Conduct of Engineering
Request for Variance or Alternate Method

1.0 General

1.1 Document Number: **VAR-10694**	1.2 Revision: **0**

1.3 Brief Descriptive Title: Project Drawing Package Approvals on Title Sheet; Fewer Signatures

1.4 Affected Program: Engineering Standards	1.5 Request Type: Variance

1.6a Affected Tech Area 99	1.6b Affected Buildings Sitewide

1.7 Requestor: Oruch, Tobin H   Organization: ES-FE

1.8 Revision History
Revision Number   Changes and Comments
0   Initial issue.

2.0 Affected Conduct of Engineering Program/Documents

2.1 Affected "P" Document:	2.2 Subordinate or related document(s) [AP, master spec, LANL ESM chapter & section; or code, Order, standard, etc.]: Document Title/No.: CAD Standards Manual Section 200
P342 Engineering Standards	
	Revision 5 chg 2
If against the P document itself, revision (or *N/A*):	Document Title/No.: Enter text..
N/A	Revision Enter text..
	Document Title/No.: Enter text..
	Revision Enter text..

2.3 Section/Paragraph: Table 202-1, Construction Drawing & Sketch Title Block Contents

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

Data Definition for items 22 and 23, requiring signatures in Submitted and Approved for Release on all sheets:

22	Submitted	3/32" Arial	3	Typed name and signature of the Design Professional in Responsible Charge or other individual acceptable to the LANL Design Authority. Not required for Sketches.
23	Approved for Release	3/32" Arial	3	Typed name and signature of the LANL Facility Design Authority Representative (FDAR). Not required for Sketches.

2.5 Contractual, preference, or other basis for requirement in 2.4:

Enter text..

Title block signatures are a LANL past-preference approach to satisfy DOE-STD-1073-2016, *Configuration Management* (hereafter "1073") which previously was considered contractual. Now, per contractual DOE O 420.1C: "1073 describes an acceptable methodology for establishing configuration management programs." As such, 1073 is now only a safe harbor and only in the context of CM by cognizant (nuclear) system engineers.

Nevertheless, at §3.4, P341 r7 promulgates the 1073 requirement that design authorities are responsible for "ensuring that design output documents appropriately and accurately reflect the design basis and accepting completed designs" and then also adds the requirement for "approving design outputs." Neither of these are specific about how this is to be captured (e.g., every drawing sheet).

Also, AP-341-608, *Engineering Drawings and Sketches*, implies that signatures are required but refers to the CAD Standards Manual for details:

3.4.7 Drawing Approvals

Drawing approvals are obtained after incorporation of the final (i.e. 100% complete design) design review comment resolutions. Drawing title block signatures are obtained in accordance with STD-342-300.

Finally, the CSM requirements for signatures are longstanding practice and may even predate use of 1073.

2.6 Type of VAR from ESM Chap 1, Z10 [*Applies only to standards variances*) Type 2	2.7 Discipline CAD

3.0 Request Information & Comments

3.1 NCR required (work has occurred)? No	
If Yes, NCR Number: Enter text.	

3.2 System/Component Affected OpSystem Acronym & Name [Select OpSysAcronymAndName] System Number or Name [Select SystemNumberOrName]	3.3 Highest ML Level **(see Proposal for details)** ML-3

3.4 Proposal with Justification/Compensatory Measures:

BACKGROUND

For a large drawing package, authenticated electronic signatures and the certificate verifications they trigger can result in a several hour task for the FDAR (normally last signature on sheets). This is encountered in both the issued-for-construction (IFC) set phase and record drawing set approval phase.

Solutions discussed have included:
1. reduction of the number of authenticated signatures per sheet,
2. addition and use signatures on only the title sheet (G-0001) that's signed in lieu of each sheet, with all sheets referring to title sheet, and
3. reliance on the FDAR's DCF signature and referring to that.

This proposal involves both 1 and 2 above — limiting the number of signatures (including authenticated ones) and allowing for some signatures to only reside in one place (e.g., the G-0001 title sheet).

PROPOSAL

Establish a default expectation on the Design Agency to support this approach, effectively immediately (including for projects underway, when project chooses).

Usage is limited to ML-4 and non-nuclear, ML-3 work (pilot purposes).

