michael W. Salmon
David A. Bingham	Lloyd B. Gordon	Jean-Francois	James R. Streit
Kelly L. Bingham	David P. Harvey	Lucchini	Ari Ben Swartz
Roger W. Brewer	Vladimir Henzl	Michael W. Mallett	Leah A. Tietjen
Paul J. Contreras	Jon E. (Rick) Hinckley	Thomas D. McLean	Taunia S. Van
Paula R. Diepolder	Patrick W. Hochanadel	Renee A. Mondragon	Valkenburg
Shannan D. Diffey	George M. Hrbek	William L. Myers	Tom L. Waters
Scott W. Doebling	Daniel A. Javernick	Glen J. Pappas	Jeffrey J. Whicker
		Donivan R. Porterfield	Ning Zhang

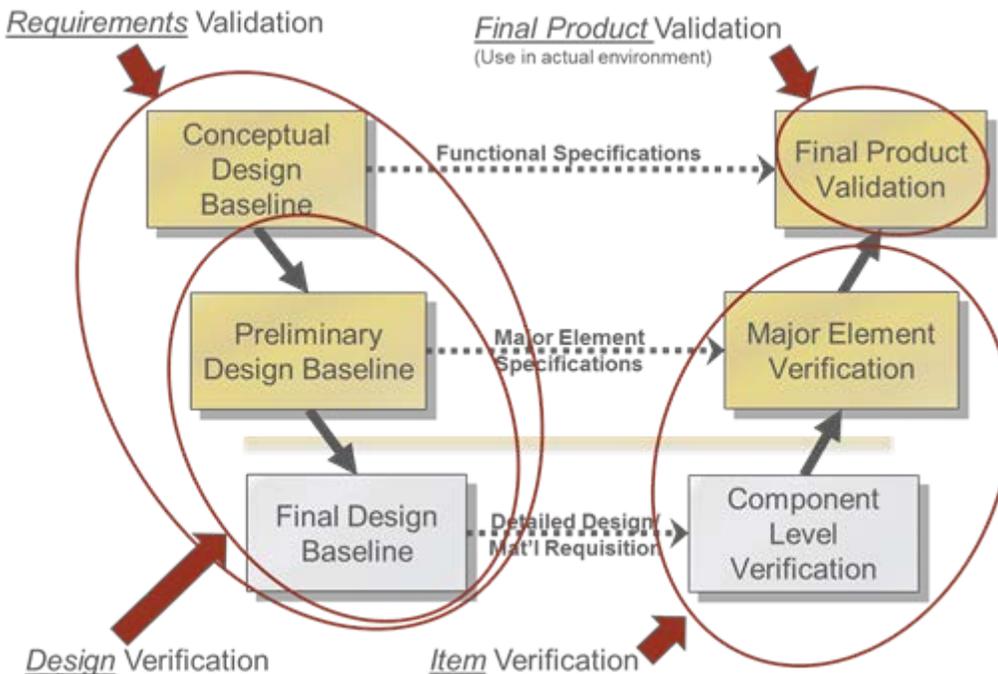
**ESM CHAPTER 20 SYSTEMS ENGINEERING —NEW!!!**

Several recent line item nuclear projects have experienced problems in planning engineering, selecting an appropriate AE, managing technical requirements, and proving adequacy of same. Engineering's IMRB/PFITS action plan to address these issues included implementation of systems engineering (SE) for such projects. SE processes provide a lifecycle approach to the development of systems and influence how work is performed and integrated among organizations. Thus, Chapter 20 of the Engineering Standards Manual was developed and

issued last week. It's required for line item projects; however, other projects will benefit from adapting the principles within it.

Let's clear one thing up now, though: It seems like the more we promote systems engineering around here, the more people misuse the term to discuss the system engineering that's done daily to keep systems up and running at LANL. Systems engineering/engineers (systems with the "s" at the end) are involved with the discipline of managing technical requirements and the like for projects as described above. System engineering/engineers (no "s" at the end of system) provide daily support for existing systems. FYI, there's a similar problem in the sustainable design world: LEED is a rating system for it and Leeds is a city in Great Britain; say LEEDS when you mean LEED and you sound foolish. Let's try to be as smart as our pets and grown kids think we are (kids at home know better—or think they do).

