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Please contact the [ESM CM/Nomenclature POC](#) for interpretation, variance, and upkeep issues.

## 200 ITEM NUMBERING AND LABELING

This Section contains the requirements for identifying and labeling systems and the items within them, and (for LANL personnel only) development and maintenance of the LANL master equipment list (MEL). **It supersedes LANL AP-341-404 r2.1 on MEL in its entirety.**<sup>1</sup>

### 1.0 APPLICABILITY

- A. This section and its related, subordinate sections (210, 220, and 230) apply to all item numbering and labeling at LANL, thus including facility, utility, environmental, and programmatic.<sup>2</sup> Exception: Those programmatic items not subject to PD340, *Conduct of Engineering and Configuration Management for Facility Work* or other LANL CMMS/MEL-use requirement and that do not warrant identification and/or MEL control per the Responsible Manager.<sup>3</sup>
1. A **Project Equipment List (PEL)** is defined and required by ESM Ch. 1 Section Z10. PELs are precursors (inputs) to the **Master Equipment List (MEL)** and shall include all items specified by a design and expected to be maintained by the operating facility; PELs must follow applicable Section 200 requirements (syntax, approved acronyms, data, etc.) so that PEL-to-MEL translation and upload to CMMS and operations is seamless.
  2. **Sections 210 and 230 system and item acronym/name listings are integral to the MEL Upload Workbook (Att 1), replacing listings formerly web-posted as standalone files under those controlling Sections.**
  3. *ESM Chapter 4 [Architectural](#) addresses Tech Area, building, and room identification and signage (wayfinding).*
- B. *These IDs are used on drawings, field labels, and in the computerized maintenance management system (CMMS).*

### 2.0 DEFINITIONS (PARTIAL; SEE WORKBOOKS FOR CMMS FIELD CONTENT/FORMAT)

|             |   |
|-------------|---|
| <b>CMMS</b> | Computerized maintenance management system that includes the MEL and facilitates work, history-keeping, and other functions (e.g., AssetSuite v9 [AS9] from Hitachi ABB Power Grids)  |
| <b>FDAR</b> | Facility Design Authority Representative  |
| <b>FOD</b>  | Facility Operation Director (or Directorate); responsible for management of a portion of LANL including its maintenance program. Currently, five FODs manage the nine directorates. <a href="http://int.lanl.gov/services/facilities/fod.shtml">http://int.lanl.gov/services/facilities/fod.shtml</a> |

<sup>1</sup> As such also supersedes/cancels VAR-10424 that authorized partial superseding of the AP by Section 200.

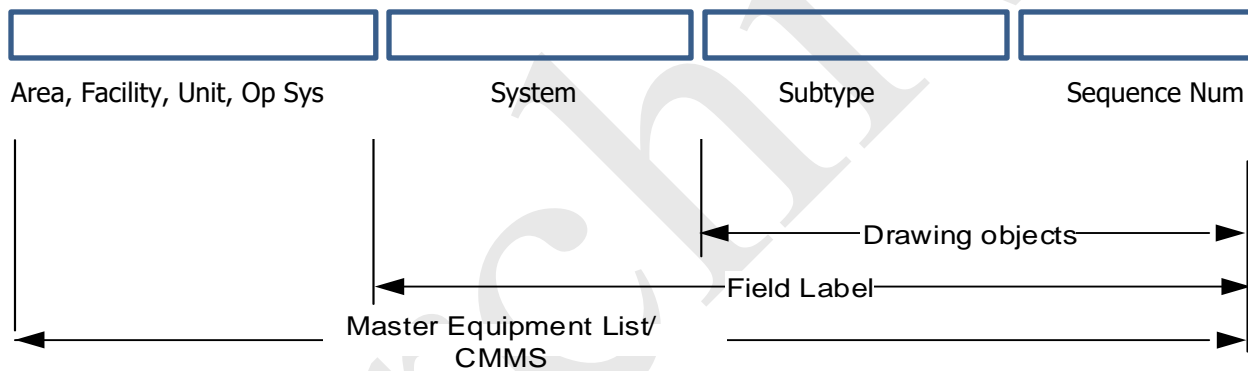
<sup>2</sup> Programmatic types are process, R&D, and tenant per Ch. 1 Section Z10. The exception is further discussed in Appendix E regarding set-up, upkeep, and approvals.

<sup>3</sup> Consistent item numbering and labeling supports safe operations across LANL by providing uniqueness and clarity (and is a key tenet of Conduct of Operations). This, in turn, allows capture in an MEL that controls other attributes such as management level for controlling risk. The MEL is the heart of the LANL computerized maintenance management system (CMMS) used for management of preventive and corrective maintenance and the associated costs for same. Per [DOE-STD-1073 on CM](#): "Unique identifiers are important to support equipment and facility operations as well. See DOE O [422.1](#), *Conduct of Operations* [Component Labeling Attachment 2 Paragraph 2.r] and [DOE-STD-1044](#), *Guide to Good Practices for Equipment and Piping Labeling*, for additional discussion of equipment/component labeling."

|             |  |
|-------------|--|
| <b>IDS</b>  | Identification string, the system-subtype-sequence number ID string defined by this document and used for numbering and labelling. Formerly called CLI (component location identifier).      |
| <b>item</b> | CMMS captures “equipment” and their “components” differently; “item” is used herein to refer to both generically.  |
| <b>MEL</b>  | Master Equipment List, a subset of CMMS data used for configuration management of items including data for unique identification such as system and key attributes such as management level. |
| <b>TA</b>   | Technical Area (e.g., TA-3)  |

### 3.0 IDENTIFICATION STRING (IDS) CONCEPT; KEY DATA FIELDS

- A. A MEL item IDS is composed of the key fields required for item identification.<sup>4</sup> See Figure 200-1 for a depiction of the IDS in its simplest conceptual form and an illustration of how shortened versions appear outside of the CMMS database.<sup>5</sup> More detail follows in Section 200 and appendices. Existing facility direction and exceptions are discussed in Appendix B.



**Figure 200-1 – Simplified Illustration of IDS Usage**

<sup>4</sup> There are other, less-critical but required CMMS fields not shown in this illustration.

<sup>5</sup> In CMMS, labwide uniqueness is achieved by the entry of this IDS data along with other required fields, in total: facility, unit, op\_system, division, area, system\_code, class, equipment\_type, equipment\_number, component\_type, and component\_number. Example “PRV-1”; you can have numerous duplicate equipment numbers. However you cannot have two PRV-1s in same building, room, and system; CMMS won’t accept it.

As well as being implied by AssetSuite, the IDS concept is suggested by ASHRAE Guideline 4, *Preparation of Operating and Maintenance Documentation for Building Systems*. Also [DOE-STD-1073 on CM](#): “Unique identifiers that incorporate system designators, component type, and numbers, (e.g., SW-MOV-91) are more useful than strictly numeric identifiers (e.g., 135711317).” National standards such as IEEE 803.1 also support the concept (ref. Section 230).