See attachment for details.

JUSTIFICATION

Generally, proposal follows commercial practice of limited signatures (typically includes professional engineer or design professional in responsible charge, refer to NMAC, Part 3, Section 16.39.3.12.G – Seal of Licensee) and minimal use of authenticated signatures. LANL's use of authenticated signatures is a zero-added-cost benefit of normal practice and is a requirement for record documents going into EDRMS (see GLOS-COE-1 and DOE O 243.1, Attachment 2).

Re LBO Signature elimination: ESM Chapter 16 mentions but no longer requires it. LBO approval for Alt Level 2B and above is captured in an internal log (SharePoint); for Alt Level 2A and below, FDAR signature in "Approved for Release" captures LBO approval.

3.5 Attachments
Document Title or Description Att. 1 – Details for VAR-10694

3.6a Project ID	3.6b: Project Name	3.6c: Code of Record Date
N/A	N/A	N/A

3.7 Duration:	3.8a If Finite Period, Start Date:	3.8b End Date:
Lifetime	Click to enter a date.	Click to enter a date

3.8c Provide the PFITS number for tracking removal/correction: [PFITSNum]

3.9 USQD/USID required (Nuclear, High/Mod Hazard)?   No

    If Yes, USQD/USID Number   Click here to enter text.

3.10 QA Review for process change matters potentially affecting LANL's NQA-1 implementation

    Is a QPA Determination required?:   No   If **Yes**, then: Choose an item.

    QPA Comments: Enter text..

3.11 POC Determination: Accept

    POC Comments: Enter text..

3.12 Management Program Owner's (SMPO) Approval for P341 and APs; P342, ESM, ML-1 and -2, and Contract Matters; and P343

SMPO Determination: Accept

    Comments: Enter text..

4.0 Participant Signatures

NOTE: *DO NOT ADD NAMES FROM WITHIN WORD! Save and close the form first, then do 1-4 below:*

1. *From the SharePoint library, select the document, then click the **ellipsis (...)** in the second column; a small dialog appears*
2. *In the small dialog click the **ellipsis** again*
3. *Click **Edit Properties** and check out the document if prompted toEnter names using the controls provided, then **Save***

	Organization	Signature
4.1 POC (Management Program Owner's Representative): Gallegos, Michael J	ES-WPD	
4.2 Facility Design Authority Representative [FDARName] FDAR signature not required ☒	Enter text..	
4.3 LANL Owning Manager (FOD or R&D/Program) [FODorPrgmMgrName] FOD or Program Manager signature not required ☒	Enter text..	
4.4 Quality Reviewer's Name: [QPAName] QPA review/signature not required ☒	Enter text.	
4.5 Safety or Security Management Program Owner's Approval for P341 and APs; P342, ESM and Contract Matters; and P343 Richardson, Michael Joseph SMPO signature not required (Type 1 variance) ☐	ES-DO	
4.6 Additional Signer 1 Oruch, Tobin H Role: Primary author	ES-FE	

4.7 Additional Signer 2 [AdditionalSigner2] Role*: Enter text.*	Organization Enter text.	Signature

4.8 CoE Administrator Signature Leyba, Matthew Anthony <u>NOTE</u>: The CoE Admin is always the last signature placed on this document. The date of that signing is the date of this document.	Signature

Att. 1 – Details of VAR-10694, Project Drawing Package Approvals on Title Sheet; Fewer Signatures

Overview: This Variance[1] reduces the quantity of signatures in a drawing package by moving many digital signatures to the title sheet to represent approval of all sheets in a package, and use of typed names on the remainder of the sheets. Eligible drawing packages must include a title sheet.[2] Concurrently, the LBO signature on drawings is eliminated.[3] This approach will usually result in no more than two authenticated signatures per sheet in a drawing package. **Usage is limited to ML-4 and non-nuclear, ML-3 work.**

For definitions, see end of document.

