

SAFETY-RELATED

(122)

PALO VERDE NUCLEAR GENERATING STATION MANUAL	PROCEDURE NO. 90GA-0ZZ11.	
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NOT FOR USE AFTER FUEL LOAD

ASSIGNED COPY

PVNGS SM # 115

PREPARED BY: Bill J. Kordur DATE 5/10/82

REVIEWS REQUIRED: NUCLEAR SAFETY ☒ YES ☐ NO QUALITY SECTION ☒ YES ☐ NO

NUCLEAR SAFETY ANALYSIS REQUIRED: YES ☐ NO ☒

TECHNICAL REVIEWER R. M. Wilkey DATE 6/2/82

QUALITY SECTION L. J. Conkerton DATE 6/2/82

DEPARTMENT HEAD [Signature] DATE 6/2/82

TWG REVIEW N/A DATE N/A

APPROVED BY: [Signature] DATE 6/2/82

DN-0080A/0181B DATE EFFECTIVE 6/9/82

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1.0 PURPOSE

- 1.1 To establish the requirements for Temporary Modification Control including authorization, responsibility, limitations, field identification, documentation and restoration during phase I, Preoperational Testing at PVNGS.
- 1.2 To promulgate the Temporary Modification Control Log and the Temporary Modification Tags to be utilized during the startup activities prior to Fuel Load.
- 1.3 This procedure complies with the Operational Quality Assurance Program, 60PR-OZZ01.

2.0 REFERENCES

- 2.1 Implementing References
 - 2.1.1 None
- 2.2 Developmental References
 - 2.2.1 90PR-OZZ01, Startup Program
 - 2.2.2 70AC-OZZ01, Procedure Format, Content and Numbering
 - 2.2.3 60PR-OZZ01, Operational Quality Assurance Program
 - 2.2.4 90AC-OZZ02, System Test Conduct
 - 2.2.5 90GA-OZZ28, Prerequisite Test Conduct
 - 2.2.6 30AC-9ZZ01, Work Control

3.0 DEFINITIONS AND ABBREVIATIONS

- 3.1 Temporary Modification - (TM) - A temporary modification is defined as the alteration or placement of components into a configuration that is not in accordance with the latest approved project drawings or documents. These modifications may include:
 - 3.1.1 Changes to installation configuration including components removed for remote testing

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- 3.1.2 Alterations to component operating logic, including electrical jumpers and lifting leads.
- 3.1.3 Installation of temporary parts or material, including pipe blocking or bypass devices.
- 3.1.4 Interchanging of compatible pieces of equipment.
- 3.1.5 Changes in instrument set points.
- 3.1.6 Incomplete or incorrect installations not identified on the Final Walkdown Punchlist.
- 3.1.7 The following modifications are considered to be exempt from the requirements of this procedure:
 - 3.1.7.1 Items carried on a Final Walkdown Punchlist.
 - 3.1.7.2 Test Modifications governed by 90AC-OZZ02 "System Test Conduct" or 90GA-OZZ28 "Prerequisite Test Conduct".
- 3.2 Temporary Modification Request (TMR) - A form used to identify and document modifications made to facilitate testing and activities associated with testing. It identifies the nature of the modification, location and purpose; including a brief statement on the reason for the modification. Installation and restoration/removal of the modification is documented by sign-off on this form.
- 3.3 Temporary Modification Log (TML) - A sequential listing of Temporary Modifications in a startup system. Its two purposes are to provide auditable serialization of TML's and to provide a summary reference of Temporary Modifications in the startup system.
- 3.4 Temporary Modification File - A complete history of Temporary Modifications, active and inactive. It includes Temporary Modification Requests and Temporary Modification Logs filed by startup system.
- 3.5 Temporary Modification Tag (TMT): An orange tag (Appendix C) used to alert personnel that the system has been modified to permit testing or related activities.

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3.6 Abbreviations:

- 3.6.1 TM - Temporary Modification(s)
- 3.6.2 TML - Temporary Modification Log
- 3.6.3 TMR - Temporary Modification Request
- 3.6.4 TMF - Temporary Modification File
- 3.6.5 TMT - Temporary Modification Tag(s)
- 3.6.6 PSE - Principal Startup Engineer.
- 3.6.7 STC - Shift Test Coordinator
- 3.6.8 TC - Tagging Coordinator
- 3.6.9 TD - Test Director
- 3.6.10 SS - Shift Supervisor
- 3.6.11 STGS - Shift Test Group Supervisor
- 3.6.12 TGS - Test Group Supervisor

4.0 RESPONSIBILITIES

- 4.1 Test Director (TD) - The TD is responsible to initiate, document and implement Temporary Modifications (TM) as dictated by test related activities. These responsibilities include:
 - 4.1.1 Complete the Temporary Modification Request (TMR) sheets specifying each required Temporary Modification Tag (TMT) as prescribed by this procedure.
 - 4.1.2 Ensure that TMT's are not used in lieu of CAUTION or DANGER tags and that the TM does not jeopardize personnel safety, deform or permanently alter components, or cause the system, component or equipment to be operated in a manner potentially damaging to the equipment.
 - 4.1.3 Advise the Shift Test Coordinator (STC) of requested TM that might affect interfacing systems.

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- 4.1.4 Supervise installation of TM, attachment of Temporary Modification Tags (TMT) and provide verification of compliance of TM installation per this procedure to the Tagging Coordinator (TC).
- 4.1.5 Initiate requests for work required to clear/restore the TM.
- 4.2 The Shift Test Coordinator - (STC) is responsible to assess the impact of TM on testing in progress or scheduled. These responsibilities include:
 - 4.2.1 Work closely with the Shift Supervisor (SS), advising and consulting, to maintain cognizance of plant/testing status in considering timeliness of authorizing installation of TM.
 - 4.2.2 Authorize requested TM installation when appropriate to do so without impact on testing.
- 4.3 The Tagging Coordinator (TC) is responsible to:
 - 4.3.1 Maintain the Temporary Modification File (TMF).
 - 4.3.2 Prepare TMT when authorized to do so by the STC.
 - 4.3.3 Assign a cognizant independant reviewer to validate TM restoration/removal.
- 4.4 The Principal Startup Engineer (PSE) is responsible to remain cognizant of activities within startup systems assigned to him. The responsibilities include:
 - 4.4.1 Cognizance of prerequisite and preoperational testing.
 - 4.4.2 Initiation of Temporary Modifications (TM) that are required in the system but not under control of an assigned Test Director (TD).
 - 4.4.3 Initiation of requests for work required to clear Temporary Modifications not under control of an assigned Test Director.
 - 4.4.4 Follow-up required activities by support groups (APS Maint, BPC, Vendors, etc) to expediently clear/restore the TM.

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- 4.4.5 Verify completion of the work required to clear/restore the modification and removal of TMT.
- 4.4.6 Prior to issuance of Operating License, audit the TML and initiate a transfer of outstanding TMT's to control of 73AC-9ZZ05, Temporary Modification, Jumper and Bypass Device Control.

5.0 INSTRUCTIONS (See Appendix D)

- 5.1 Limitations - In addition to the requirements of paragraph 4.1.2 above, temporary modifications or restorations of temporary modifications shall:
 - 5.1.1 When it requires heating, cutting, welding, cable pulling or material bending of permanent plant equipment, be accomplished only by qualified personnel using approved procedures.
 - 5.1.2 Require authorization by the STC and all tags prepared prior to commencing the modification.
 - 5.1.3 Not have tags removed until restoration has been verified and the removal is authorized by the Test Director or Principal Startup Engineer.
 - 5.1.4 Be evaluated prior to conducting system tests and those temporary modifications determined to potentially invalidate test data shall be restored prior to performing such tests.

5.2 Documentation

- 5.2.1 The Temporary Modification Log shall be initiated by Startup when testing is authorized and will remain in effect until issuance of operating license, at which time it will be transmitted to the appropriate PVNGS Operations Supervisor for review and retention in permanent plant records.
- 5.2.2 Field identification of temporary modifications shall be accomplished by attaching the TMT completed in accordance with the instructions in Appendix C. Tags shall be placed conspicuously and wherever possible directly on the wire, cable or component modified. In cases where the temporary modification affects the operating logic or setpoints of a system, each control panel (both local and remote) shall be tagged to ensure operating personnel are aware of the modification.

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5.2.3 The Temporary Modification File (TMF) shall be kept in the STC's office.

5.2.4 The TMF shall be divided into two sections, both of which will be in alphabetical order by startup system designation.

5.2.4.1 The first section shall contain the Temporary Modification Log (TML) and the active TMR sheets.

5.2.4.2 The second section shall contain inactive TMR sheets.

5.2.4.3 In the ACTIVE section, the TML for that startup system shall be placed in front of the TMR sheets and shall be a sequentially numbered index to aid in locating TMR sheets and provide a summary of both active and inactive TMR for review/audit purposes. Instructions for completing the TML are contained in Appendix B.

5.2.4.4 Active TMR sheets for that startup system shall be maintained directly behind the TML. Each TMR shall be utilized to identify one set of TMT associated with a modification. Several tags might be required to alert personnel to various locations that a TM exists. The instructions for completing the TMR sheets are in Appendix A.

5.2.4.5 In the INACTIVE section, the TMR sheets for TM that have been restored/removed and signed off shall be filed numerically for each startup system.

5.2.5 Numbering (Serializing) TMR sheets and TMT shall be a three part number. The first part indicates the applicable system (i.e. system letter designator from reference 2.2-2). The second part is sequential number (3 Digit) indicating the number of temporary modifications made to the system. Individual tags are further identified by a letter following the sequence number.