**WARNINGS:**

1. The above and all of Section 200 is the default, mandatory syntax; variations are possible only when specifically allowed herein (e.g., see Labelling/Tagging appendices).
2. Names and acronyms other than those in Sections 210 and 230 may only be created and used by written permission of the Chapter 1 Item Numbering/Labelling POC or delegates shown on the POC/Tech Committee page [here](#).

- B. Brief explanation of Figure 200-1 code fields on typical labels (Att. 1 — Upload Workbook covers these and others in detail):

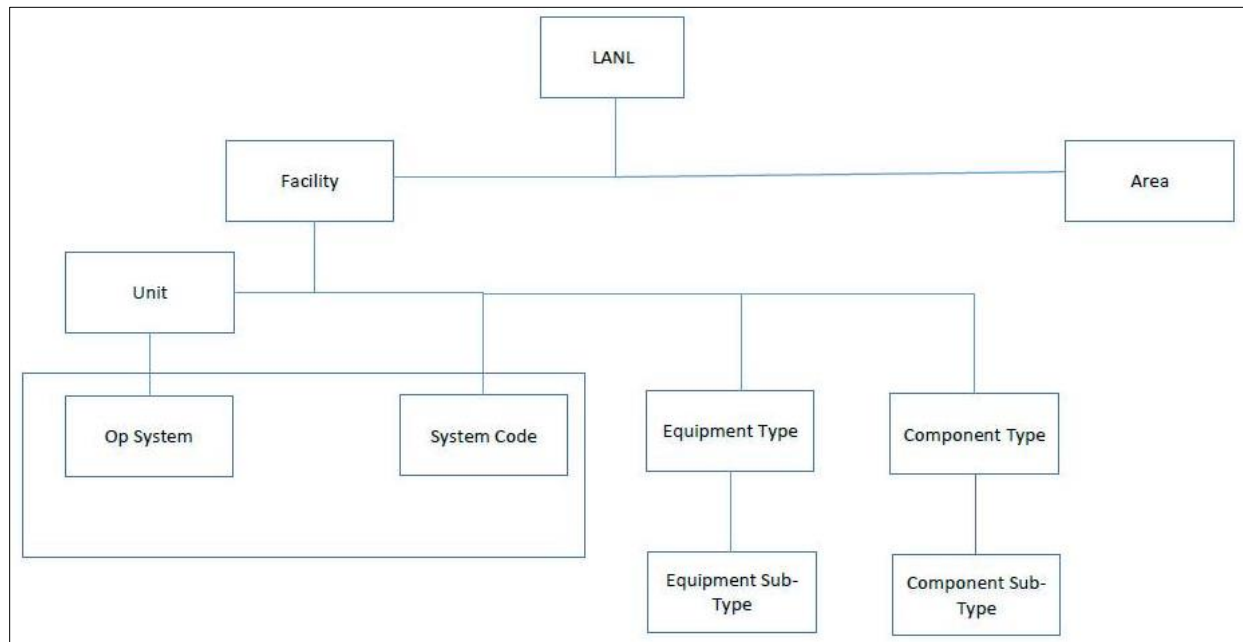
1. **SYSTEM** - Identifies the system. Systems are defined as elements (subsystems, equipment, and any components) with physical or notional interconnection and collective purpose. System boundary setting direction is in Chapter 1 Section 220. System (and also Operating System) names and acronyms are controlled by Section 210 (listing itself is on the Section 210 tab of Upload Workbook).

*Note: Field tags may use System alone (preferred) or OpSys and System. See Appendix for exceptions.*

2. **EQUIPMENT or COMPONENT TYPE** -- A more general category of item, a six-character-maximum alphanumeric ID, controlled by Section 230 (listing itself is on a tab on Upload Workbook). A required CMMS field, but normally not on label IDS. Example: VALVE. CMMS captures in the left-hand Equipment (or Component) field (the right-hand, unlabelled field used to capture the equipment ID).

*Equipment and Component Guidance: CMMS supports a hierarchical relationship for items. When there is complex equipment for which associated component tracking is needed, such components may be entered as subrecords hooked to that equipment. Components of equipment should be added to the associated Equipment when information on them warrants capture, including when they need separate PMs/history or have a lower ML level. Components need not be directly connected. Examples are: (1) pressure gauge on a pump (equipment is the pump), (2) main drain valve on a sprinkler system (equipment is the trip valve), and (3) flow gauge for regenerating air on a desiccant air dryer (equipment is the air dryer). The Section 230 Type and Subtype name/acronym choice listings for equipment and their components are identical.*

3. **EQUIPMENT or COMPONENT SUBTYPE** – Allows for more-specific designation for an item than just Type. Subtype is a four-character-maximum alphanumeric ID. Choices controlled by Section 230 (listing itself is on a tab on Upload Workbook). Example: VB for "Valve, block."
4. **SEQUENCE NUMBER:** See Appendix A.



**Figure 200-2 – CMMS-MEL Field Hierarchy (and Positional Qualification of Data)**

#### 4.0 FORMS

FM01 CMMS Change Approval Form

FM01 CMMS Change Approval Form Instructions (I)

Chapter POC maintains forms and attachments and is approval authority for same. FM01 is considered a sample, so users may modify or use alternative approval methods so long as FM01 approval roles are fulfilled (e.g., signing worksheet instead, electronic routing systems, etc.) and results are shared with POC.

#### 5.0 ATTACHMENTS<sup>6</sup>

| No. | Title                      | Purpose  |
|-----|----------------------------|--|
| 1   | CMMS Upload Workbook       | Primarily a spreadsheet to capture key item attributes for manual or script-based uploads to the CMMS. <sup>7</sup> Includes tabs with (1) examples, (2) official Sections 210 and 230 acronym and name listings and (3) an extensive listing of CMMS MEL-related field requirements and their usage. <sup>8</sup> |
| 2   | CMMS Parameters (Guidance) | A tabbed workbook of fields for capturing item details called parameters for several classes of items. These should be uploaded where practical; in addition, other documents may require their use (e.g., the P101-34 Pressure Safety Program or P101-41 Oxygen Monitor program).                                 |

<sup>6</sup> Attachments may be revised independently of Section 200 proper by Standards Mgr approval.