Instructions

For drawing packages with a title sheet, implement the following:

Table 1. Required Entries in Drawing Package Role Fields[4] (refer to Figures 1 and 2 examples)

Role	External Design Agency (AE)	LANL[5]
Derivative Classifier	When entire drawing package is Unclassified and each sheet is so marked, signed title sheet (e.g., G-0001) and typed name on each sheet. When not all sheets are U, sign each.	
Drawn	Typed name on each sheet (signature not required on any sheet)	
Design	Typed name on each sheet (signature not required on any sheet)	
Verified	• If the sealing P.E. performed any work, a separate Verifier must sign the title sheet (e.g., G-0001) for applicable sheets and type name on subsequent sheets. • If P.E. did not perform any work, typed name and "SEE P.E. SEAL", and seal/sign each applicable sheet.	• Sign the title sheet (e.g., G-0001) only; subsequent sheets they verified gets typed name. • When Verifier is same as Submitter, typed name on each sheet (and sign as Submitter)
Submitted	• On each sheet, enter "SEE P.E. SEAL" when seal is present • When no P.E. seal is present, Design Professional in Responsible Charge (preferred) or Engineer or Architect of Record must sign title sheet (e.g., G-0001)	• Signed by the Submitter (see Submitter definition in CoE Glossary) • Signature on each sheet or title sheet (e.g., G-0001)
Approved for Release (FDAR)	Title Sheet (e.g., G-0001), or each sheet if they choose	
LBO-Design Package Reviewer (LBO-DPR)	On each sheet: • For projects not requiring LBO-DPR Approval, enter "N/A" • For projects requiring LBO-DPR Approval, enter "SEE LOG".	

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[1] VAR to LANL CAD Standards Manual Section 200 r5.2

[2] However, this Variance doesn't force the use of a G/title sheet when not otherwise required — and when no title sheet is present, each sheet must be signed.

[3] This does not reduce the ESM Chapter 16 requirement for LBO review/acceptance, only the way it is has been visibly indicated in the past.

[4] Minor variations from table allowed so long as package includes at least one signature of Verifier and Submitter (if different), and P.E. where applicable, if approach is acceptable to FDAR.

Sketch packages: Follow Table 1. Only checker/verifier signature applies. Submitted and Approved for Release signatures are N/A if they are captured elsewhere (e.g., DCF, work package).

[5] When LANL is the Design Agency, signatures must be authenticated per AP-341-402, Section 4.5.

Table 1. Required Entries in Drawing Package Role Fields[4] (refer to Figures 1 and 2 examples)

Role	External Design Agency (AE)	LANL[5]
Professional Engineer (P.E.)	On each sheet[6]: • Seal and sign outside the signature block • Authenticated signature encouraged • See Figure 3	N/A

Process Steps

1. <u>Title/G-Sheet</u>: The Design Agency (LANL or External Design Agency) shall:

    a. Ensure G-sheet lists all the sheets <u>with rev. number</u> that are a part of the drawing package, as well as any reference documents that must be followed, in an index.

    b. Add a new Package Approval Signatures Table (schedule) to the G-sheet (see Figure 1).

    c. Delete most standard approval fields in title block on G-sheet (see Figure 1).

    d. Follow Table 1.

2. On <u>each subsequent sheet</u> of the drawing package, the Design Agency shall follow Table 1 and Figure 2 example:

    a. When signatures are required on the G-sheet per Table 1, type names in the title block, followed by "(SEE G-0001)."

    To illustrate, replace these signature lines:

    with the typed name and "(SEE G-0001)"; e.g.:

    b. Optionally, add a note above the title block stating:

    Exception: LBO-DPR field should be marked "SEE LOG" for projects requiring LBO-DPR Approval; N/A otherwise (see Table 1) (Eliminating block also acceptable; regardless, projects must ensure Permitting review per ESM Ch. 16).

3. <u>Signing</u>: Design Agency create single pdf of drawing package and route electronically.

    a. Project shall ensure field typed names or signatures are completed per Table 1.

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[6] When required by contract (ref. ESM <u>Ch. 1</u> Z10 on P.E. sealing — each sheet shall be signed and sealed by P.E. responsible for that sheet per ESM implementation of <u>NMAC 16.39</u>.3.12.G–H)

     b. Drawing package filename shall be of this format: C·Number-DWG-TA-BLDG-ALL-0000.[7] This string should not appear on the package but will become the document number in EDRMS (DCRM steps below).

     c. The bound, routed drawing package should be locked by the last signer (typically FDAR); check box in Acrobat (or other PDF editing software) just prior to signing.

