Los Alamos NATIONAL LABORATORY EST. 1943

Conduct of Engineering
Request for Variance or Alternate Method

Assigned by SMPO or SMPOR: ☐ Alternate Method ☒ Variance Tracking number VAR- **2011-101**

1.0 Affected Document(s)

☐ Engineering Processes (e.g., P 341) ☒ Engineering Standards (e.g., P 342) ☐ Engineering Training & Qualification (e.g., P 343) If against P documents themselves, revision: _____	Subordinate (Functional Series) document if applicable (ESM Chapter, Master Spec, AP, etc.): Document Title/Number: **ESM STD-342-100 Chapter 5** Revision: **5**

Section/Para

ESM STD-342-100 chapter 5 Appendix A, section A.1.B (and Master specifications including MS 03-1550 Page 17, MS 03-1512 page 4 and MS 03-1534 page 4.)

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

NOTE: At time of Rev. 5 issuance, the flush-mount- / coupling-type variation of the Maxi-Bolts were NOT approved for LANL; verify approval status before use.

2.0 Request

Brief descriptive title:

Allow use of the DrillCo flush-mount Maxi-Bolts throughout TA-55.

NCR required (work has occurred)? ☐ Yes ☒ No	If Yes, NCR Number
TA-Bldg-(Room) and/or Project Affected Anchor bolts used in TA-55	System/Component Affected All

Proposal

Allow the use of the flush-mount Maxi-Bolts in variance to the note contained in Appendix A section A.1.B of ESM STD-342 -100 and in the Master specifications including MS 03-1550 Page 17, MS 03-1512 page 4 and MS 03-1534 page 4

Justification/Compensatory Measures

The Engineering Standards Manual and Master Specifications currently allow the use of Drillco Maxi-Bolt stud-mount anchors. The stud type anchors were approved based on the report, "*Post-Installed Concrete Anchors – Installation and Testing 24590-QL-BPO-FA02-00002-07-00001 Report of Maxi-Bolt Anchor Testing for the Hanford River Protection Project Waste Treatment Plant*" (Attachment 1) which is referenced in Master Spec Section 03 1550 "Post-Installed Concrete Anchors." The manufacturer's independent testing and evaluation agency for this reference was CEL Consulting.

The flush-mount is a variation of, or change to, the DrillCo stud-mount Maxi-bolt. Section 4.4 of ACI 355.2-07 "*Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary*" states "Before an anchor is changed, the manufacturer shall report the nature and significance of the change to the independent testing and evaluation agency, which shall determine which tests, if any, shall be performed." A letter from DrillCo stating the differences between the two types was given to CEL consulting.

CEL, the independent testing and evaluation agency has determined that additional testing is not required and that the original test report results apply to both the flush-mount / coupling-type anchors and stud type anchors (Attachment 2).

The external dimensions and anchoring mechanism for interface with the concrete are the same for both the stud mount and flush mount Maxi bolts. Based on our comparison of the flush-mount and stud-mount design we concur with DrillCo and CEL that the tensile strength properties of the flush anchor meets or exceeds the stud type design and that resistance to shear and tensile loading in properly installed flush or stud type anchors is the same (Attachment 3).

This engineering evaluation is also supported by Dr. Derek Watkins and George Antaki (Attachment 4 & 5)

Duration of Request: permanent	Start Date: 8/29/2011		End Date:	☒ Lifetime
Requestor	Z Number	Organization	Signature	Date

Bryce Hinderer	242607	IPM-4	Signature on File	9/1/11
USQD/USID required (Nucl. High/Mod Hazard)? ☐ Yes ☒ No		If Yes, USQD/USID Number		
Design Authority Representative Dave Haring	Z Number 170159	Organization ES-55	Signature Signature on File	Date 8/29/11
LANL Owning Manager (FOD or Programmatic) Derek Gordon	Z Number 107621	Organization ES-55	Signature Signature on File	Date 8/30/11

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

☐ Decline ☐ Accept ☒ Accept Labwide ☐ with Modification:			
POC Michael Salmon	Z Number 115793	Signature Signature on File	Date 9/1/11

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

☐ Accepted ☒ Accepted with comments ☐ Declined			
Comments: This variance is approved with the stipulation that anchor bolt is installed per manufacturer's written instructions including that the anchor sleeve is set such that the top of the sleeve is even with or below the edge of the concrete and the fastening bolt is fully engaged in the sleeve.			
Safety or Security Management Program Owner Daniel Steinberg	Z Number 219039	Signature Signature on File	Date 9/16/11
	Rev. 1	Signature on File	9/27/11

Attachments available upon request