<sup>7</sup> The spreadsheet was formerly Att. 2 to Rev. 8 of this document (and AP-341-404 Att. 1 prior to Sect. 200 Rev. 8 and VAR-10424)

<sup>8</sup> Formerly AP-341-404 Att A prior to Rev. 8 of this document and VAR-10424

## 6.0 APPENDICES<sup>9</sup>

- Appendix A. Sequence Number
- Appendix B. Existing Facilities
- Appendix C. Labelling/Tagging
- Appendix D. Label Material, Attachment, and Other Matters
- Appendix E. MEL Approval and Upkeep (LANL-only actions)

## 7.0 TRAINING

Asset Suite 9 Engineer Module ([UTrain](#) 45150) is an optional half-day course that provides hands-on (live, computer-based) instruction on the Asset Suite 9 system basics as well as focus on functions specific to engineering.

## 8.0 RECORDS

Section 200 generates the following documents and records:

- CMMS Change Approval Form (or approved equivalent), CMMS Upload Worksheet, and/or CMMS Parameters worksheet

Control documents and records per P1020-2, Laboratory Document Control, and P1020-1, Laboratory Records Management.

## 9.0 REFERENCES

This standard implements requirements of:

- LANL SD330, *LANL Quality Assurance Program* (thus DOE O 414.1D; 10CFR830; and ASME NQA-1),
- LANL P950, *Conduct of Maintenance* (thus DOE O 433.1B Chg 1, *Maintenance Management Program for DOE Nuclear Facilities and 10 CFR 830 Subpart B—Safety Basis Requirements*), and
- DOE-STD-1073-2016, *Configuration Management* (thus DOE O 420.1C Chg 3).

## 10.0 REVISION RECORD

| Rev | Date     | Description   | POC                            | OIC                             |
|-----|----------|---|--------------------------------|---------------------------------|
| 0   | 9/26/01  | Initial issue as Chapter 1 Section 230, Component Nomenclature.                     | Tobin Oruch,<br><i>FWO-SEM</i> | Mitch Harris,<br><i>FWO-SEM</i> |
| 1   | 5/22/02  | Adopted acronyms used frequently at LANL historically.                              | Tobin Oruch,<br><i>FWO-SEM</i> | Kurt Beckman,<br><i>FWO-SEM</i> |
| 2   | 11/18/02 | Eliminated unused/hardly-used historical acronyms, added shop equipment, other IDs. | Tobin Oruch,<br><i>FWO-SEM</i> | Kurt Beckman,<br><i>FWO-SEM</i> |

<sup>9</sup> Chapter POC may allow minor variations from appendices in writing.

## Section 200 – Item Numbering and Labelling

Rev. 9, 12/21/21

|   |          |  |                                 |                                      |
|---|----------|--|---------------------------------|--------------------------------------|
| 3 | 2/9/04   | Body: loop numbering guidance; converted appendices to atts and reordered; clarified acronym disciplines are typical, not binding; added/clarified several fire acronyms.  | Tobin Oruch,<br><i>FWO-DO</i>   | Gurinder Grewal,<br><i>FWO-DO</i>    |
| 4 | 8/16/04  | Changed suggested CMMS/MEL use of IDs to reference FWO IFMP Procedure AP-MNT-10.   | Tobin Oruch,<br><i>FWO-DO</i>   | Gurinder Grewal,<br><i>FWO-DO</i>    |
| 5 | 5/18/05  | This section split off from Section 230 which became Functional ID listings only. Organizational and URL changes.  | Tobin Oruch,<br><i>ENG-CE</i>   | Gurinder Grewal,<br><i>ENG-CE</i>    |
| 6 | 10/27/06 | Organizational, URL, spec number changes.  | Tobin Oruch,<br><i>CENG-OFF</i> | Kirk Christensen,<br><i>CENG-OFF</i> |
| 7 | 6/16/08  | Clarified existing facility use, added CLI term, addressed sequence number reuse, other minor clarifications.  | Tobin Oruch,<br><i>CENG-OFF</i> | Kirk Christensen,<br><i>CENG-OFF</i> |
| 8 | 1/28/21  | Major revision to implement Opsys-Sys-Type-Subtype hierarchy (for MEL realignment to support Builder). Change in title. Creation of appendices covering labeling including material from TA55 desk instruction. VAR-10424 was issued simultaneously to enable new dictionary, upload file, and approval form to supersede those with AP-341-404.   | Tobin Oruch,<br><i>ES-FE</i>    | Jim Streit,<br><i>ES-DO</i>          |
| 9 | 12/21/21 | Fully superseded/canceled AP-341-404 (and VAR-10424) by adding App. E, MEL Approval and Upkeep. Allowed for limited change approval delegation.<br><br>Introduced upload workbook that includes examples, the official acronym/name listings discussed by Sections 210 and 230, and field requirements replacing several standalone attachments to Sections 200–230.<br><br>Other minor changes throughout including oxygen monitor ID requirements. | Tobin Oruch,<br><i>ES-FE</i>    | Jason Apperson,<br><i>ES-DO</i>      |

## Section 200 – Item Numbering and Labelling

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## Appendix A – Sequence Number

**APPENDIX A SEQUENCE NUMBER**

This is an alphanumeric code that ensures a unique identification string for each item. It is joined with the Subtype using a hyphen to form the Equipment (or Component) ID. On the D030 panel, this is captured in the unlabeled fields to the right of Equipment or Component.

- A. As a minimum, the Sequence Number assignment shall be used to provide uniqueness within a System.<sup>10</sup>
- B. Appendix C, Labeling/Tagging, provides examples of sequence numbers used in the ID of both equipment and components.
- C. Only upper-case alphanumeric characters should be used in the makeup of a Sequence Number. Other characters allowed are the hyphen (-), period (.), and ampersand (&). No other symbols should be used. Non-recommended symbols include the at (@), plus (+), underscore (\_), forward and back-slash (/ , \), single or double quotes (', "), percent (%), brackets ( [ ] ), parentheses [ ( ) ], and en (–) and em (—) dashes; such symbols affect various software programs or scripts and can yield unexpected/unintended results (the @ was previously used in some subtype acronyms but is now only seen with those legacy items/labels).
- D. *Guidance: Sequence number flexibility can be employed in a number of ways. Ordinarily the Sequence Numbers are assigned beginning with 1, 01, 001, or 0001 (use of zeros is a formatting choice)—or letters (A, B...)—, and typically progress in ascending order (e.g., 1, 2, 3, etc.). Thus, VB-1, VB-2, etc.*
- E. *Guidance: For large systems that run throughout a building, a location identifier can be incorporated into the Sequence Number or elsewhere to ensure uniqueness and aid in locating (see Labelling/Tagging appendices that follow for examples).*
- F. Instrumentation Loop Numbering
  - 1) Beyond simply providing a unique item number, added intelligence shall be built into this field for instrumentation and this approach may be used for other applications. Instruments in a loop shall have the same sequence number. *For example, the primary element, transmitter, controller, and final control element for a control loop should all have the same number, e.g.: TE-102, TT-102, TIC-102, and TCV-102.*
  - 2) For loops with multiple items of the same type, add an upper case letter to the item number for each of the duplicate items. *For example, if there are three temperature elements, they would be TE-102A, TE-102B, and TE-102C.*
  - 3) *To avoid any duplication of the numbers in the master equipment list (MEL), the sequence number should be followed by a hyphen and the parent item designation if present. For example, a temperature element on HVA-1 could have a sequence number of 102A-HVA-1.*
  - 4) *When utilized in a P&ID drawing, the instrument bubbles should contain the Function ID and the first part of the sequence number excluding the subsystem designation, e.g.: TE-102A. Because the P&ID drawings are typically applicable to only one subsystem, the subsystem designation will be shown in the title block and is not needed in the instrument bubbles.*