4. <u>DCRM</u>: Drawing package must be uploaded to EDRMS as a record of approvals.

     a. For package, use filename as document number (will be of the form C·Number-DWG-TA-BLDG-ALL-0000, where ALL indicates multi-discipline)

     b. In addition, the individual sheets must be separated and uploaded as single sheets.[8] ALSO at this time, relate each sheet to the bound package (and vice-versa); this will aid understanding that G-sheet signing took place and enable ready access to all files.

5. <u>Validity/Partial-Package Revisions</u>: A G-sheet package approval is only valid for the drawing package's sheets as they existed when signed (i.e., revisions of drawing sheets noted on the G-sheet). Subsequent sheet revisions that do not warrant entire package resigning must be signed individually. That is, during a project or afterwards, when modifications to one or more sheets (but not the entire package) are made, approval signatures will be required on that/those sheet(s) following Table 1 modified as required (i.e., in lieu of G-sheet package approval method).

     a. <u>EDRMS</u>: When a single sheet or subset revision happens, DCRM won't establish a relationship in EDRMS between the newly revised sheet(s) and the previous (and now partially historical) bound package.[9]

     b. Also, when all required signatures are applied to a revised sheet, users must accept that the revised sheet and its approvals take precedence over the G-sheet signatures, due to the later date and the updated revision number, which will differ from the G-sheet's sheet-by-sheet revision number listing.

6. <u>Package reissuance considerations</u>: A project may always elect to revise/re-issue (and re-sign G-sheet) the entire package, which would be appropriate if additional sheets are added or if many sheets are revised (e.g., when transitioning from a for-construction set to a project record document set).

7. <u>Process maturation</u>: Figures below are illustrations (examples); meet their intent. If/when LANL Title Sheet template(s) posted with CAD Standards Manual Section 200 support this approach, or this attachment is revised independently of the Form 2137 by Standards Manager and webposted, it supersedes the direction in this version.

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[7] When not a single TA use 99; when not a single building use MULT or INFR (infrastructure) rather than a BLDG number; ALL indicates package covers multiple disciplines. This aligns with CSM Section 200 r5.2 (202 and 214).
[8] This is typical, especially after they become project record drawings, but will also help users as they revise a subset of sheets after the package approval — see "Validity" step.
[9] Furthermore, in the case of revised sheet(s), DCRM can, but as the default won't, remove the EDRMS relationship between the bound drawing package and the specific revisions of the sheet(s) to which the package applies unless specifically requested.

Figure 1. G-Sheet Package Approval Signature Table/Schedule (Example)

PACKAGE APPROVAL SIGNATURES

THE SIGNATURES BELOW SIGNIFY THE DESIGN AGENCY ROLES AND LANL ACCEPTANCE OF ALL DRAWING SHEETS INCLUDED IN THIS SET AS LISTED IN THE INDEX. SUBSEQUENT SHEET REVISIONS THAT DO NOT WARRANT PACKAGE RESIGNING MUST BE SIGNED INDIVIDUALLY AND, WHEN ISSUED, THEY SUPERSEDE THE SHEETS(S) HEREIN.

LBO-DESIGN PACKAGE REVIEWER
"SEE LOG" (FOR LBO-DPR APPROVAL); "N/A" (OTHERWISE)

APPROVED FOR RELEASE
JOHN SMITH _____ *SIGNATURE*

SUBMITTED
JOHN SMITH _____ *SIGNATURE*

CLASSIFICATION
UNCLASSIFIED _____ *SIGNATURE*

VERIFIED BY DISCIPLINE		
CIVIL	JOHN SMITH	_____ *SIGNATURE*
STRUCTURAL	JOHN SMITH	_____ *SIGNATURE*
ARCHITECTURAL	JOHN SMITH	_____ *SIGNATURE*
FIRE PROTECTION	JOHN SMITH	_____ *SIGNATURE*
PLUMBING/MECHANICAL	JOHN SMITH	_____ *SIGNATURE*
ELECTRICAL	JOHN SMITH	_____ *SIGNATURE*
INSTRUMENTATION & CONTROLS	JOHN SMITH	_____ *SIGNATURE*