Example: CH 003C - This means the tag is the third tag (C) for the third temporary modification (003) to the Chemical and Volume Control (CH) System.

5.2.5.1 When more than twenty-six tags are required, the individual tag identification number shall become alpha-numeric (i.e. CH-003A1 etc.).

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5.2.6 TMR sheets shall be completed by the Test Director (TD), Principal Startup Engineer (PSE) or designated person in accordance with instructions in Appendix A, entering all required information and marking non-applicable blocks N/A.

5.2.7 The Test Director or Principal Startup Engineer shall prepare a graphic (See Appendix A) of the temporary modification and attach it to the TMR. The graphic shall be one of the following:

5.2.7.1 A 1/4 or 1/2 size microfilm reproduction of the affected drawing, with the modification depicted in red.

5.2.7.2 The affected portion of the drawing reproduced by copy machine, with the Temporary Modification depicted in red.

5.2.7.3 A hand-drawn facsimile of the affected portion of the drawing, with the Temporary Modification depicted in red.

5.2.7.4 In all cases, the graphic shall present sufficient information to adequately assess the impact of the modification on the system being modified. (i.e. flowpath, pressure boundary, circuit logic, etc.).

5.2.8 The graphic shall be identified by printing the following information in red on the face of the graphic:

5.2.8.1 The serial number of the TM.

5.2.8.2 The name of the requestor.

5.2.8.3 The drawing or document number showing the TM.

5.2.9 The TC will prepare a TML in accordance with Appendix A and forward the TMR sheets to the STC.

5.2.10 The STC shall consider impact of the requested modification on testing in progress or scheduled.

5.2.10.1 When timely to do so, the STC shall authorize installation of the TM by placing his signature and date signed on the TMR sheet in accordance with Appendix A. (item 13).

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5.2.11 The TC shall:

- 5.2.11.1 Prepare the required TMT from information contained on the TMR and details from the TD or PSE as needed.
- 5.2.11.2 Deliver the TMT to the TD or PSE upon request at the STC office.
- 5.2.11.3 Insert the TMR in the ACTIVE file of the TMF.

5.3 Installation

- 5.3.1 The TD or PSE will direct the installation of the modification in accordance with approved documentation, and be responsible to attach or direct the attachment of the TMT when the modification is installed.
- 5.3.2 The TD or PSE shall verify the correct installation of the modification and attachment of the TMT. He shall communicate such verification to the TC by signature and date on the TML in accordance with Appendix B. (item 11).
- 5.3.3 The TD or PSE shall act expeditiously to cause the TM to be installed for as short a period of time as is reasonably possible. He shall:
 - 5.3.3.1 Prepare necessary work request documents (WR, EER, SWP, SFR, etc.) to accomplish whatever support activity is required to clear/restore the TM.
 - 5.3.3.2 The TD shall communicate expediting requirements to the PSE for follow up to accomplish expeditious completion of clearing/restoring tasks for TM initiated by the TD.

5.4 Auditing

- 5.4.1 The Shift Test Group Supervisor (STGS) is responsible for auditing the TMF. He shall:
 - 5.4.1.1 Audit the TML and TMR weekly to verify legibility, accuracy and complete compliance with the requirements of this procedure.
 - 5.4.1.2 Direct the audit/survey of TMT shown by the TMR to be actively installed as he considers it necessary to ensure complete compliance with this procedure.

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5.5 Restoration

- 5.5.1 Partially Restored Temporary Modifications may be accommodated by accomplishing the partial restoration and removing only the effected tag(s). The TMR sheet should be annotated accordingly and the removed tags attached for review/audit purposes. The TML shall not be closed out until all restorations are satisfied.
- 5.5.2 When the work required to remove/restore the TM is reported to be complete, the PSE or TD shall:
 - 5.5.2.1 Ensure that the work is complete, was accomplished in accordance with an approved document and is documented.
 - 5.5.2.2 Ensure that completion of the work causes the circuit or equipment to be in compliance with design requirements.
 - 5.5.2.3 Direct the removal of the TMT and return of them to the TC.
 - 5.5.2.4 Verify removal and return of TMT to the TC. Signify such verification by signature and date on the TML in accordance with Appendix B. (Item 12).
- 5.5.3 The TC shall complete documentation requirements to close out the TM. He shall:
 - 5.5.3.1 Attach the TMT to the TMR or if the number of TMT is prohibitive, establish a means of maintaining the TMT until independent verification is complete.
 - 5.5.3.2 Assign an individual other than the person accomplishing section 5.5.2.1 through 5.5.2.4 to independently verify restoration/removal of the TM. The person assigned shall be cognizant of the activities, circuits, systems, etc. involved in the TM.
 - 5.5.3.3 Upon completion of the independent verification,
 - 5.5.3.3.1 Destroy the TMT.
 - 5.5.3.3.2 Remove the TMR from the ACTIVE file and file it in the INACTIVE section of the TMF.

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5.5.4 The assigned independant verifier will conduct a survey of equipment and documentation. He shall:

- 5.5.4.1 Verify that all TMT have been removed and are attached to the TMR or are filed in the STC office.
- 5.5.4.2 Verify that the work is complete and was accomplished in accordance with an approved document. Such approval exists if work was accomplished by any of the approved methods listed under RESTORATION on the TMR sheet.
- 5.5.4.3 Verify that the completed work causes the circuit or equipment to be in compliance with design requirements.
- 5.5.4.4 Return the TMR and TMT to the TC, sign and date the TMR and show his job classification in accordance with Appendix A. (item 18).

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EXHIBIT

Page 1 of 1									
TEMPORARY MODIFICATION REQUEST									
1	2	3	4	5	6	7	8	9	10
SYSTEM	UNIT	INITIATING DOCUMENT NUMBER	REQUEST SER. NO.	TAG NO.	LOCATION	DRAWING NO.	PERSON ATTACHING TAG	DATE	PERSON REMOVING TAG
REASON FOR TEMPORARY MODIFICATION (10)									
DESCRIPTION OF TEMPORARY MODIFICATION (11)									
TEMPORARY MODIFICATION REQUESTED BY (12) Test Director DATE									
TEMPORARY MODIFICATION AUTHORIZED (13) DATE									
TEMPORARY MODIFICATION CLEARED (16) DATE									
DISPOSITION BY:									
(17) MAINT. WORK REQ. NO. _____ WORK ORDER NO. _____ STARTUP WORK PERMIT NO. _____ STARTUP FIELD REP. NO. _____ DRAWING REVISION - DWG NO. _____ REV. _____ DCN NO. _____ DESIGN CHANGE PACKAGE NO. _____ INSTALLED OTHER (SPECIFY) _____									
INDEPENDENTLY VERIFIED BY (18) DATE									
JOB CLASSIFICATION									

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TEMPORARY MODIFICATION REQUEST (Cont)

INITIATING
DOCUMENT NUMBER

SER. NO.

UNIT

②

⑦

DRAWING NO. C

⑥ LOCATION	⑦ DATE	⑧ TIME	⑨ WIND	⑩ WAVE	⑪ SEA	⑫ TEMP	⑬ HUMID	⑭ PRESS	⑮ VISIB	⑯ CLOUD	⑰ REMARKS
1	10/10/1964	0800	010	1.0	1.0	20.0	75	1010	10	010	1.0
2	10/10/1964	0900	010	1.0	1.0	20.0	75	1010	10	010	1.0
3	10/10/1964	1000	010	1.0	1.0	20.0	75	1010	10	010	1.0
4	10/10/1964	1100	010	1.0	1.0	20.0	75	1010	10	010	1.0
5	10/10/1964	1200	010	1.0	1.0	20.0	75	1010	10	010	1.0
6	10/10/1964	1300	010	1.0	1.0	20.0	75	1010	10	010	1.0
7	10/10/1964	1400	010	1.0	1.0	20.0	75	1010	10	010	1.0
8	10/10/1964	1500	010	1.0	1.0	20.0	75	1010	10	010	1.0
9	10/10/1964	1600	010	1.0	1.0	20.0	75	1010	10	010	1.0
10	10/10/1964	1700	010	1.0	1.0	20.0	75	1010	10	010	1.0
11	10/10/1964	1800	010	1.0	1.0	20.0	75	1010	10	010	1.0
12	10/10/1964	1900	010	1.0	1.0	20.0	75	1010	10	010	1.0
13	10/10/1964	2000	010	1.0	1.0	20.0	75	1010	10	010	1.0
14	10/10/1964	2100	010	1.0	1.0	20.0	75	1010	10	010	1.0
15	10/10/1964	2200	010	1.0	1.0	20.0	75	1010	10	010	1.0
16	10/10/1964	2300	010	1.0	1.0	20.0	75	1010	10	010	1.0
17	10/10/1964	0000	010	1.0	1.0	20.0	75	1010	10	010	1.0
18	10/10/1964	0100	010	1.0	1.0	20.0	75	1010	10	010	1.0
19	10/10/1964	0200	010	1.0	1.0	20.0	75	1010	10	010	1.0
20	10/10/1964	0300	010	1.0	1.0	20.0	75	1010	10	010	1.0
21	10/10/1964	0400	010	1.0	1.0	20.0	75	1010	10	010	1.0
22	10/10/1964	0500	010	1.0	1.0	20.0	75	1010	10	010	1.0
23	10/10/1964	0600	010	1.0	1.0	20.0	75	1010	10	010	1.0
24	10/10/1964	0700	010	1.0	1.0	20.0	75	1010	10	010	1.0
25	10/10/1964	0800	010	1.0	1.0	20.0	75	1010	10	010	1.0
26	10/10/1964	0900	010	1.0	1.0	20.0	75	1010	10	010	1.0
27	10/10/1964	1000	010	1.0	1.0	20.0	75	1010	10	010	1.0
28	10/10/1964	1100	010	1.0	1.0	20.0	75	1010	10	010	1.0
29	10/10/1964	1200	010	1.0	1.0	20.0	75	1010	10	010	1.0
30	10/10/1964	1300	010	1.0	1.0	20.0	75	1010	10	010	1.0
31	10/10/1964	1400	010	1.0	1.0	20.0	75	1010	10	010	1.0
32	10/10/1964	1500	010	1.0	1.0	20.0	75	1010	10	010	1.0
33	10/10/1964	1600									