<sup>10</sup> Thus, there can only be one V-1 valve in a system, but an adjacent system could also have a V-1 (and tags have additional, distinguishing information). However, to avoid potential operator valving or other mix-up, facilities may choose to assign valve and instrument numbers from a single, sequential list—e.g., "1" and "101" and other numbers used only once.



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## Appendix A – Sequence Number

- 5) *When utilized in an instrument list applicable to multiple subsystems on a drawing, the subsystem designator can be attached with a hyphen or added in a separate column to ensure a unique instrument number.*
- 6) *The recommended maximum number of characters for the main Sequence Number for instruments is four plus two for alpha subcodes so it fits in the P&ID bubble (e.g., 1002AB). Although not generally recommended, inclusion of System in the bubble may also be expected at some facilities (e.g., TA-55); verify when producing drawings.*
- 7) The LANL Engineering Standards I&C POC can grant variance to the I&C sequence number requirements above by email.

F. Electrical Suffixes. Use as follows:

- 1) Apply suffixes in ascending order, if more than one like item per structure.
- 2) Suffix the Sequence Number based on system voltage as follows (in existing facilities, coordinate the assignment of suffixes with the Engineering Manager)<sup>11</sup>:
  - a) With a number if the system voltage is in excess of 1000V (e.g., 13.8 kV). Example the third 13.8 kV motor-operated disconnect switch in a substation will be identified DMO-3.
  - b) With a letter if the system voltage is in excess of 250V but less than 1000V (e.g., 480Y/277V). Example: The second 480Y/277V power panelboard in a building will be identified PP-B.
  - c) With a number if the system voltage is 250V (e.g., 208Y/120V) or less. Example: The fourth 208V panelboard in a building will be identified PP-4.
- 3) Add suffix IG for isolated-ground panelboards. Example: LP-1-IG.

G. Other Suffix Guidance. A suffix may also be used as follows:

- Where associative coding is used to associate one or more similar items with a primary items. Ordinarily the suffix is an alpha character. An example of this might be a primary control relay fed by an array of secondary relays: the primary might be numbered 001 while the sub-relays are numbered 001A through 001Z.
- For certain power distribution items, it is allowable to show the alpha acronym as well the numerical device function number. For example, an AC circuit breaker Subtype might be "CBA," but it is also listed as a "52;" thus one could choose to include both in the identification code – e.g., CBA52-1.

---

<sup>11</sup> This method of designating system voltage has generally been used at LANL for decades (not always consistently).

## Section 200 – Item Numbering and Labelling

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## Appendix B – Existing Facilities

## APPENDIX B EXISTING FACILITIES

- A. This appendix provides direction on existing item field, drawing, and procedure use of labelling. An MEL usage and data realignment in 2019-2022 resulted in much of the CMMS data reflecting the current conventions shown in Section 200/210/230, and future data entry following same.<sup>12</sup>
1. Not an NCR: The realignment resulted in some MEL data not always being identical to all data appearing on existing field labels and in documents (e.g., drawings and procedures). This is not a nonconformance, and is generally not considered unsafe or problematic because the MEL and field item are linked by the MEL Equipment-Component Tag field which will sufficiently match (and if it does not, it should be made to match). Also, there is a second tag field in CMMS, the Equipment-Comp **Alt**-Tag field that can and should be used to capture the new (post-realignment) ID string.<sup>13</sup>
- B. Modification projects: Because of the potential for confusion this appendix creates on how to label new items for an existing facility, design agency shall obtain concurrence on IDs from LANL system engineers and include them in the 30% design submittals (e.g., on P&IDs and/or in project equipment list).
- C. System identifier addition for uniqueness: In the field, it may be necessary to add a system identifier to legacy convention labels to produce unique item identification and labels.<sup>14</sup> Placing it in front of the Subtype (as shown herein) is required except where specifically approved by Section 200 POC.<sup>15</sup> *Guidance: Labeling is further addressed in Appendix C.*
- D. *Like-for-like Guidance: When items are replaced with a different model performing the same function, the IDS identification should not be changed.<sup>16</sup> Even a total upgrade project should retain the original Equipment ID (or else people may think "Where is HVA-001? We need to keep it running.")*
1. *The MEL record history should indicate the reason the replacement occurred, e.g., failure, upgrade, etc. The new item record should include the new info (make/model/size, etc.) and address what was replaced.*
- E. Moving toward Consistency
1. FDARs desiring approaches not discussed/authorized by this document require this document's POC approval.<sup>17</sup>
  2. General: When multiple numbering and/or labeling conventions are in use in a facility, progression toward this institutional standard is desirable and shall be the goal.

<sup>12</sup> The main effects of this realignment were, for all items:

- A two-tiered Opsystem/System hierarchy was imposed
- A two-tiered Type/Subtype hierarchy was imposed. Subtype choices are largely the previous "Functional ID" acronyms, but shortened to four characters when longer.
- Existing field tag information was captured in a CMMS for same.

<sup>13</sup> Tag info appears on work orders and therefore enables maintenance personnel to locate the affected item. The Equip-Comp ID field will generally match the tag as well. Location intelligence may precede or succeed the subtype depending on where captured (e.g., FGF-RM50-1 is in CMMS while RM50-FGF-1 appears on item's tag; see labeling examples appendix).

<sup>14</sup> Where multiple, adjacent systems could have a valve "1" (V-1), having System on tag should prevent misvalving.

<sup>15</sup> WETF has many items with System appended at the end. This practice may continue for existing systems begun in this manner, and all systems existing and new if desired by FDAR.

<sup>16</sup> Unless the System, Subtype, or other designator is model specific, or when transitioning to the new Type/Subtype schema introduced in Rev. 8 of this document.

<sup>17</sup> This may require FDARs to document approach in a formal way (e.g., desk instruction). Enables POC to refer to document/rev when approving and potentially webpost for design agency awareness.