DESIGNER NOTES:

A. UPDATE VERIFIED DISCIPLINES TO ALIGN WITH PROJECT.

B. TITLEBLOCK FOR G-0001 SHALL BE UPDATED AS SHOWN.

NO	REVISION DESCRIPTION	DATE
0	INITIAL ISSUE FOR DCF-24-00-0000-0000	-TBD-

ENGINEERING SERVICES

Project Name
Project Name
TITLE SHEET

TA XX   BLDG XXXX

Los Alamos
NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET **G-0001**
SHT OF **TTL**

PROJECT ID	DRAWING NO	REV
XXXXXX	CXXXXX-DWG-XX-XXXX-G-0001	0

## Figure 2. Reference to G-Sheet in Subsequent (Discipline) Sheet Title Block (Example)

WHEN (SEE G-0001) FOLLOWS AN APPLICABLE NAME, SEE G-0001 INDICATES APPROVAL SIGNATURE CAN BE FOUND ON THE TITLE-SHEET (G-0001).			
LBO-DESIGN PACKAGE REVIEWER "SEE LOG" (FOR LBO-DPR APPROVAL); "N/A" (OTHERWISE)			
APPROVED FOR RELEASE JOHN SMITH (SEE G-0001)			
SUBMITTED JOHN SMITH (SEE G-0001)			
VERIFIED JOHN SMITH (SEE G-0001)			
DESIGN TYPED NAME			
DRAWN TYPED NAME	0	INITIAL ISSUE FOR DCF-24-00-0000-0000	-TBD-
CLASSIFICATION UNCLASSIFIED JOHN SMITH (SEE G-0001)	**NO**	**REVISION DESCRIPTION**	**DATE**

ENGINEERING SERVICES

Project Name
Project Name
ARCHITECTURAL ABBREVIATIONS, LEGEND & NOTES

TA XX   BLDG XXXX

Los Alamos
 NATIONAL LABORATORY

PO Box 1663
 Los Alamos, New Mexico 87545

SHEET **A-0001**

SHT OF **TTL**

PROJECT ID **xxxxxx**

DRAWING NO **CXXXXX-DWG-XX-XXXX-A-0001**

REV **0**

Figure 3. P.E. Seal/Signature of External Design Professional[10]

Apply on each sheet; authenticated digital encouraged

John Q. Public
 NEW MEXICO
 0000
 PROFESSIONAL ENGINEER

John Q. Public
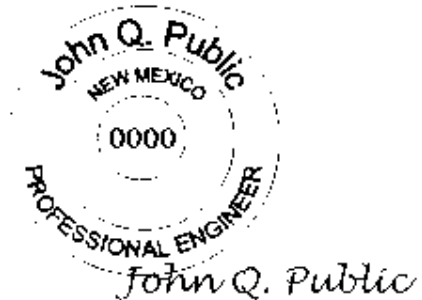
November 23, 2011

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[10] When required by contract (ref. ESM Ch. 1, Z10)

Table 2. Guidance on Approvals (G-sheet/all-package and otherwise)

based on GLOS-COE-1, Conduct of Engineering Glossary r1 draft; latest issued is official