Here's a graphic from Ch 20 to give you a taste:



## ENGINEERING PROCESSES CHANGES

The following Administrative Procedures have been posted on the AP [SharePoint site](#):

<b>AP-341-401-R4</b>	<b>CoE Program Administrative Procedure Management</b> Course 54129 (for those assigned)	<b>Issued:</b> 09/19/17
<b>AP-341-503-R2.1</b>	<b>Technical Evaluation of Replacement Items</b> Administrative changes only.	<b>Issued:</b> 09/13/17

For questions about CoE engineering processes, please contact POC [Jeff Fauble](#) (5-0595).

**TRAINING & QUAL**

To register for LANL courses, sign up via [UTrain](#). Enter course number in search field, assign to yourself. Disenroll a similar way if you have to bail. AEs can also register; contact Yolanda Trujillo at 665-5696 or [ytrujillo@lanl.gov](mailto:ytrujillo@lanl.gov) with Z number

**Safety Basis Overview -- Course 37365, NHHO Safety Basis Training for Engineers, Wed, Oct 4, 9-11 a.m., TA-55-0400 RLOUB room 4503/4.**

The following are required to complete this training:

- FEMs,
- FDARs
- PEs
- Procurement Engineers

**Electrical Standards Course – Thurs, Nov 16**

Four-hour course 17998 covers the electrical engineering standards in Chapter 7 of the LANL Engineering Standards Manual and discusses mandatory requirements and good practices for those involved in electrical design. Strongly suggested for electrical designers, electrical engineers, electrical safety officers, and facility managers. AEs are also encouraged to attend. Taught by Electrical Standards POC Eric Stromberg from 7:30–11:30 am, currently listed for Otowi Building 03-261 - Main Gate Otowi Classroom Rm. F200W.

**Pressure Safety Officer T&Q**

If you or anyone you know is interested in being scheduled for the next round of Pressure Safety Officer (PSO) Duty Area A or B classes, please contact Ari Ben Swartz, 606-2279. Per him, your manager must approve for you to become a PSO candidate and enrolled in the qualification program. The classes are also open as training for people that are not required to be qualified. Please notify Yolanda Trujillo and me if you are interested in the training or qualification. The classes will be (1) PSO Overview (for PSO Duty Area A and B) and (2) ASME B31.3 Process Piping (for PSO Duty Area B).

**LANL STANDARDS ISSUED IN SEPTEMBER**

<b>ESM <a href="#">STD-342-100</a></b>	
Ch. 20 Systems Engineering – NEW!!! SE Requirements, Rev. 0 SE Guide, Rev. 0 References	Initial issue based in large part on parent company procedures and subject matter expertise. Completes PIAT 2015-1228 Action 3 and TLW POFMR-2016-22 Action 7.2.4 to execute a formal SE requirements development and verification program through requiring specific deliverables.
Ch. 21 Software, SOFT-GEN-FM01(I) - SWDS Instructions with Example, R1.1	Minor improvements to instructions and updated example to use Rev. 1 of FM01

<b>Master Specifications <a href="#">STD-342-200</a></b>	
07 8400R4, Firestopping	Minor revision of labelling requirements. Added TA-55 content and authors notes. Thanks to Fire POC Julie Wood, Ralph Clayton, Kyle Hall, AHJ Jim Streit, etc.
13 3419 R4, Metal Building Systems	Major revision to this section includes updating to IBC 2015, elimination of building components covered in other LANL standard specification sections, updating/correcting of references, updating to current manufacturer's standards and products, and general formatting. Thanks to POCs Glen Pappas and Scott Richardson.
Thanks to Mechanical POC Michael Ladach, John Sur, Ben Swartz, etc.:	
22 0554R3, Identification for Plumbing, HVAC, and Fire Piping and Equipment	Updated Submittal List, updated valve tag selections, updated catalog numbers, minor editorial edits
22 0713R5, Plumbing and HVAC Insulation	Updated Submittal List, updated insulation thicknesses, minor editorial edits
22 0813R8, Testing Piping Systems	Removed Holiday Testing, updated code references, updated submittal list, updated test pressures and durations
22 1100R4, Facility Water Distribution	Updated Submittal List, updated model numbers to reflect lead free pipe and fitting requirements
23 2300R3, Refrigerant Piping	Updated code references, updated submittal lists, Removed soldering instructions, added refrigerant specialties
23 3101R1, HVAC Ducts	Updated submittal lists, defined finish requirements for exposed ducts, inserted directions for 100% penetration welds for lab ductwork, added requirements for duct leakage testing
23 3300R1, Air Duct Accessories	Updated submittal lists, added additional quality information and model numbers for control dampers
Thanks to Electrical POC Eric Stromberg et al:	
26 0519R6, Low Voltage Electrical Power Conductors and Cables	Removed definition of critical systems and listed where it appears in document. Allow Aluminum conductors for all circuits 8 AWG and larger, except for ML-1 and ML-2. Rearrange color code sections. Add note that color codes are for construction only. Added note that isolated grounds may only be used with approval of POC. Remove restriction of max 2 AWG for MC cable. Added note for size of conduit bodies. Removed requirement for removing abandoned. Allow stranded conductors when pressure-plate terminations are used. Added phrase that rotation must be kept constant downstream of the utility transformer
26 0529R6, Hangers and Supports for Electrical Systems	Streamlined seismic wording, added nuclear use caution, other minor corrections and updates