## Section 200 – Item Numbering and Labelling

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## Appendix B – Existing Facilities

3. When field relabeling an entire system or modifying over 70% of an existing system's items,<sup>18</sup> current LANL standards shall be followed and MEL to match (drawings and procedures should be made to match over time).<sup>19</sup>
4. *Guidance on reaching consistency:*
  - a. *When modifying a system in a minor way (FDAR judgement on minor):*
    - i. *If nuclear procedures are NOT affected, THEN it makes more sense to revise field label and document nomenclature for the P&ID.*
    - ii. *If nuclear facility procedures ARE affected, perpetuating existing field label and document reference conventions is generally reasonable.*
  - b. *Also, if/when most/all of system's tech baseline documents are being updated, follow current ESM nomenclature/approach.*
  - c. *Any time a P&ID sheet is updated, it as well as all system field labels and CMMS should be made to conform to this Section.*

<sup>18</sup> Fifty percent is a generally accepted threshold for system upgrade to current standards when modifying it; this has a basis in safety and cost effectiveness (ref IEBC Alt Level 3). Item identification relates to safety and cost effectiveness, though arguably less so; thus 70 percent was chosen. Requirement does not apply in rare cases where a facility was specifically allowed to deviate for unique functional reasons, not merely project inadvertent noncompliance. (E.g., TWF added bldg. no at the beginning of the IDS per VAR-2015-071 because of similarity of buildings and systems within and potential for mistakes).

<sup>19</sup> Alignment (exact matching) between drawings, MEL, labels, and other numbering usages is always ideal; however, except for the case of system relabeling, it is generally not cost effective to relabel to achieve greater alignment—so long as misalignment is not judged a safety risk by FOD or FDAR. The MEL includes a Tag field that must always match the actual field label; this allows documents to be correlated to field item.

## Section 200 – Item Numbering and Labelling

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## Appendix C – Labeling/Tagging

## APPENDIX C LABELING/TAGGING

- A. Item labels and tags shall contain the following minimum IDS data: System, Subtype, and Sequence Number. Additional data is allowed when addressed below or approved by Section 200 POC but generally not recommended; see below for approved examples.
1. *Exception: Where small tags are necessary due to congestion and preclude such detail (e.g., small, brass, sequence number-only valve tags on a manifold that is labelled with its system).<sup>20</sup>*
- B. *Description: Along with the above, tags/labels should also include a concise and meaningful verbal description of the function for the item being identified that correlates with the system and subtype on a separate line from IDS, assuming helpful. Examples: "XXXX Feed Pump" or "Bldg XXX Main Breaker."*
- C. Detailed label requirements exist in LANL Master Specifications [22 0554](#), Identification for Plumbing, HVAC, and Fire Piping and Equipment, [25 0553](#), Identification for BAS Electrical Systems, and [26 0553](#), Identification for Electrical Systems; ESM Chapter 7, Electrical; and [P315 Conduct of Operations Manual](#).
1. *Relevant requirements and guidance may be contained in [P101-19](#), Safety Signs, Labels, and Tag.*
  2. *When an item is placed out of service, labeling to this document should remain; however, an "Out of Service" label/tag should be installed.<sup>21</sup>*
- D. Identification rules and examples:  
CMMS fields for a hypothetical gas-fired furnace in TA-3-410:

## Typical CMMS Field Data:

| FOD | Unit   | Opsys | System | Type | Subtype | (Seq. Num. <sup>22</sup> ) | Eq. ID |
|-----|--------|-------|--------|------|---------|----------------------------|--------|
| F07 | 030410 | HVACR | HVAC   | HTR  | FGF     | 1                          | FGF-1  |

## CMMS Field Data with location intelligence in Eq. ID's sequence number portion:

| FOD                   | Unit | Opsys | System | Type | Subtype | (Seq. Num) | Eq. ID     |
|-----------------------|------|-------|--------|------|---------|------------|------------|
| Same as above example |      |       |        |      |         | RM50-1     | FGF-RM50-1 |

The ID string for above would be HVAC-FGF-RM50-1

## Typical Tag on Furnace (TA/BLDG is optional for most facilities):

|   |
|---|
| 03-410<br>HVAC-FGF-1<br>East Wing Furnace |
|---|

<sup>20</sup> Correlation with system and type is not a mandate for identical match, although that's always ideal.

<sup>21</sup> [FSD-315-00-001](#), Conduct of Operations Glossary of Terms and Acronyms, includes Out of Service. The shorthand "OOS" should only be used for logbooks and status boards where users are familiar with it.

<sup>22</sup> Sequence number is not a CMMS field, but appears in Eq. ID and Eq.-Comp Tag fields as a concatenation.

**Tag with location intelligence (note how location now precedes Subtype on label):**

|  |
|--|
| 03-410<br>HVAC-RM50-FGF-1<br>East Wing Furnace |
|--|

**HVAC P&ID diagram's furnace symbol label or bubble:**

FGF-1

**Another equipment CMMS and Tag Field example:**

| OP. Sys. | System | Equip SubType | Equip ID | Comp. Type | Comp ID | Equip. Tag |
|----------|--------|---------------|----------|------------|---------|------------|
| HVACR    | HVAC   | RUA           | RUA-3    | ---        | ---     | HVAC-RUA-3 |

**A component of the above:**

|                       |     |       |            |
|-----------------------|-----|-------|------------|
| Same as above example | CDD | CDD-7 | HVAC-CDD-7 |
|-----------------------|-----|-------|------------|

Equipment-Component association: Including the associated equipment info on a component's label may be helpful. Thus:

|                       |                 |
|-----------------------|-----------------|
| Same as above example | HVAC-RUA3-CDD-7 |
|-----------------------|-----------------|

Above, the hyphen normally in the Eq string is eliminated to reduce confusion on syntax when it is used as an association reference in the component tag string (thus RUA-3 becomes RUA3). Adding an Eq association is very similar to the addition of a location reference (described below) and is in that same position on the tag.

**E. Locational Intelligence in Item ID and/or Tag**

FDARs sometimes build detailed location-based intelligence into their IDS nomenclature and tagging conventions; this is allowed where described herein and likely to be required for future work there; it may be employed elsewhere with notification to Section 200 POC. The purposes of these variants are (1) to identify where to find something, and (2) in some cases, to make the IDS unique. The "Location ID" is a LANL construct that is not the 3+8+6 character "Location" field in CMMS, nor necessarily the 65-character Location Description CMMS field data, nor necessarily the "Area" field data. See below for usage conventions.