TAC NO. 5

PERSON ATTACHING TAG

DATE _____

PERSON REMOVING TAG

DATE _____

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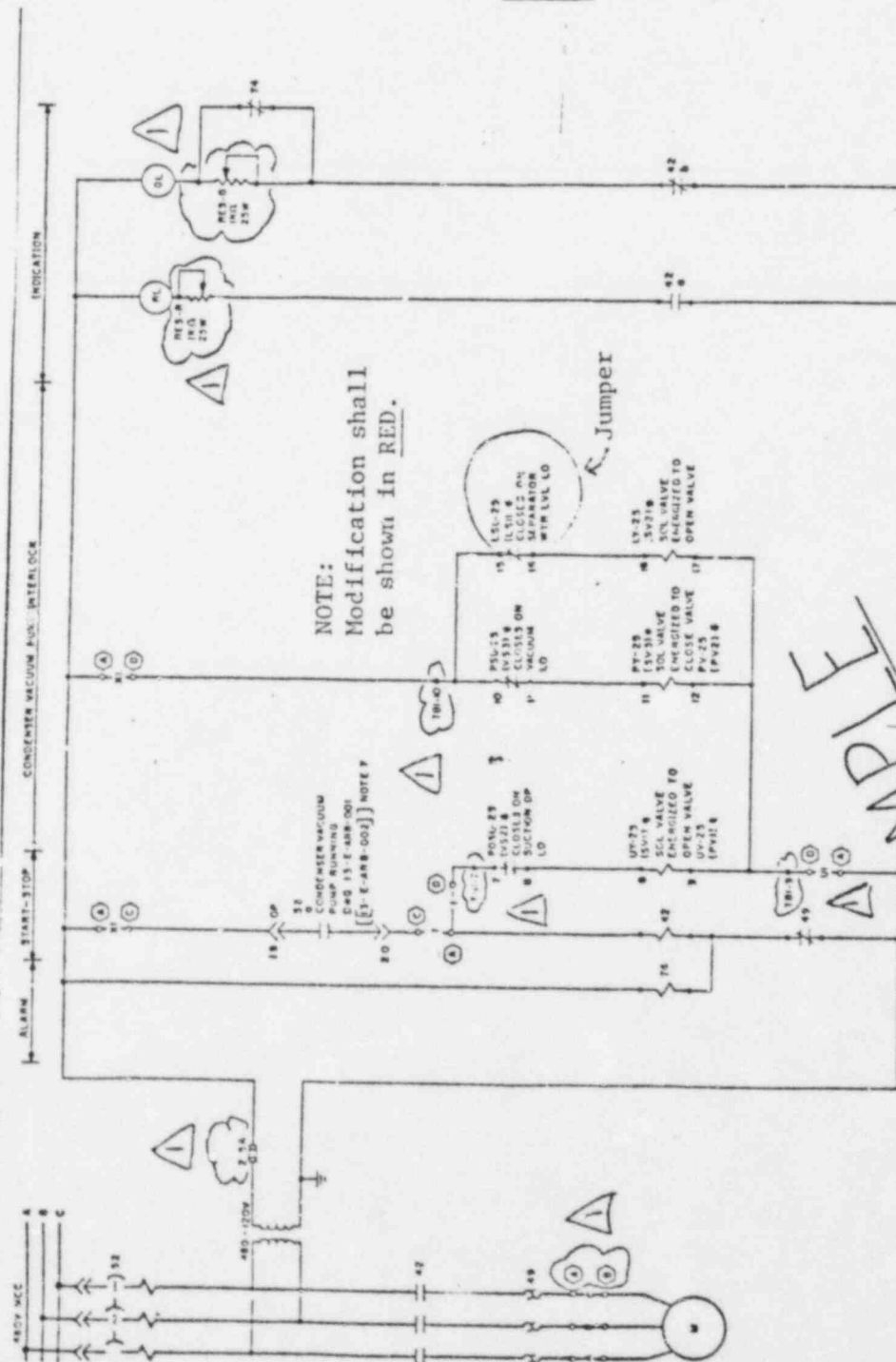
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SAMPLE



NOTE:
Modification shall
be shown in RED.

Jumper

TM No. SC004
Req. by B. Aid

Dwg. 13-E-ARB-004

TM No
Req.

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Temporary Modification Request Instructions

A. The person requesting a Temporary Modification shall complete the following:

- ① Enter System Designator.
- ② Enter Unit Affected (i.e. 1, 2, or 3 or WRF; if common enter 1-3, 1&2, 1&3, 2&3).
- ③ Enter the number of the document showing the requirement for the modifications. (i.e. Test Procedure No. etc.)

Note: If Modification is required to a component which is not in the boundaries of test procedure being performed but is required to support the test enter the procedure number being performed. But explain fully in blocks 12 and 13.

- ④ Enter Serial No. obtained from the Temporary Modification Log (Item 6).
- ⑤ Enter alphabetical Tag. No. If additional tags are required beyond D attach continuation sheet.
- ⑥ Enter Location where tag will be attached (i.e. meter ID on Control Panel).
- ⑦ Enter Drawing No. and coordinates where the modification can best be identified. (May be physical location or electrical connections, i.e. elementary, single line, loop dwg. etc.).
- ⑧ Enter Name of person who has been assigned to attach tag.
- ⑨ Enter Data Tag Attached. (Modification must be accomplished prior to tagging).
- ⑩ Enter Reason for Temporary Modification in plain language.
- ⑪ Enter Description of Modification to be accomplished; use all descriptive information to ensure reviewing personnel can clearly understand. Include effect this modification will have on system operations.

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Temporary Modification Request Instructions

- ⑫ Test Director signature verified accuracy of TMR.
- ⑬ Shift Test Coordinator signature here authorizes installation of the requested modification.
- ⑭ Person removing TMT signs here when TMT are returned to T.C.
- ⑮ Date of TMT removal.
- ⑯ Test Director signature here confirms that the temporary modification has been cleared and all the tags have been removed and returned to the Tagging Coordinator.
- ⑰ Test Director enters the number of the work request, work order, startup work permit, drawing revision, design change package, or whatever means was used to clear the Temporary Modification. All blanks must have an entry. Write N/A in those blanks that do not apply.
- ⑱ Signature here indicates that the person assigned as independent verifier has examined the documents noted and has inspected the instrument, equipment, etc., and confirms that the instrument, equipment, etc., is in accordance with design requirements.

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EXHIBIT

[illegible]

Appendix A Tab I

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Temporary Modification Log Instructions

Preparation

- ① Enter page no. 1 of 1 (if additional pages are required change page numbering and initial).
- ② Reserved.
- ③ Enter Unit No. 1, 2, or 3. If Water Reclamation enter "WRF"; if common enter 1-3.
- ④ Enter Startup System Designator.
- ⑤ Print the name of the Principle System Engineer responsible for the Startup system.

Entering Index Items

- ⑥ Enter Serial No. which also appears on TMR (Item 4 of pg. 3 of 6).
- ⑦ Enter Date Authorized by Shift Test Coordinator.
- ⑧ Enter Identification of Component/System/Cable Modified. (Brief description if necessary)
- ⑨ Enter name of person initiating Temporary Modification Request.
- ⑩ After Modification is accomplished and tags attached Tag Coordinator enters the date accomplished.
- ⑪ Test Director signs here indicating that the TM is installed per the TMR.

Restoration

- ⑫ Date and signed by the verifier and TMR sheet removed from Active file and placed in the Inactive file.

NOTE

Partial restoration shall be recorded on the Request. The Log shall be signed only when all restoration is complete.

PALO VERDE NUCLEAR GENERATING STATION MANUAL	PROCEDURE NO. 90GA-OZZ11	APPENDIX C Page 1 of 2
TEMPORARY MODIFICATIONS	REVISION 0	Page 20 of 22

EXHIBIT

TMT		OPS	
PVNGS TEMPORARY MODIFICATION			
TEST NO.	(1)		
SUBSYSTEM	(2)		
TAG NO.	(3)		
LOCATION	(4)		
PVNGS STARTUP PV419-05C			

TMT		OPS	
PVNGS TEMPORARY MODIFICATION			
TEST NO.	(1)		
SUBSYSTEM	(2)		
TAG NO.	(3)		
LOCATION	(4)		
DESCRIPTION OF MODIFICATION			
(5)			
DATE	(6)		
P-S/U ENG.	(7)		
PVNGS STARTUP PV419-05B			

TMT		OPS	
PVNGS TEMPORARY MODIFICATION			
TEST NO.	(1)		
SUBSYSTEM	(2)		
TAG NO.	(3)		
LOCATION	(4)		
DESCRIPTION OF MODIFICATION			
(5)			
DATE	(6)		
P-S/U ENG.	(7)		
PVNGS STARTUP PV419-05B			

PALO VERDE NUCLEAR GENERATING STATION MANUAL	PROCEDURE NO. 90GA-OZZ11	APPENDIX C Page 2 of 2
	REVISION 0	Page 21 of 22

TEMPORARY MODIFICATION TAG INSTRUCTIONS

INSTRUCTIONS

The Temporary Modification tag alerts personnel that the system is changed for purposes of startup testing or other activity. Information provided must be clear and accurate.