26 3334R1, Stored Emergency Power Supply System	Added seismic requirements. Gave option for LANL internal group to do startup and commissioning. Deleted warranty requirements (this is handled by purchasing). Clarified requirements for spare parts list. Clarified NRTL requirements. Clarified requirements for existing/abandoned equipment. Changed torqueing of bolts from after-the-fact, to witnessing
26 4100R3, Facility Lightning Protection	Change “air terminal” to “strike termination device” in order to align with NFPA 780. Change “lightning striking” to “rolling sphere”. Add requirement for a calculation of the proposed grounding electrode system when empirical testing is not possible or meaningful. Delete requirement to test existing grounding electrode systems, due to the testing requirements making this impractical.
26 4115R3, Lightning Protection for Explosive Facilities	Added requirement for calculated contact resistance submittal when values cannot be obtained through empirical methods. Changed “air terminal” to “strike termination device” Minor edits for readability
26 5100R5, Interior Lighting	Added seismic requirements and conditions where luminaires are exempt. Deleted warranty requirements (these are handled by purchasing). Deleted requirements for spare parts for LED luminaires (these are throw away units, they are not repaired). Deleted requirement for LED luminaires to have a CRI of 90, added designer note recommending a CRI of 80. Fixed existing requirements to only apply when the luminaires are a part of the project. Deleted requirement for construction to relamp fluorescent tubes prior to handover to LANL.
26 5200 R6, Safety Lighting	Renamed from “Emergency Lighting.” Added seismic requirements. Changed ‘wall-mount emergency light unit’ to ‘unit equipment’ to conform to national codes and standards. Gave option to select [emergency][egress]. For when luminaires are not legally required to be emergency but we install them anyway. Deleted all requirements for warranties. (this is covered by purchasing, does not need to be covered here) Deleted requirement for unit equipment to operate on 120 or 277. This was causing too many Code violations in the field due to having to install cord separately. Now, the cord can be part of the unit. Added note that tritium signs are not to be used without special permission
26 5600R5, Exterior Lighting	Added seismic requirements. Add guidance for spare parts. Removed “3rd edition” from UL 1449. Removed specific taper requirements for tapered poles. Deleted allowance for flame cutting of poles. Added “or person in charge (PIC)” to sections that indicated STR. Allowed for UFER ground for concrete pole foundations

That's a lot of specs! In fact...

## STANDARDS PROGRAM FY17 WORK SUMMARY

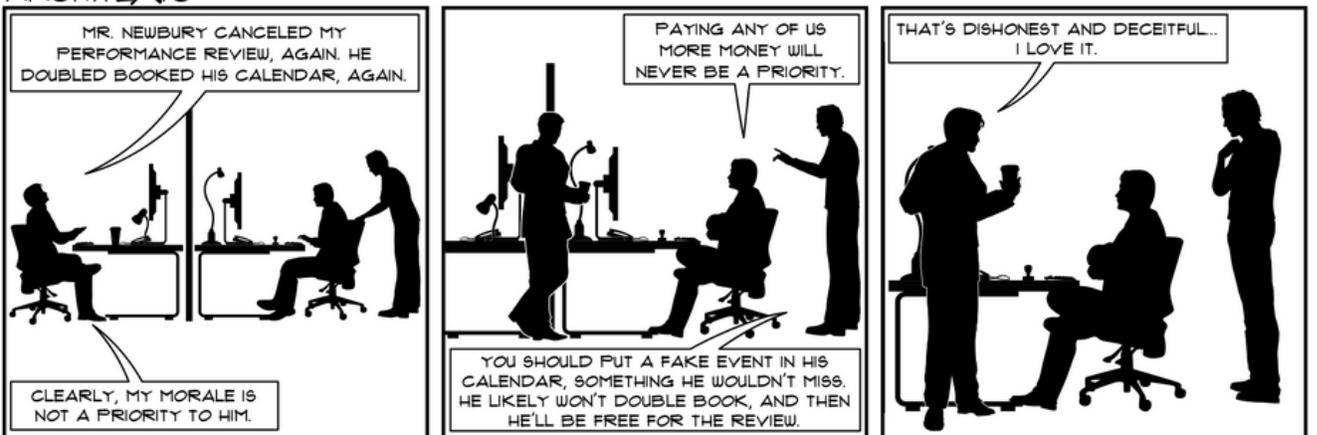
The program accomplished a whole lot of work this year. As usual, I took credit for it all in my Annual Appraisal, I but want to acknowledge here the POCs and other team members like Christina Salazar-Barnes who did much of it. Plus, this article captures it for posterity when Performance Management is inevitably replaced with something else in a year or two (if you've been here a while, you know).