**Locational Intelligence at TA-55 (FOD 1 and RLUOB); Elsewhere with POC Concurrence**

**Syntax: System–Location ID–Eq/Comp SubType–Sequence Number**

| Acronym | Meaning  | Location Usage Example in Item Tag Field   |
|---------|----------|--|
| B       | basement | B-#, where # is nearest numbered structural basement column  |
| ---     | building | HVAC-0410-FE-001, HVAC-410-FE-001, or HVAC-PF4-FE-001, where 0410, 410, or PF4 is the building number indication |

## Section 200 – Item Numbering and Labelling

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## Appendix C – Labeling/Tagging

| Acronym | Meaning      | Location Usage Example in Item Tag Field   |
|---------|--------------|--|
| GB      | glovebox     | AR-GB147-V-1, where GB147 is used in Equipment field together with Subtype and Sequence Number to identify an argon valve by associated glovebox |
| XB      | transfer box | similar to GB  |
| DB      | drop box     | similar to GB  |
| RM      | room         | AR-RM117-V1, where 117 is the room and V1 is first isolation valve from floor penetration  |
| TB      | tank bank    | AR-TB2-V1, where TB2 is Tank Bank 2  |

## F. Gas Cylinders versus “House” Gas: Boundaries and Labelling Guidance

When a facility has both “house” gas and standalone cylinders of the same gas:

1. For cylinders and downstream gas items serving only one system, make them part of the using system and the IDS reflect that. For example, for a nitrogen PCV valve fed by standalone N2 cylinders, the using/owning system is in the beginning of the tag string (normal practice) and the gas acronym is included later as part of the sequence number: SOLA-PCV-N2-1.
2. For gases fed from (and thus belonging to) the house N2 system, the label would lead with that system as normal (e.g., N2-PCV-1)

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Appendix D – Label Material, Attachment, and Other Matters

**APPENDIX D. LABEL MATERIAL, ATTACHMENT, AND OTHER MATTERS****1.0 Labels**

The Responsible Engineer (RE) is responsible for designating piping, valves, and equipment/components to be labeled and to ensure that labels and fonts are sized appropriately so that they can be easily viewed from a normal viewing distance. The RE is responsible for providing guidance of label placement so that the labels can be easily read without manipulation. *Text size will be dependent on the number of characters and the size of label required.*

Deviations: Deviation from this appendix, including label materials, labeling methods, and pipe markers/arrow tape, may be made with the documented approval of the ESM Ch. 1 POC.

**1.1 Label Materials**

Labels shall be made from

- a. material per the LANL ESM and STD-342-200, *LANL Master Specifications*;
- b. microsurfaced ABS (acrylonitrile butadiene styrene) impact acrylic with engraved letters; or
- c. metal-coated plastic with engraved letters. Dual-finish Gravostrat™ material from Gravotech has been used but other materials may be used.

Temporary labels may be made of paper (additional direction follows later).

**1.2 Labeling Method**

At the discretion of the RE, labels shall be attached with:

- methods in the LANL ESM and STD-342-200, *LANL Master Specifications*;
- stainless steel beaded chain and couplings/connectors;
- stainless steel swaged wire cable;
- stainless steel or brass jack chain (single or double);
- Kynar cable ties for use in corrosive environments (typically inside gloveboxes) only; cable ties are also known as zip ties, tie wraps, and hose ties; or
- double-sided sticky tape or foam to attach to equipment/component surfaces.

**1.3 Pipe Markers/Arrow Tape**

Pipe markers/arrow tape may be used following methods in the LANL ESM and STD-342-200, *LANL Master Specifications*.

Other types of pipe markers/arrow tape may be used with the documented approval of the ESM Mechanical POC.

**2.0 Labeling Requirements**

*Each label should be placed in a highly visible (conspicuous) location so that the person viewing the label does not have to turn it. In addition, the label should not cover existing labels (including etching, paper labels, criticality postings, mass location labels, etc.).*

**2.1 Pipe Labels**

Pipe labeling is required for the following as a minimum:

- Safety-class and safety-significant SSCs
- Piping systems containing hazardous materials (e.g., acids/bases, poisonous or suffocating gases)
- Systems with pressure above 50 psig, regardless of material contained and including portable systems

Pressure safety equipment shall also be labeled per ESM Chapter 17 and P101-34.



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**Step Description**

1. Follow the color and nomenclature of the ESM Mechanical specifications as closely as possible. Discuss variations with the RE.
2. Place the labels at intervals of not more than approximately 20 feet of horizontal or vertical runs; at each branch connection; and where the pipe penetrates walls, ceilings, and floors. Discretion may be used as long as confusion from more or fewer labels will not result.
3. Place the labels axially on the pipe (except as noted in Step 4).
  - If flow is unidirectional, place an arrow decal showing the direction of flow by each identification label.
4. Mark small piping or tubing with a tag at the prescribed intervals where it is not practical to attach a label axially on the pipe or tubing. Use the type of tag provided for valves.

**2.2 Valve Labels**

The minimum requirements for valve labeling are as follows:

- Valves that are required to be in a locked or throttled position, including those located inside a glovebox
- Valves that are routinely operated in accordance with an approved procedure, including those located inside a glovebox

The RE is responsible to ensure that valve labels follow the format listed below.

Pressure safety equipment shall also be labeled per ESM Chapter 17 and P101-34.

**Step Description**

1. The valve label shall consist of four parts:
  - The service abbreviation identifying the system
  - TA55, RLW, only: The floor penetration number, room number, or a glovebox number (if the valve is associated with a glovebox)
  - The letter V, denoting valve
  - A unique number

**NOTE:** Consult with the RE for an appropriate abbreviation from this standard.

2. It is preferred that a piping distribution system entering a room starts with the number "1." In these cases, the first valve encountered from the pipe's entry into the room is numbered 1; other valves are numbered sequentially from there. If the first valve entering a room is not numbered 1, the valves should be sequentially numbered with the first valve starting the sequence, if possible/ available.

Where distribution piping branches to service that is associated with a single glovebox, Step 3 applies.

3. For branches going to specific gloveboxes, valves are numbered from the glovebox to a point where the line combines with other piping, therefore losing its glovebox specificity. It is preferred that these valves are numbered starting with 1 from the glovebox out. Valves on subsequent penetrations should begin at the next available number, with the lowest number closest to the glovebox.

Example:

- A valve in an argon line going into GB-147 (closest valve to the GB) in Room 113 is labeled AR-GB147-V1.
- If a second valve existed in the same pipe between the first valve and the argon supply header, it is labeled AR-GB147-V2.
- If positive-pressure circulating chilled water is also supplied to the same glovebox, the supply isolation valve nearest the glovebox is labeled PPCCWS-GB147-V1.



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- The return line isolation valve nearest the glovebox is labeled PPCCWR – GB147-V1 (note the S and R differentiate supply and return).
4. Other valves in the room not associated with a specific glovebox are labeled as follows at TA55 and RLW:

**[System acronym]-RM#-V[Sequential #]**

Examples:

- The argon supply pipe enters Room 117 and has an isolation valve near the floor penetration. That valve is labeled AR-RM117-V1.
- The next valve in that pipe is labeled AR-RM117-V2, and so on.
- The first positive-pressure, circulating chilled water (PPCCW) supply piping valve, from its entry into the room, is labeled PPCCWS-RM117-V1.
- The first return valve from where the pipe enters the room is labeled PPCCWR-RM117-V1.