NOTE: This tag is not to be used as a substitute for danger or cautionary tags.

- ① Block out entire line with black marker pen.
- ② Enter Startup Scoping No. with subsystem designator (i.e. LN-05).
- ③ Enter Serial No. from TMR sheet with letter indicator.
- ④ Enter Location or Component No. (for instrument or sensor, enter No., for cable enter ID No. & Terminal No., etc.)
- ⑤ Briefly describe temporary modification, (i.e., Set point changed to 25 psi; cable wires A and B reversed; logic changed to open pump discharge after pump starts, etc.)
- ⑥ Enter Date Tag Attached.
- ⑦ Enter Name of Responsible Principal Startup Engineer.

PALO VERDE NUCLEAR GENERATING STATION MANUAL

PROCEDURE
NO. 90GA-OZZ11

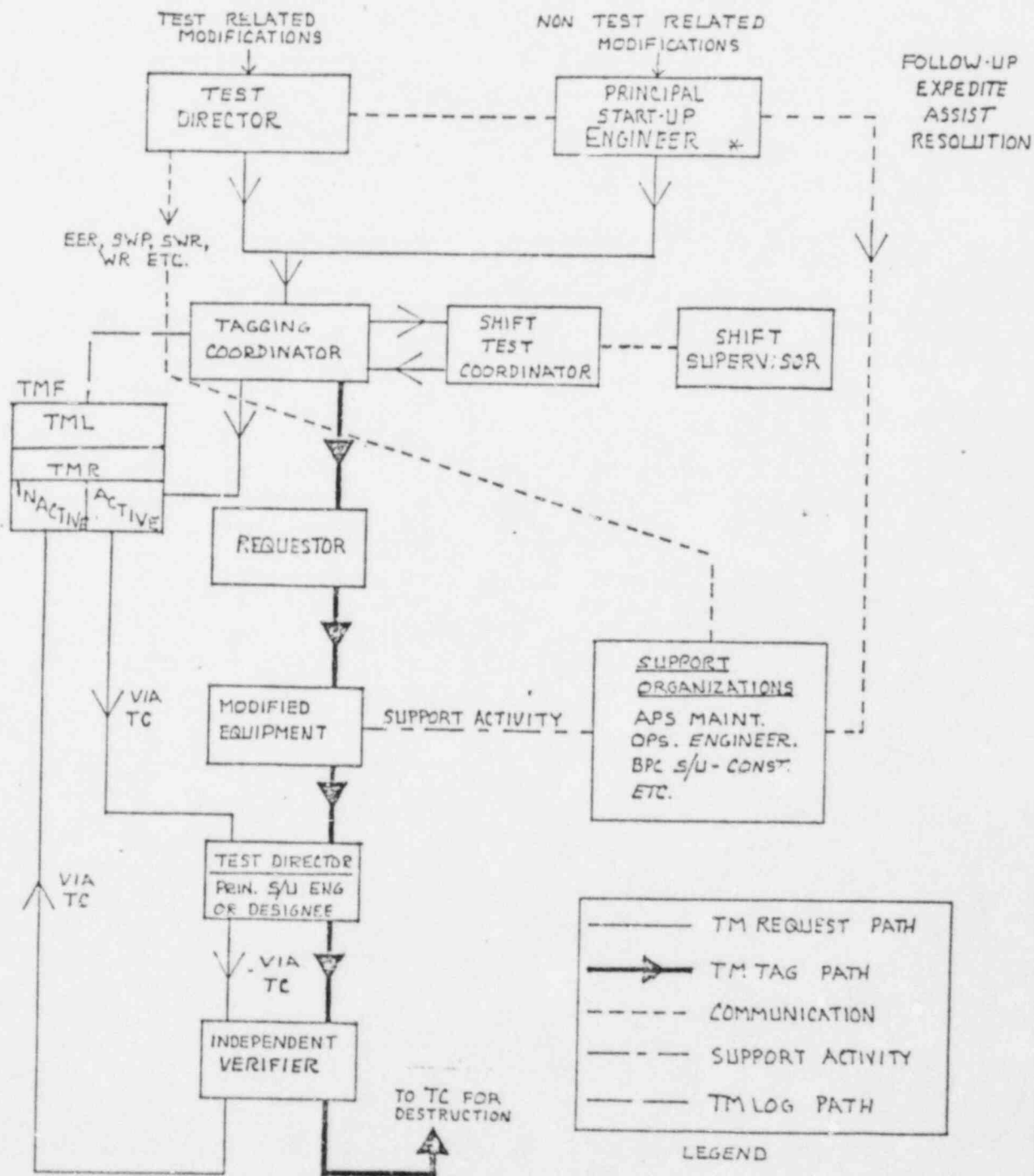
APPENDIX D
Page 1 of 1

TEMPORARY MODIFICATIONS

REVISION

0

Page 22 of 22



* SHIFT TEST COORDINATOR MAY INITIATE IF SUE IS UNAVAILABLE. (i.e. ABSENT FROM PROJECT, ETC.)

STATUS: AA CK DDVENDOR: HBA

PALO VERDE NUCLEAR GENERATING STATION



NONCONFORMANCE REPORT

NO SA1773PAGE 1 OF 1

1. UNIT <u>1</u>	2. MO DAY YR <u>1/11/82</u>	3. DRAWING/PART NO. <u>SS2 block 12</u>	REV.	4. ITEM DESCRIPTION <u>CABLE TERMINATIONS</u>	5. ITEM LOCATION <u>Aux 88 E LV</u>
6. Q CLASS <u>Q</u>	7. STARTUP SYSTEM NO. <u>1RD04 TA</u>	8. SERIAL NO. <u>SS2 block 12</u>	9. SUBCONTRACTOR/SUPPLIER/BECHTEL <u>Bechtel</u>	10. P.O. OR SPEC NO. <u>13-217-506 REV 5</u>	11. ASME AUTHORIZED INSPECTION REQ'D. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
12. DESCRIPTION LIST IN ORDER: NO. PCS., DWG/SPEC REQMT., PRESENT CONDITION <u>1. 1382</u>	16. FIELD ENGR DECISION <u>Rework</u>	17. <input checked="" type="checkbox"/> FIELD RECOMMENDED DISPOSITION <input type="checkbox"/> ENGINEER CONCURRENCE REQ'D. <input type="checkbox"/> ENGINEER DISPOSITION REQ'D.			
<u>1 3 cables 1ERD07BC1RA, 1ERD07 BC1RC & 1ERD07BC1RD have been disconnected from equipment 1ERD07J01 after final acceptance without rework authorization</u>	<u>Rework</u>	<u>Rework. Field to reissue termination cards and reterminate cables in accordance with WPP/QCI 255.0. QC to be notified prior to rework</u>	<u>WRS 1/19/82</u>		
13. REPORTED BY: <u>Richard A. Osakins</u>			15. INSPECTION/VALIDATION/REVIEW DATE <u>1/15/82</u>		
19. ACCEPTANCE OF REWORK/REPAIR <input checked="" type="checkbox"/> QC ENGR <u>1/28/82</u> AUTH. <u>NA</u> <input type="checkbox"/> FIELD ENGR			15A. REPORTABILITY EVALUATION: NOT REPORTABLE: <input checked="" type="checkbox"/> OR DER NO. _____		
14. ASSUMED CAUSE OF DISCREPANCY <u>CONSTRUCTION ERROR</u> <u>Disconnection performed by personnel</u> <u>persons unknown</u> INITIATOR <u>Phil White</u> DATE <u>1-11-82</u>			18. DISPOSITION CONCURRENCE mls PROJ FIELD ENGR <u>1/28/82</u> NUCLEAR GROUP SUPV <u>NA</u> GROUP SUPV <u>NA</u> PROJ ENGR <u>NA</u> AUTHORIZED INSPECTOR <u>NA</u> QA ENGR <u>1/28/82</u>		

File: V-82-009

Subject: START-UP OPERATIONS

8/5/82

— BILL McLANE, APS — knowledgeable of Start Up. program involving electricians. (LOU VORDERBRUEGGEN furnished this info. on 8/5/82)

LOU also advised that he recalled that initially Bechtel formed a special group for electrical start-up. They were not union electricians. They were called technicians. They wore special blue hats.

Because they were not union hard feelings built up between them and the union electricians. There were reportedly threats made against some of these technicians.

This group was disbanded.

Wern C. Sheekleton Jr.

To: V-82-089

FROM: OWEN C. SHACKLETON JR

Subject: START-UP

DATE: 8-5-82

Interview of WILLIAM E. CRAIG, Start Up QC Supervisor, APS
tel. ext. X 2217

932-5300 X2217

June, 1981 he started on this project.

— May to Nov., 1981 SUP APS had it totally.

At that time CRAIG was in Ops QA APS at that time.

— Nov., 1981 they were behind schedule. Bechtel took over the pre requisite Start Up Program. They set up a startup QA Staff.
Their QC staff at that time reported directly to SUI Mgt.

During this period of time their QC staff was op. primarily on paper work.
Several CAPs were written on this subject.
That existed for about 2 mos.

Then over one trans to Const QA APS in last part of Dec.

Feb., 1982 jurisdiction went back to Ops QA.

May
~~March~~, 1982 they consolidated all QA under the Ops umbrella.
Two weeks prior to that they had unprovided all the
Prerequisites Test Data and and all testing came to a halt.

S-8

S-~~8~~

Interview of CRAIG (Contd.)