Term	Definition/Direction
Approved for Release	Design output signature accepting for LANL. *Normally the LANL FDAR. It may and should also be attesting that the output accurately reflects the design basis and followed a technically adequate design process and appropriate design control; however, where permitted by CoE, these design authority (FDAR) responsibilities from DOE-STD-1073-2016 (§2.5) may be indicated by FDAR signature elsewhere (e.g., a drawing set G sheet or DCF signature at FM01/19 §8.0 Modification Final Design Approval). When not the FDAR on individual documents, outputs should be signed by the person with the best knowledge to affirm the above as chosen by the FDAR — this may be the system engineer, project engineer, or Modification Manager heading the effort. LANL Building Code Permitting Authority signature field on SSIs (e.g., IBC-IP Att. B r15) is a similar concept attesting to adequacy of SME review and comment resolution. [CSM Table 202-1; P341 (§3.0, 3.4)]*
Authenticated Electronic Signatures (aka Digital Signature)	1. Digital Signature: An electronic signature comprised of encrypted identification certificates. When properly implemented, provides a mechanism for verifying origin authentication, data integrity and signatory non-repudiation (e.g., PIV/CAC certificates). [DOE O 243.1C CRD; P1020-1] 2. These include Entrust and Adobe digital signatures with certificates, and embedded signatures in online tools such as SharePoint, Delta, or other engineering-approved document system. Authenticated electronic signatures are acceptable for engineering documents (versus wet-signing paper). *For drawings, the CAD Standards Manual may provide additional direction. [AP-341-402 r2]* *For LANL personnel, who have certificates inherent in their PIV (badge), use of authenticated signatures is expected.* *For subcontractors, there is a similar expectation for those doing ML-1, ML-2, and UCNI work because of its importance and since UCNI transmittal necessitates encryption (e.g., Entrust software) and thus such capability.* *When the pdf file is a QA record, the last signer before transmittal to PSE-IM should click the "Lock document after signing" button in the Acrobat dialog box during signing (this is generally the Authentication step defined below). This is especially true of NQA-1 QA records (see Record definition).*
Authentication (identity, credential, and access management)	The process of verifying a person's identity using a credential (password, PIN, smartcard, badge, etc.). The Physical Access community may use the term "validate & verify" a credential, which is an equivalent operation. [DOE O 206.2]
Authentication (records)	Approval of QA records by an authorized individual by providing signature (or initials) and date that indicate a record has been reviewed for technical accuracy and administrative requirements. Authentication confirms the completeness of a record. Various forms of authentication may be used, e.g., e-mail sent by an authenticated user, electronic or handwritten signature, or a completed and accepted form. [P1020-1, r14] *See also Project Record Document (PRD).*

Term	Definition/Direction
Authentication	Approval of QA records by an authorized individual by providing signature (or initials) and date that indicate a record has been reviewed for technical accuracy and administrative requirements. Authentication confirms the completeness of a record. Various forms of authentication may be used, e.g., e-mail sent by an authenticated user, electronic or handwritten signature, or a completed and accepted form. [P1020-1, r14] *See also Project Record Document ([PRD](#)).*

Design Verification	Documented process for ensuring that the design and the resulting items comply with the project requirements *[(e.g., inputs, constraints)]*. Design verification methods can include design reviews, alternate calculations, qualification testing, and peer review of experimental design. When appropriate, the verification process may include consideration of previous verifications of similar designs or verifications of similar features of other designs. [DOE G 414.1-2B Chg 2 4.6.5 *since not in NQA-1 or 414.1D*]
	
	    a. Who (NQA-1): Design verification shall be performed by any competent individual(s) or group(s) other than those who performed the original design but who may be from the same organization. This verification may be performed by the originator's supervisor, provided the supervisor (1) did not specify a singular design approach or rule out certain design considerations and did not establish the design inputs used in the design; or (2) the supervisor is the only individual in the organization competent to perform the verification. Cursory supervisory reviews do not satisfy the intent of this Standard. [NQA-1 Req.3 section 500.a] … Quality achievement is verified by those not directly responsible for performing the work [Req.1, section 201.c]
	    b. What/Who (DOE O 414.1D, Att. 2, 6.d): Verify or validate the adequacy of design products using individuals or groups other than those who performed the work.
	
	This may preclude a sealing P.E. (i.e., in Responsible Charge) from performing as Verifier if they performed work on the output depending on the governing mandate and its conditions.

Submitted	Design Agency signature affirming that the document was (1) <u>coordinated</u> among potentially affected disciplines and design entities and (2) required <u>checks, verifications</u>, and <u>reviews</u> were performed and review <u>comments resolved</u> per required processes. "Submitted" may be same individual as Verifier. *External Design Agency (AE): Should be signed by the Design Professional in Responsible Charge or possibly another lead in the firm. P.E. sealing may be by different person.* *LANL: Should be signed by the person with the best knowledge to affirm the above—the Responsible Engineer. For larger projects, this may be the lead or only Project Engineer, or the Group Leader. For very small tasks, it may be a design or system engineer. It could also be the FDAR (even when also "Accepting").*
Verified	Design Agency role attesting to the quality of the design. This is design verification (see that definition)

Nov 19, 2024