**2.3 Equipment/Component Labels**

The minimum requirements for equipment/component labeling are as follows:

- Equipment/components associated with safety class, safety-significant systems that would significantly affect the system function of the SS SSC and/or the SC SSC. Additionally, other facility equipment that should be labeled may be designated by the RE, design engineer, engineering manager, etc. These equipment/components include, but are not limited to, gloveboxes, support stands, pressure transducers, temperature transmitters/elements, flexible hoses (bellows), pumps, pressure indicators, etc.
- Equipment/components requiring maintenance
- Pressure safety equipment shall also be labeled per ESM Chapter 17.

**Step Description**

1. Obtain a copy (typically from Design Engineering) of a relevant system drawing (e.g., system equipment drawing, P&ID, etc.).
2. If a relevant drawing does not exist, the RE:
  - performs a walkdown of the system,
  - sketches a relevant system drawing, and
  - assigns current nomenclature/labeling convention (the labeling coordinator may assist with this convention).
3. For large systems, it is appropriate to maintain the legacy labeling format that is currently implemented. The glovebox system is an example of a large system that will maintain the legacy labeling format, examples being:
  - For Glovebox 259, the legacy labeling format would be GB-259.
  - Transfer Boxes (XB) and Drop Boxes (DB) will follow suit.
4. Other equipment/components are labeled using the outline in Step 1. Examples:
  - Label the support stand associated with Glovebox 567 with a label that reads:  
– SPRTC-SPRT-GB567
  - The pressure differential indicator associated with GB-1068 would have the label GB-GB1068-PDI1.
  - The pressure control valve on the argon line associated with GB-1069 would have the label AR-GB1069-PCV1.

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- The filter on the argon line associated with OF-1148 would have the label AR-OF1148-FLT1.
- The flow-indicating control on the compressed air line associated with FH-1050 would have the label CA-FH1050-FIC1.

**3.0 Labeling Requests (TA55 and RLW follow this; others follow local direction)****3.1 Permanent Labels**

The process to obtain permanent labels is below. *The requester is typically the RE but may be anyone who needs the system labeled.*

**Step Description**

1. The requester obtains a Label Request Form from Documentum (TA55-DI-014-FM2 or successor).
2. The requester fills out the Label Request Form using information consistent with facility procedures (including this DI), equipment alignment sheets, and P&IDs. Submit multiple labels on an Excel Spreadsheet accompanied by the Label Request Form. Request support from the RE, as needed.
3. If multiple labels need to be created, a single Label Request Form may be filled out and an Excel spreadsheet file may be submitted to the label coordinator.
4. The requester submits the Label Request Form (and Excel Spreadsheet if applicable) to the label coordinator.
5. The label coordinator reviews the request to ensure that it is compliant with the applicable standards (including this DI). If the requester is not the RE, the label coordinator notifies the appropriate RE of the labels created for their system.
6. The label coordinator submits the request to the label creator.
7. The label creator processes the request and informs the label coordinator that the labels are available.
8. The label coordinator informs the requestor that the labels are ready.

**3.2 Temporary Labels**

The process to obtain temporary labels is shown below. The requester is typically the RE but may be anyone who needs the system labeled. Example label:

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|   |
|---|
| <b>TEMPORARY<br/>LABEL (EXAMPLE)</b>                |
| System:<br>HVACOB                                   |
| Equipment Type:<br>Temperature Element (TE)         |
| Equipment Number:<br>94130                          |
| Field Label:<br>HVACOB-TE-94130                     |
| Authorized by (Z#):<br>On-Duty Operator (Z# XXXXXX) |
| Date:<br>2/29/2014                                  |

**Step Description**

1. If the label coordinator is unavailable and the need for a label is immediate, the Requester fills out the Label Request Form using information consistent with facility procedures (including this DI), equipment alignment sheets, and P&IDs. Request support from the RE, as needed.
2. The Operations Center will issue a temporary label and send an email to the label coordinator detailing the temporary label that was issued.
3. A knowledgeable, qualified, and authorized worker installs the temporary label after the Operations Center concurs that the installation may proceed.
4. The label coordinator processes the request from the Operations Center to make a permanent label.

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Appendix E – MEL Approvals and Upkeep (LANL-only Actions)

**APPENDIX E. MEL APPROVALS AND UPKEEP (LANL-ONLY ACTIONS)****1.0 PURPOSE**

Provide direction to LANL personnel developing or maintaining a MEL. This replaced similar material in LANL AP-341-404 r2.1 in December 2021.<sup>23</sup>

**2.0 APPLICABILITY**

This Appendix applies to LANL engineering personnel that develop and maintain MEL data.<sup>24</sup>

The MEL includes:<sup>25</sup>

1. ML-1 and ML-2 SSCs (active and passive) including vital safety systems (VSS) of hazard category 2 and 3 nuclear facilities and those in accelerator facilities;
2. ML-3 SSCs;<sup>26</sup>
3. ML-4 SSCs (facility and programmatic) of hazard category 2 nuclear facilities when required by FDAR;
4. ML-4 SSCs that are important to life safety (e.g., building evacuation, fire protection, pressure safety, oxygen monitors, etc.);
5. SSCs that require formal configuration management (CM) for staying in compliance with approved safety basis;
6. SSCs that require periodic preventive or predictive maintenance (PM/PdM) including periodic calibration, testing, and/or inspections for compliance with national codes and standards or LANL policy (e.g., pressure safety, fire protection, life safety, etc.);
7. Program-driven items requiring MEL entry (e.g., pressure safety, room oxygen monitors);
8. SSCs that use special materials (e.g., special sealing materials, special lubricants, special radiation-resistant materials, etc.);
9. Custom-engineered equipment<sup>27</sup>; and
10. Other SSCs as selected by the Facility Design Authority Representative (FDAR).

*Guidance: Including all SSCs (such as from a project equipment) in CMMS/MEL facilitates Builder asset system population, tracking detailed maintenance history/cost at an item level, and data mining for finding spares, suspect/counterfeit, etc.; set-up is efficiently done at project turnover. Otherwise, Section 210, System List, may be used as further guidance regarding systems that should be considered for inclusion in the MEL.*

<sup>23</sup> In doing so, Sect. 200 r9 also superseded/canceled VAR-10424 that authorized a partial superseding of AP.

<sup>24</sup> Where FDAR is responsible for programmatic equipment per PD340 (i.e., nuclear safety), this appendix applies; otherwise, programs using the CMMS/MEL for other reasons should institute an appropriate process for capture and approval of their data. Note: Use of the MEL by programmatic groups was increasing rapidly beginning in 2022.