PAGE 2

- o During the time all this was unfolded they set up their present organization.
- o Start Up QPR as resp for the time the systems trans to fuel loading for all testing.
- o Desitel reports basically to the AS Mgt. in the Start Up Program.
- o From Nov, ¹⁹⁸¹ to somewhere around March, 1982 there could be some truth to the allegations
 - o They now have a pre-requisite procedure for startup. They lost control of their test engineers.
 - o In all subsystems they now do startup for all subsystems.
 - o They did have some test engineers that did not know how to set up the equipment.
 - o Their control now is much more disciplined and controlled.

Start up has been underway now for about 2 weeks.

He has 10 to 12 guys in the field doing nothing but swimming.

Interview of CRAIG (Cont'd.)

Page 3

The test directors were Level II. Startup engineers

They brought in some contract electrical techs to supplement the Bechtel craft.

Their job was to do nothing but assist the test director.

They hooked up wires etc.

They were nonunion (technicians) this caused some hard feelings w/ the trade.

They were here about 2 or 3 weeks.

The craft refused to work so they got rid of them.

Craft people are being used now until they release the systems to Operations.

They are going back to all the subsystems and re-verifying the installations. Any conflicts are being resolved.

EG 200.2 - Procedure for Start Up to remove leads, etc.
Control & Power Cable Verification.

Review of Affidavit ^{to ASLB} (Cont'd.) (Notarized 19 May 82)

6. Use of One-bolt lugs, rated only for 45 to 65 amps, were crimped on a line that runs on 120 amps with surge lines using 480 amps.

"I also saw that one-bolt lugs, rated only for 45 to 65 amps, were crimped on a line that runs on 120 amps with surge lines using 480 amps. Two bolt lugs should have been used but Bechtel often did not have the equipment to provide the correct two-bolt lugs. These improper lugs were placed on the emergency pumps at the cooling tower, the LPSI and HPSI pumps used to flood the ~~reactor~~ reactor core in the case of a serious accident, the circulating pumps for the turbines, and the spray pond pumps, both on the "a" and "b" sides. These lugs cannot tolerate a 480-amp ~~surge~~ surge and may melt in the event of an accident, thus making it impossible to activate many of the most important safety systems in the event of a serious LOCA."

ALLEGATION: IMPROPER INSULATION MATERIALS WERE USED ON
HIGH VOLTAGE TERMINATIONS ON CERTAIN CLASS 1E
MOTORS.

FINDINGS:

THE INSTALLATION SPECIFICATION FOR CABLE SPLICING, TERMINATION
AND SUPPORTS FOR ARIZONA PUBLIC SERVICE COMPANY,
PMD VERDE NUCLEAR GENERATING STATION UNITS 1, 2, AND 3
QUALITY CLASS Q AND R

BECHTEL PLVR

BECHTEL PLVR

3 . :9 '50 ?

TX 5 ST PAUL MINN JUN18
TRI RYT

TELEX NO.: 910-950-1970

ZIP

BILL SAYLOR

BECHTEL POWER

P.O. BOX 49

PALO VERDE, AZ

71496?

BT

THIS REGARDS SCOTCH 2200 VINYL MASTIC. THE DIELECTRIC STRENGTH
OF THIS MATERIAL IS 225 VOLTS/MIL AND COULD BE USED IN 5 KV
APPLICATIONS WITH NO DELETERIOUS EFFECTS TO THE MATERIALS,
PROVIDING IT IS SUPPORTED TO PREVENT IT FROM FLOWING AWAY
FROM THE ELECTRICAL DEVICE IT IS INTENDED TO INSULATE. IN
A CASE WERE IT IS USED AS A FILLER UNDER A SHRINK TUBE, IN
A 5 KV APPLICATIONS, THE 5 KV WILL HAVE NO DELETERIOUS EFFECT
ON IT.

31 CO. D. N. HUNTER ELECTRO PRODUCTS 260-5A TELEX NO.: 29-7023 PS
NNNN

BECHTEL PLVR

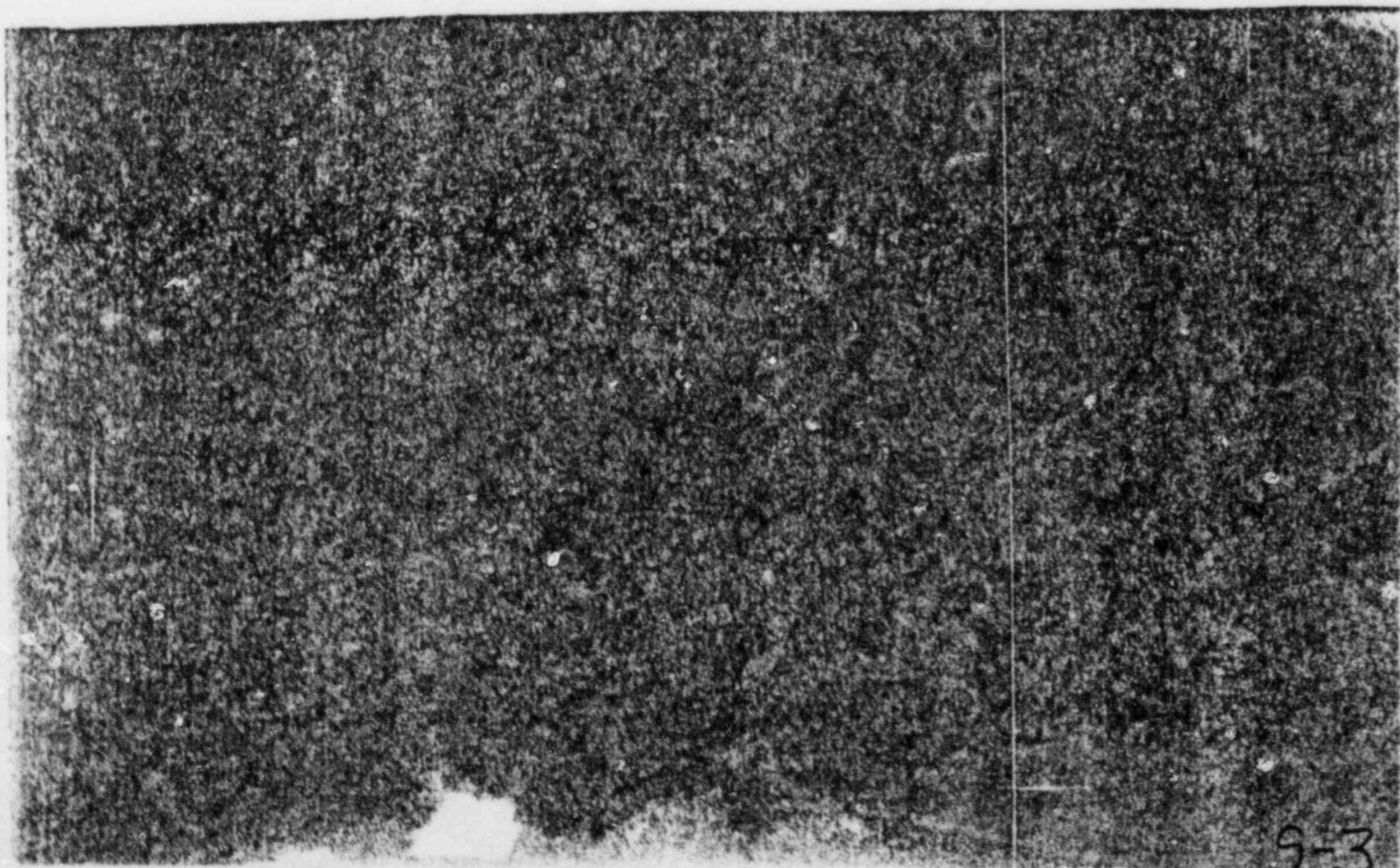
9

(129)

AD

RECEIVED
122 JUN 20 PM 12 30

Obtained from JOHN ELIN



9-3

BECHTEL PLVR

2

BECHTEL PLVR

WU INFOMASTER 4-021783M172002 06/21/82

ICS RCMMNPH MNPK

035

TX 9109501970 BECHTEL PLVR

06/21/82 RAYCHEM MP MG

ATTN: BILL SAYLOR

CC: BOB BRIGGS

RE: HVMC-5: PHONE CON 6/18/82

IN RESPONSE TO THE TWO QUESTIONS, THE FOLLOWING INFORMATION IS PROVIDED:

1. Q: WHAT IS THE DIELECTRIC STRENGTH OF THE RAYCHEM HVTM TUBING USED IN THE HVMC-5 KITS? DOES THIS DIFFER BETWEEN EXPANDED OR RECOVERED TUBING?

A: THE DIELECTRIC STRENGTH IS ONE HUNDRED FORTY KV/CM, MEASURED AT 3M THICKNESS. THIS NUMBER IS INVERSELY PROPORTIONAL TO THE SQUARE ROOT OF THICKNESS, SO WOULD BE HIGHER AT THINNER WALL THICKNESSES. TYPICAL APPLICATION RANGES WOULD VARY BETWEEN 1.5 AND 2.3 MM THICK. (NOTE: MULTIPLY BY THICKNESS TO GET DIELECTRIC BREAKDOWN VOLTAGE.)