In fiscal year 2017:

- nearly 100 master spec sections were revised or newly introduced, with another 25 in process; a total of 18 were cancelled
- nearly all mechanical details were revised; the other discipline details are in technical review/approval.
- for the ESM:
  - Chapter 21 Software was revised by Paula Diepolder, becoming mandatory, and training was developed and delivered multiple times for by Joy Getha.
  - For Systems Engineering, a parent-company SME was engaged to provide general training and help develop the new chapter discussed at the top of this newsletter.
  - Several sections of other ESM chapters were revised (13, 16, 17), plus a few new NDE and welding procedures issued.
- the Standards Overview course was taught twice and a trainer brought in to teach building code classes, with unusually great help from Mike Brazile and Yolanda Trujillo on this and other training classes.

## PERFORMANCE REVIEWS III

### ARCHITEXTS



## U.S. World Standards Day Oct 19, 2017 to focus on intelligent systems in modern healthcare

Intelligent systems have revolutionized modern healthcare, providing new ways for caregivers to deliver treatments to patients, and supporting a streamlined approach to track vital medical information. Standards support such innovative healthcare systems by ensuring that they operate reliably and effectively for caregivers and patients alike. To commemorate the enormous role that standardization has on global health, the 2017 U.S. Celebration of World Standards Day on October 19, will [highlight the theme "Smart Health: Using Intelligent Systems to Improve the Quality and Delivery of Health Care in a More Integrated, Focused Approach."](#)

Pretty lofty. We can't get drop-in care at Occ Med anymore but we can get a flu shot and be better for it.

## DOE TECHNICAL STANDARDS ACTION

[Activity](#) in the past month:

DOE-STD-1063-2017 [Facility Representatives](#) (posted Aug, dated Jul 14, 2017' noticed Sept.)

DOE-STD-1225-2017 [DOE Canine Performance Testing Protocol Standard \(OUO\)](#)

## NATIONAL STANDARDS ACTION

Of possible interest, LANL's [IHS online standards service](#) reports:

Document Number: NFPA 30 ERTA  
Publication Date: July 08, 2016  
Title: Fire Protection Guide to Hazardous Materials  
Type of Change: Errata/Erratum

Document Number: NFPA 30  
Publication Date: January 01, 2018  
Title: Flammable and Combustible Liquids Code - Effective Date: 9/6/2017  
Type of Change: Complete Revision

Document Number: NFPA 70E  
Publication Date: January 01, 2018  
Title: Standard for Electrical Safety in the Workplace - Effective Date: 08/21/2017  
Type of Change: Complete Revision

Document Number: NFPA 220  
Publication Date: January 01, 2018  
Title: Standard on Types of Building Construction - Effective Date: 5/19/2014  
Type of Change: Complete Revision

Document Number: NFPA 170  
Publication Date: January 01, 2018  
Title: Standard for Fire Safety and Emergency Symbols - Effective Date: 4/23/2017  
Type of Change: Complete Revision

**WHEN GOOD CONDUCT OF ENGINEERING ISN'T FOLLOWED**

In the annual tradition, Since October has Fire Prevention Week/Fire Safety Month and Halloween, here are some FP horrors:



## **LAST MONTH'S UPDATE TOPICS**

Miss an issue? The archive is at "Monthly Update" on the Standards homepage. Last month's topics:

- **Accessing the I-Codes Online**
- **IHS Upgrade to Engineering Workbench**
- **UL Listings and Violations—or Not**
- **Engineering Processes Changes**
- **Training & Qual – IFC, IEBC, and Software this Month!**
- **LANL Standards Issued in August**
- **DOE Technical Standards Action**
- **National Standards Action**
- **When Good Conduct of Engineering Isn't Followed**

To request a change to this newsletter's distribution, please contact me.  
The views expressed in this email are not necessarily those of my employer.

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