<sup>25</sup> General basis: Implementation of DOE O 420.1C and 433.1B; further guidance in DOE G 433.1-1A (article III.C) and P950 Conduct of Maintenance. Older 433.1 editions were more specific: DOE O 433.1A, Att. 1 CRD para 2.a.1; and DOE G 433.1-1 para 4.4.3.1: "SSCs must include, as a minimum, all safety SSCs and all other facility SSCs requiring maintenance or surveillance or critical to mission objectives or facility operations or desirable for inclusion in the maintenance program for other reasons. Special tools and equipment should be included in this master list."

<sup>26</sup> ML-3, beginning 2021, included many high-value and mission-critical items.

<sup>27</sup> Unique data may be captured in CMMS proper and/or MEL IDS field data used as metadata in EDRMS record of document(s).

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Appendix E – MEL Approvals and Upkeep (LANL-only Actions)

**3.0 APPENDIX DESCRIPTION****3.1 Instructions**

The term System Engineer used in this Appendix denotes the engineer responsible for developing MEL for a system. The System Engineer for a vital safety system is the Cognizant System Engineer.

**3.1.1 Developing and Maintaining the MEL**

This section provides instructions for developing and maintaining a MEL. The FDAR owns the facility MEL. The Facility Design Authority Representative (FDAR) and the System Engineer work with maintenance and operations to determine what SSCs will be included in the MEL.

The SE is responsible for developing MEL for the assigned SSCs (except where delegated per 3.1.2). *Guidance: Projects will normally deliver a project equipment list (PEL) file that is a precursor to a MEL upload file (Ref. ESM Ch. 1 Section Z10).*

The Facility Engineering Manager, in conjunction with MSS, determines who the MEL Administrators are and the number required for their facility.

**3.1.2 MEL Item Setup and Change Control**

This section provides instructions for control of MEL database.

MEL changes may be proposed by anyone.

MEL data/change requires two people minimum, the requestor and the approver. An intermediate reviewer (Verifier) is required when the Approver does not perform this function as well.

Delegation: MEL accuracy responsibility rests with the FDAR; however, they may delegate change approval authority with the following limitations:

1. Initial item setups and entries that affect management level (ML) must be FDAR-approved; no delegation allowed.
2. The delegated MEL Manager serves as the FDAR function for changes to existing entries. For ML-1, ML-2, & ML-3 item changes, the delegated MEL Manager must be within engineering. For ML-4 item changes, the delegated MEL Manager may be the MSS Maintenance Manager for the associated Facility.<sup>28</sup>
  - a. Other LANL programs may require engineering approval of MEL change beyond the above (e.g., pressure safety); if so, comply.
  - b. FDARs shall provide CoE a listing of FDAR delegations; CoE should maintain such information as a webpage reference to Section 200.

Grouping guidance, e.g., fire protection:

1. In some cases, a single MEL entry for one fire protection sprinkler loop/segment/branch's sprinkler heads can be captured by a single entry for purposes of ML level and preventative maintenance task (PM) creation. The location description and name should be clear that it is multiple items. This concept might be applied to other items such as fire extinguishers or other non-fire items that are reasonably inspected as a lot based on a listing or geographical area.

<sup>28</sup> Whether or not delegation occurs, FDARs may designate MEL Manager(s) to provide MEL upkeep oversight and assist with new item data decisions.

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## Appendix E – MEL Approvals and Upkeep (LANL-only Actions)

Electrical Item Setup Guidance

1. Lightning Protection: Aerials are in the MEL by a roof area. (The BUILDER program Unit of Measure are by square feet. Also included are the conductors). Surge arrestors are listed individually if they are stand alone. If in a panel they are considered part of that panel.
2. Lighting fixtures: There is a separate Type for them.
3. Wall Switches, receptacles: Do not enter. Low level items of little impact/price typically not listed.
4. Items of higher importance such as switchboards are given a specific ID and should be in MEL. Same for small but important items like seismic switches, of course.

| Step | Responsible Person                            | Action  |
|------|---|---|
| 1    | Requestor                                     | <p>Complete Upload tab of CMMS Upload Workbook (Section 200 Attachment 1)</p> <p>Complete FM01, the currently preferred method for capturing approvals; see FM01(I) instructions file with form (or use other FDAR-directed approval mechanism).</p> <p>Forward proposed changes to the Approver (or intermediate Verifier or other role if local procedure requires such).</p> <p><b>Note 1:</b> Utilize the MEL change control to change MEL data pertaining to a modification and SSC changes outside a modification (e.g., discovered errors, adding additional data about SSCs, etc.).</p> <p><b>Note 2:</b> For both modifications and maintenance activities, the MEL is required to be updated prior to the equipment being turned over to operations, where the MEL data will become "Active."</p> |
| 2    | Verifier (Approver may perform)               | <p>Verify correctness, accuracy, and completeness of the data developed by the Requestor.</p> <p>Iterate with Requestor with any corrections needed.</p> <p>Sign to approve changes.</p> <p><b>Note:</b> Verifier may be anyone who is also knowledgeable of the system for which the MEL is being developed.</p>   |
| 3    | Requestor or Verifier                         | Forward the changes to the Approver.  |
| 4    | Approver (FDAR or delegate as allowed herein) | <p>As the MEL data owner, reviews the MEL Worksheet for accuracy and completeness.</p> <p>Sign for data (tool or form).</p> <p>Return form to Requestor (or forward to MEL Administrator with copy to Requestor)</p>  |
| 5    | Requestor                                     | Forward approved change(s) to the MEL Administrator   |

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| Step | Responsible Person | Action   |
|------|--------------------|--|
| 6    | MEL Administrator  | Enter MEL data into CMMS.<br>Verify that data is entered correctly.<br>Sign as complete.<br>NOTE: Documentation must be retrievable from an approved records system. |

**4.0 Facility MEL Re-development (Tech Baseline Reconstitution)**

**Core Implementation** includes capturing 100% of vital safety systems (VSSs) in hazard category 2 and 3 nuclear facilities, ML-1 and ML-2 SSCs in high and moderate hazard nonnuclear facilities, and ML-1 and ML-2 SSCs in accelerator facilities in MEL.

**Mature Implementation** is capturing other SSCs that require maintenance in MEL.

**Note:** Each FDAR, working with maintenance and operations, should prepare a plan for implementation of this Appendix in their facility. The FDAR will determine when the conversion to the new MEL format will commence based on the implementation plan. Apply a graded approach to convert existing MELs. One method may be to update MEL data each month based on systems with scheduled preventive maintenance and updating inactive systems last. Integrate implementation of this Appendix with Operations and Maintenance for the facility.