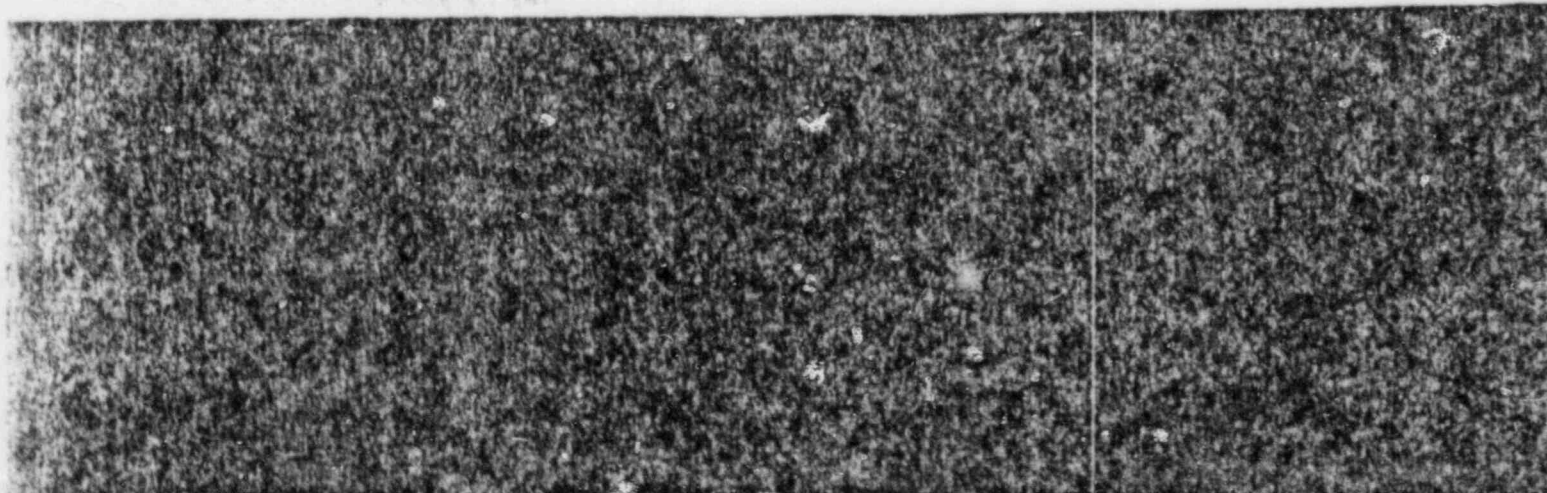
2. Q: IS THE FILLER REQUIRED TO HAVE INSULATION PROPERTIES?

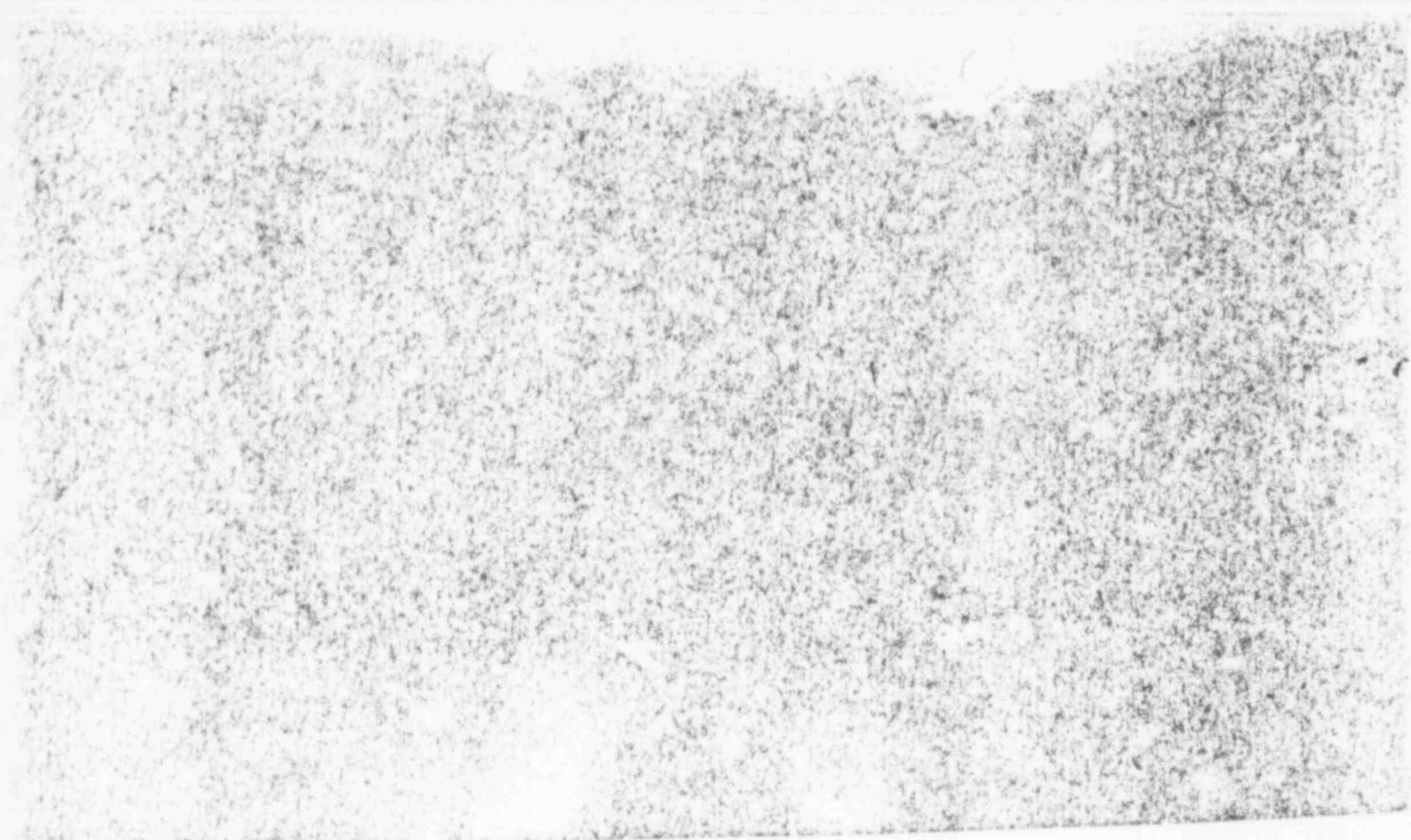
A: NO, ITS FUNCTION IS A VOID FILLER. THE INSULATION IS PROVIDED BY THE TWO LAYERS OF HVTM AND THE AIR SPACING IN THE APPLICATION.

REGARDS,
BOB SCOTT

1419 EST

BECHTEL PLVR





1.000000

2.000000 3.000000 4.000000 5.000000 6.000000 7.000000 8.000000 9.000000 10.000000

11.000000 12.000000 13.000000 14.000000 15.000000 16.000000 17.000000 18.000000 19.000000 20.000000

21.000000 22.000000 23.000000 24.000000 25.000000 26.000000 27.000000 28.000000 29.000000 30.000000

31.000000 32.000000 33.000000 34.000000 35.000000 36.000000 37.000000 38.000000 39.000000 40.000000

41.000000 42.000000 43.000000 44.000000 45.000000 46.000000 47.000000 48.000000 49.000000 50.000000

51.000000 52.000000 53.000000 54.000000 55.000000 56.000000 57.000000 58.000000 59.000000 60.000000

61.000000 62.000000 63.000000 64.000000 65.000000 66.000000 67.000000 68.000000 69.000000 70.000000

71.000000 72.000000 73.000000 74.000000 75.000000 76.000000 77.000000 78.000000 79.000000 80.000000

81.000000 82.000000 83.000000 84.000000 85.000000 86.000000 87.000000 88.000000 89.000000 90.000000

91.000000 92.000000 93.000000 94.000000 95.000000 96.000000 97.000000 98.000000 99.000000 100.000000

Review of Affidavit to ASLB (Cont'd.)

7. Use of Ray Chem Splicing Kits (Notarized 5/17/82)

"The Ray Chem splicing Kit is not adequate to splice under the very hot, arid conditions in which it must be used at Palo Verde."

Review of Affidavit to ASLB (cont'd.)

7. Use of Ray Chem Splicing Kits

(Notarized 5/17/82)

"The Ray Chem splicing kit is not adequate to splice under the very hot, arid conditions in which it must be used at Palo Verde."

(Might be in Elin's notes. Believes only used in non-class work)

STATUS: AA DD

Vm

VENDOR: HBA

PALO VERDE NUCLEAR GENERATING STATION

NONCONFORMANCE REPORT

NO E-A-1562 PAGE 1 OF 2

1. UNIT 1	2. MO DAY YR 11/3/81	3. DRAWING/PART NO. 13-EZA-COI	REV. 1	4. ITEM DESCRIPTION "Q" CONTROL CABLE	5. ITEM LOCATION Aux bldg. 40' Level, C-QUAD
6. Q CLASS Q	7. STARTUP SYSTEM NO. SIOS	8. SERIAL NO. Refer To Block 12	9. CONTRACTOR/SUPPLIER Bechtel	10. P.O. OR SPEC NO. RAYCHEM SPICE SPEC HYMC-5-15-20-00	11. ASME AUTHORIZED INSPECTION REQ'D. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
12. DESCRIPTION LIST IN ORDER: NO. PCS., DWG/SPEC REQMT., PRESENT CONDITION	16. FIELD ENGR DECISION		17. <input checked="" type="checkbox"/> FIELD RECOMMENDED DISPOSITION <input type="checkbox"/> ENGINEER CONCURRENCE REQ'D.		
1. At "Q" Pump IMSI APO2, 4.16 KiloVolt, 120 AMP Motor. Power Cable IES-10: ICA-2, A 3-CONDUCTOR, 4/0 WAS 1/4" WAS BOLT/WUG SPLICED TO AFDREM-ENTIONED Motor Leads, 3-CONDUCTOR, 2 AWG. Raychem Splice Kit HYMC-5-15/20-00 WAS USED. These Specs Called for 2 hole AMP Copper Lugs WHICH Provide ≈ 1.7 SQUARE INCHES of Electrical CONTACT SURFACE AREA, As Well as Sufficient Physical			<div style="border: 2px solid black; padding: 10px; text-align: center;"> <h2 style="margin: 0;">INVALIDATE</h2> <p style="margin: 5px 0;">REASON: NCR WRITTEN IN ERROR. NO REQUIREMENT IN SPEC. HYMC-5-15-20-00 TO HAVE MINIMUM SQ. INCH CONTACT SURFACE. NO NONCONFORMANCE EXISTS.</p> <p style="margin: 10px 0;"> 11/14/81 SIGNATURE DATE </p> </div>		
13. REPORTED BY: K. Brophy	15. INSPECTION/VALIDATION/REVIEW DATE G. Gaither 11/3/81		15A. REPORTABILITY EVALUATION: NOT REPORTABLE: <input checked="" type="checkbox"/> OR DER NO. _____		
19. ACCEPTANCE OF REWORK/REPAIR QC ENGR <u>na</u> 11-14-81	AUTHOR. INSP <u>na</u> DATE		13. DISPOSITION CONCURRENCE PROJ FIELD ENGR <u>na</u> DATE GROUP SUPV <u>na</u> DATE AUTHORIZED INSPECTOR <u>na</u> DATE		
14. ASSUMED CAUSE OF DISCREPANCY Feix Field Failed TO FOLLOW VENDOR Specifications			NUCLEAR GROUP <u>na</u> SUPV <u>na</u> (IF REQUIRED) DATE PROJ ENGR <u>na</u> DATE QA ENGR <u>na</u> DATE		
INITIATOR <u>K. Brophy</u> DATE <u>Nov 3, 1981</u>					

PALO VERDE NUCLEAR GENERATING STATION

NONCONFORMANCE REPORT

NO. E-1562 PAGE 2 OF 3

1. UNIT 1	2. FIG DAY YR 11/3/81	3. DRAWING/PART NO 13-EZA-CO1	REV 1	4. ITEM DESCRIPTION "Q" CONTROL CABLE	5. ITEM LOCATION Aux Bldg. 410 Level C - RUH0	17. <input type="checkbox"/> FIELD RECOMMENDED DISPOSITION <input type="checkbox"/> ENGINEER CONCURRENCE REQUIREMENT
--------------	--------------------------	----------------------------------	----------	--	--	---

12. DESCRIPTION
LIST IN
E M
ORDER, NO. PCS, DWG/SPEC REQMT., PRESENT CONDITION

STRENGTH. HOWEVER THE LUGS USED
FOR THE THREE 2 AWG MOTOR LEADS
HAVE AN ELECTRICAL CONTACT SURFACE
AREA OF LESS THAN 0.5 SQ. INCHES, AND
HAVE ONLY ONE BOLT HOLE.
THIS MOTOR DRAWS GREATER THAN
500 AMPS. - INITIAL STARTUP CURRENT.
ELECTRICAL COMPATIBILITY OF THESE
LUGS ARE IN QUESTION.

RAYCHEM HIGH VOLTAGE MOTOR CONNECTION KIT TYPE HVMC-5 INSTALLATION INSTRUCTIONS

SHRINKING TOOLS & TECHNIQUE

RAYCHEM FH-2609 TORCH, WITH 6-FT. HOSE (AD 1433), REGULATOR VALVE (AD1358), AND LP GAS TANK (MIN. 1 GALLON SIZE) IS THE MOST PRACTICAL COMBINATION OF EQUIPMENT FOR SHRINKING HVMC MATERIALS.

ADJUST REGULATOR TO APPROXIMATELY 5PSI. ADJUST TORCH TO OBTAIN 12-INCH FLAME, BLUE WITH YELLOW TIP, WHEN TRIGGER IS PULLED.

APPLY FLAME TIP TO HEAT-SHRINKABLE PARTS WITH RAPID BRUSHING MOTION- KEEP IT MOVING, TO AVOID SCORCHING. WORK ALL AROUND SLEEVE AT ONE POINT; THEN MOVE ON TOWARD UNSHRUNK AREA, STILL WORKING AROUND PART. PINPOINT FLAME SHAPE IS NOT RECOMMENDED. IT WILL BURN THE OUTER SURFACE BEFORE THE INNER ADHESIVE CAN MELT AND FLOW.

WHEN HEATING TO SHRINK COATED PARTS, A SLIGHT BEAD OF ADHESIVE AT EACH END OF THE SLEEVE, AND A SMOOTH OUTER SURFACE WILL INDICATE SUFFICIENT HEAT HAS BEEN APPLIED TO FORM AN ADHESIVE SEAL.

ALTERNATIVELY, A HIGH-POWERED HOT AIR GUN WITH SUITABLE ADAPTER AND REFLECTOR MAY BE USED, WHERE A 110 VOLT POWER SUPPLY IS AVAILABLE. RECOMMENDED IS RAYCHEM'S MODEL CV-2102 HEAT GUN, WITH GS-123 ADAPTER AND TG-24 REFLECTOR. FOR FASTER HEATING, THE 220 VOLT, MODEL CV-2103 IS AVAILABLE, AND USES THE SAME ADAPTER AND REFLECTOR.

CHECK KIT SELECTION GUIDE FOR: SUPPLY CABLE CONDUCTOR AND O.D.

MOTOR LEAD DIAMETER

BOLT LENGTH

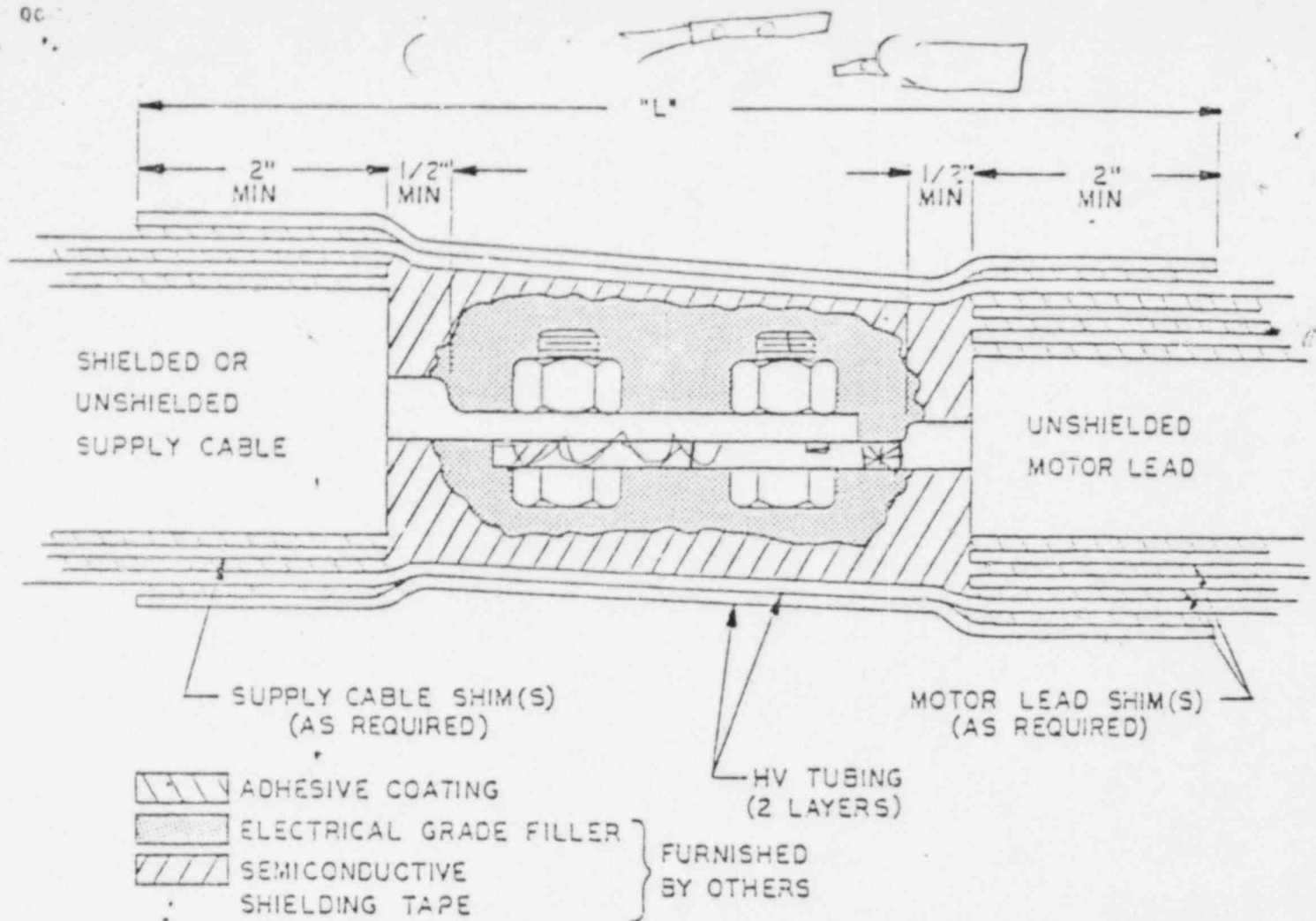
LUG TYPE

OBTAIN SUPPLY OF ELECTRICAL GRADE FILLER PUTTY AND SHIELDING TAPE.

KIT SELECTION GUIDE

KIT CATALOG NUMBER	<u>SUPPLY CABLE</u>		<u>MOTOR LEAD</u>		<u>STANDARD NEMA</u>	
	AWG RANGE	MIN. O.D.	MAX. O.D.	MIN. O.D.	MAX. O.D.	2-HOLE COPPER LUGS MAXIMUM BOLT LENGTH
HVMC-5-15/20-00	#8-#4/C	.32"	1.00"	.32"	1.00"	1"
HVMC-5-22/22-00	250-500MCM	.85"	1.50"	.50"	1.50"	1½"
HVMC-5-30/30-00	600-1000MCM	1.10"	2.00"	.62"	2.00"	1½"

HVMC-5(081324)



SHIM APPLICATION DIMENSIONS

TABLE 1

KIT PART NO.	SUPPLY CABLE	NUMBER OF SHIMS	MOTOR LEAD	NUMBER OF SHIMS
	DIAMETER INCHES		DIAMETER INCHES	
HVMC-5-15/20-00	.32 - .75	2	.32 - .75	2
	.76 - .95	1	.76 - .95	1
	OVER .95	0	OVER .95	1
HVMC-5-22/22-00	.85 - 1.10	1	.50 - .90	2
	OVER 1.10	0	.91 - 1.10	1
			OVER 1.10	0
HVMC-5-30/30	1.10 - 1.30	2	.62 - 1.00	3
	1.31 - 1.50	1	1.10 - 1.30	2
	OVER 1.50	0	1.31 - 1.50	0

HVMC-5(081324)

DIRECT READING DIAMETER TAPE - INCHES

1. TRIM BACK SUPPLY CABLE TERMINATION END AS REQUIRED, TO EXPOSE AT LEAST $\frac{1}{2}$ " OF BARE LUG BARREL. CLEAN LUGS AND CABLES WITH SUITABLE SOLVENT.
2. MEASURE DIAMETER OF MOTOR LEAD AND SUPPLY CABLE, USING THE DIAMETER TAPE PRINTED BELOW SHIM TABLE. REFER TO TABLE 1 FOR SHIM SLEEVES REQUIRED TO MATCH CABLE AND LEAD DIAMETERS. SHIM SLEEVES ARE $4\frac{1}{2}$ " LONG, BLACK WITH RED INNER COATING IDENTIFIED IN LABELED BAGS. WHEN MORE THAN ONE SHIM SLEEVE IS REQUIRED ON A GIVEN CABLE, ALWAYS APPLY THE SMALLEST SLEEVE FIRST.
3. POSITION REQUIRED SHIM SLEEVE(S) OVER CABLES SO THAT INNER END OF SHIM IS FLUSH WITH CUT END OF CABLE INSULATION OR TERMINATION. HEAT TO SHRINK IN PLACE, ONE AT A TIME. IF REQUIRED, POSITION AND SHRINK SECOND SLEEVE ON TOP OF FIRST, ETC.
4. SLIDE TWO LONG RED SLEEVES OVER CABLES, AND MAKE UP BOLTED LUG CONNECTION. DO NOT EXCEED MAXIMUM BOLT LENGTHS SPECIFIED IN SELECTION GUIDE.
5. APPLY ELECTRICAL GRADE FILLER TO CONNECTOR FLAT AREA TO FORM A SMOOTH CONTOUR OVER BOLTS. USE ONLY ENOUGH FILLER TO CONTOUR THIS AREA. BE SURE TO LEAVE $\frac{1}{2}$ " LUG BARREL CONTACT AREAS CLEAN.
6. BEGINNING AT ONE BARE LUG BARREL AREA, APPLY TWO HALF-LAPPED LAYERS OF SHIELDING TAPE ACROSS FILLED AREA TO OTHER BARE LUG BARREL, CONTINUE TO APPLY SHIELDING TAPE TO BUILD UP LUG BARRELS TO A DIAMETER EQUAL TO THE OUTER DIAMETERS OF THE SHIMS ALREADY INSTALLED. FORM A SMOOTH CYLINDRICAL CONTOUR OVER THE ENTIRE CONNECTION AREA.
7. SLIDE THE SMALLER DIAMETER RED SLEEVE TO BE CENTERED OVER THE CONNECTION AREA. HEAT UNIFORMLY, BEGINNING IN THE MIDDLE, AND WORKING TOWARD ONE END. THEN START BACK IN THE MIDDLE AND WORK TOWARD THE OTHER END.
8. CENTER THE REMAINING RED SLEEVE OVER THE FIRST, AND HEAT TO SHRINK IN THE SAME MANNER. DO NOT FLEX ASSEMBLY UNTIL IT IS COMFORTABLE TO TOUCH, SO ADHESIVE SEALS WILL HAVE TIME TO SET.

JUL 14, 1982

Larry Sousa (?) APS QA
provided copy of NCR written
by Broyhill.

7/16/82 - Mtg. w/ ANDY ANDERSON

(RV-IV-82-029)

AMP Special Industries Wiring Devices
Valley Forge, ~~Industries~~ Penn. 19482
(215) 642-1000

} Mfr. of the subject terminal

The numbers on some of the terminals is a Military Spec

The lug that matches the cable is for that cable.

DON TAYLOR 602/265-8788
AMP Special Industries

is the factory rep. on site



AMP
SPECIAL
INDUSTRIES



Donald E. Taylor
District Representative

Phoenix, Arizona, (602) 254-2655
1840 S. Wilmington Ave., Compton, CA 90220 (213) 639-1691
Division of AMP Products Corporation | Subsidiary of AMP Incorporated



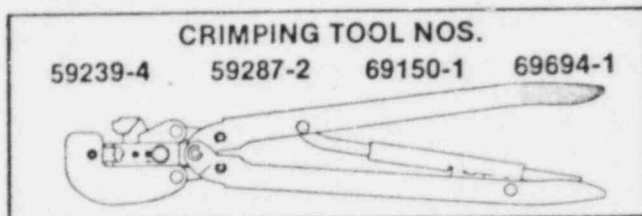
INSTRUCTION/MAINTENANCE/INSPECTION SHEET

IS 1261

10-17-77

1. INTRODUCTION

This publication provides "Instructions" on product application and a "Maintenance and Inspection Procedure" for:



These tools are used to crimp:

- PIDG ★ terminals and splices on wire sizes 12-10 and 16-14 HD.
- PIDG STRATO-THERM ★ terminals on wire sizes 12-10.
- PIDG insulation restricting nylon terminals on wire sizes 12 and 10.
- PIDG insulation restricting TEFLON† terminals on wire sizes 12 and 10.

- PIDG Radiation Resistant terminals and splices on wire sizes 12 and 10.
- PLASTI-GRIP ★ terminals on wire sizes 12-10 and 16-14 HD.
- Spare Wire Caps on wire sizes 12 thru 10.

Basic instructions on the use of these tools, wire preparation, tool adjustments, etc. are provided in Section 2, "Instructions." Section 3 features a terminal and splice "Crimp Inspection" procedure. Section 4 contains a "Maintenance and Inspection Procedure" which will enable you to establish and maintain a *tool certification program*.

These instructions may be used for tools not listed in Figure 1 but accompanied by this IS. For unlisted tools, use the wire strip dimensions given in Figure 1 for an identical size tool.

Tools are coated with preservative to prevent rust and corrosion. Wipe this preservative from tool, particularly from crimping area.

SPARE WIRE CAP

PLASTI-GRIP
TERMINALPIDG TYPE
TERMINALSINSULATION
RESTRICTING

PIDG BUTT SPLICE

COLOR STRIPE
ON 16-14 HD.COLOR
BANDCOLOR
STRIPE ON
16-14 HD AND
RADIATION RESISTANTCOLOR STRIPE
ON RADIATION
RESISTANT

PRODUCT	TOOL HANDLE COLOR AND DOT CODE	TOOL NO.	WIRE RANGE	INSULATION DIAMETER RANGE	INSULATION COLOR CODE	WIRE STRIP LENGTH			
						Terminals		Splices	
						Min.	Max.	Min.	Max.
PLASTI-GRIP TERMINALS PIDG VINYL AND NYLON TERMINAL OR SPLICE	YELLOW ONE DOT	59239-4	12-10 16-14 HD	.230-.250	12-10 YELLOW 16-14 HD YELLOW W/ BLACK STRIPE	5/16"	11/32"	11/32"	3/8"
		59287-2		.275-.300					
		69150-1		.230 ONLY					
PIDG STRATO-THERM TERMINALS	BLACK ONE DOT	69694-1	12-10	.214 ONLY	BLACK	5/16"	11/32"	—	—
PIDG INSULATION RESTRICTING NYLON TERMINALS	YELLOW ONE DOT	59239-4 & 69150-1	12	.095-.200	YELLOW INSUL. W/YELLOW BAND	3/8"	13/32"	—	
			10	.119-.200	YELLOW INSUL. W/BROWN BAND				
PIDG INSULATION RESTRICTING TEFLON STRATO-THERM TERMINALS	BLACK ONE DOT	69694-1	12	.085-.200	YELLOW	15/32"	1/2"	—	
			10	.119-.200	BROWN				
PIDG RADIATION RESISTANT TERMINALS & SPLICES	YELLOW ONE DOT	59239-4 69150-1	12-10	.230" MAX.	NATURAL COLOR W/YELLOW STRIPE	5/16"	11/32"	11/32"	3/8"
			16-14 H.D.	.150" MAX.	NATURAL COLOR W/BLACK STRIPE			—	—

PRODUCT	TOOL COLOR AND DOT CODE	TOOL NO.	WIRE RANGE	MAXIMUM INSULATION DIAMETER	PRODUCT INSULATION COLOR CODE	WIRE STRIP LENGTH	
						MIN.	MAX.
SPARE WIRE CAP NO. 328309	YELLOW ONE DOT	59239-4	12-10	.210	YELLOW	11/32"	3/8"

Figure 1

All illustrations and information contained in this instruction sheet are based on the latest product information available at the time of publication.

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