

1.0 SCOPE

This procedure outlines the requirements for weld repairing of the defective rupture restraints. All welding repairs shall be made in accordance with AWS D1.1-79, Structural Welding Code - Steel.

2.0 BASE MATERIAL

The Base Material shall conform to any one, or any combination, of the follow ASTM A-36, A-441, A-572, A-515, A-516 and A-500. For shapes, A-515 shall not used.

3.0 FILLER METAL

The Filler Metal shall conform to ASME Filler Metal Specification SFA 5.1, Ty E-7018_

4.0 POSITION

Welding shall be done in all positions.

5.0 . PREHEAT AND INTERPASS TEMPERATURE

5.1 The minimum preheat temperature shall be as specified below. The minim interpass temperature shall be the minimum specified preheat temperatur and the maximum interpass and preheat temperature shall be 800°F.

Metal Thickness	Temperature	
Up to 3/4"	50°F*	
Over 3/4" through 1-1/2" .	150°F	
Over 1-1/2" through 2-1/2"	225°F	
Over 2-1/2"	300°F	

5.2 The specified preheat and interpass temperature shall be maintained unit the completion of each weld. Suitable preheat equipment and/or personr shall be provided to assure compliance with requirements during period: of inactivity. 8708190372 870814

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Plates to be flame dried when below 70°F ...

Gangen Aupture Restraint Repair Procedure

Procedure No. 2077 Page: 2 0: FOR INFORMATION ONLY.

POST WELD HEAT TREATMENT

The completed welds shall not be given a post weld heat treatment.

WELDING PROCESS 7.0

All welding shall be done with the manual shielded metal arc welding process_

8.0 PREPARATION OF BASE METAL OR CAVITY FOR WELDING

- The edges or surface of the parts to be repaired shall be prepared by 8.1 flame cutting, air arc gouging, machining, drilling, grinding or any combination of these methods.
- All flame cutting and are gouging of weld preparations shall be performe 8.2 using the preheat temperatures specified for welding.
- All flame cut and/or air arc gouged surfaces shall be ground to bright 8.3
- After surface preparation, all repair areas shall be magnetic particle 8.4 examined using Department of Engineering Research Procedure No. 3212, "Magnetic Particle Examination of Welds in Pipe Rupture Restraints."
- 9.0 ELECTRICAL CHARACTERISTICS

The current used shall be DC Reverse Polarity.

- 10.0 WELDING TECHNIQUE
 - 10.1 A Welding Technique Sheet shall be prepared for each repair. The Technique Sheet shall be submitted to P G and E for approval and shall include, as a minimum, the following information:

The configuration of the repair cavity or groove. 10.T.1

10.1.2

10.1.5

The sequence of welding, including the electride sizes to be used, along with the voltage and amperage to be used with each electrode size. Extra care is required to sequence all weld repairs so that residual stresses and distortion are minimized. Coped corner holes are not to be filled with weld metal.

10.1.3 The preheat requirements for the repair.

10.1.4 Peening requirements, if desired.

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All special instructions concerning cleaning, weaking, or appearance of the weld

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WELDING TECHNIQUE - Continued

EQE INFORMATION ONLY

10.1 (continued)

- -- TO. 1.6 The Nondestructive Test requirements for the repair.

10.2 Revision to the Technique Sheets shall be made only with the approval. of P G and E.

NONDESTRUCTIVE TESTING 11.0

The completed weld repairs are to be nondestructively examined in accordance with the requirements of Engineering Specification 8833XR. The required examinations shall be performed at least 48 hours after completion of all full penetration and partial penetration welds which are thicker than 1/2 The examination of other welds may take place at any time after completion o the werd.

R Fifn Ken Department of Engineering Research

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Diablo Canyon Project

Harold Karner

From D. A. Rockwell

Pullman Power Products

General Construction

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PACIFIC GAS AND ELECTRIC COMPANY BECHTEL POWER CORPORATION

Date January 24, 1983

File No.

Sugget Weld Procedures for Rupture Restraints Reference Pullman Letter Dated January 14, 1983

Weld procedure specification code 7/8 has been approved for the process and joint configurations itemized on the weld procedure specification (WPS). These itemized parameters are considered prequalified by AWS or are supported by tests and procedure qualification records (PQR). If Pullman wishes to use WPS code 7/8 for processes or joint configurations not itemized a new WPS and PQR's are required.

Since the square groove welds shown in your letter are not considered prequalified by AWS for SMAW in the material sizes shown and are not supported by tests and PQR's these welds are not allowed.

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Assistant Project Superintende:

RTorstrom:fgm cc: EBFriend JBHoch JRManning JWShryock RDEtzler



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FWE	UNSCHEDULED AUDIT NO.: 32	DATE: 8-6-82	50 243, ESD 201,		IRR-MA, DQ 335 (etch 1251RR-WA weld uppose to be a Plug h convex contour. In f Standard Symbols and ntersink. In definition of a Plug a lap or T-joint fusing wil8x45. The call out he Plug welds are not f lapped parts and to as Plug welds violated cing of Plug welds violated cing of Plug welds are not f lapped parts and to as Plug welds violated cing of Plug welds violated cing of Plug welds are not f lapped parts and to as Plug welds violated f lapped parts and to as Plug welds violated f lapped parts and to as Plug welds violated cing of Plug welds as Plug welds violated f lapped parts and to as Plug welds violated f lapped parts violated f lapped
DIABLO CAYYON NUCLTAR PORER PLANT	JUALITY AUDIT CHECKLIST	AUDIT CRITERION	R COMPONENTS ANS-D1.0-69, ANS-D1.1-79, ANS 1-1 AT	OBSERVATION	Rupture Restraint 251, FW's #60, #60R1, #61, #61R1, Sketch #25 I. Process sheets weld symbols $(\sqrt{2} - 1)$ do not agree with sk symbol (-1) by the process sheets weld symbol per Dq335 is symbol weld. The sketch appears to call for a Square Groove weld with addition, the Plug weld symbol used does not meet AWS Design o it did not give the size of the Plug weld and the angle of cour- li. The call out for a Plug weld does not meet the AWS Code weld. The welds are not made thorugh a hole in one member of one member to another. The welds were made in the flange of a for a Plug weld does not meet the USE Requirements of AISC. The weld of transmit shear in a lap joint or to prevent buckling of joint component parts of built-up members. The R1 welds made AMS D1.0-59.215 requirement that minimum center-to-center space shall be four times the diameter of the hole. The center-to-center shall be four times the diameters were 1". The spacing times the diameter of the hole with the weld doposit an allowed by AMS D1.0-59.102a and c for backing is not one of these Class I Rupture Restraints. Copper backing is not one of these the copper backing was not fused with the weld deposit an inded that instead of the term "copper hacking bar" being used if would be more appropriate to use the term "copper retainer". Would do utside the scope of AIS D1.0-69.102.c and would inf fusion with the weld material.
rev. 3/39/79			NONCONFORMING MATERIALS. PARTS 0	PROGRAM REQUIREMENT	 ESB 243.5.2.3.A - Field Layout Brawings shall be used as an aid in location and identification of details. AWS A2.4-79.5.2 - The size of a Plug weld shall be shown to the left of the weld symbol. AWS A2.4-79.5.3 - Included angle of countersink, when not the user's standard, shall be shown. AWS A2.4-79, Figure 1 - Basic weld symbols. AWS D1.1-79, Appendix C.10 AWS D1.1-79, Appendix I - Plut weld is a circular weld made thru a hole in one member of a lap or I-joint fusing that member to the other. AISC V.1.17.12 - Plug welds may be used to transmit shear in a lap joint or to prevent buckling of lapped parts of built up members.

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AWS-D1.0-69, AWS-D1.1-79, AWS 1-1, AISC, Weld Code #7/8 AUDIT NO.: 32 8-6-82 WERENENCE DOCUTENTS: ESD 264, ESD 243, ESD 201, DATES OBSERVATION JUALITY AUDIT CHECKLIST AUDIT CRITERION NONCONFORMING MATERIALS, PARTS OR COMPONENTS THEIRING NEGOTA PROPERTY ACTUVIT's

welds shall be four times the diam-AWS D1.0-59.215c - The minimum center-to-center spacing of Plug eter of the hole.

Class I materials from the Pullman tion applies to requisitioning all ESD 201.1.1 - This specifica-Power Products warehouse and/or storage area. 8

used for the welding of any steels bars, run off plates and backings permitted by paragraph 102(a) may AWS 01.0-69.102c - Extension be of any of the listed steels. 6

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to assure that it meets workmanship requirements and visual acceptance Inspector shall examine in process 0. ESD 243.13.4.1 - The Field OC and completed work, as required, criteria of this procedure.

sheet indicating acceptance when it is determined that work is in compliance with applicable require-Inspectors perform required inspection and sign the process 1. ESD 264.4.4.2 - Field 0C ments.

nician or the QC inspector or other documentation to indicate that the welds had been work was assured of meeting the workmanship requirements and visual acceptance criter required by ESD 243.13.4.1. There is no QC Comment Sheet report made by the MI lech-The Final Visual and Dimensional hold point was signed indicating that the completed pleted weld acceptance to Quality Control. QC Inspector corrected the problem after Dimensional step and stating on the QC Comment Sheet that welds "ground out complete the audit finding by marking the process sheet with "Report" at the Final Visual and totally removed and required repair. The process sheet information reflects a comia of ESD 243. But the welds had been removed as a result of grinding to remove MI The process sheets for FW'3 #60 and #61 had the MI hold point signed as NRI. indications and did not meet the final Visual and Dimensional acceptance criteria due to MT indications". IV.

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The FW's #60 and #61, audited on 8-3-82 were found not to have stamping identifying FW#61R1 stamping was not per ESD 243 requirements. The R1 stamping was not under the welds. Both welds were completed on 7-29-82 and had Final Visual and Dimensional buy The stamping that flange with the FW number and only one set of operator stencils. Per ESD 243.9.9.1 the weld numbers, the symbol of the welder who tacked the fit-up and completed the off on 8-2-82. The QC Leadman and Production Superintendent were informed on this there should have been a operators stencil for both the fit-up and weld complete. FW#60 stamping was inaccessible for review. FW#61 was stamped on the edge of the date to implement Corrective Action. On 8-6-82 a follow up audit was performed. FW#61 stamping but placed separately on the bottom of the flange. was accessible had the fit-up and weld complete operator stencils

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F. Strid	UNSCHEDULED AUDIT NO. 1 32	DATE: 8-6-82 243, ESD 201, C, Weld Code #7/8		have revision numbers ss sheets for 2046-10 (NDE Inspect:ons) nges did not have a	RT, BMR#1, #2 and #3 e BMR*s do not have ar 33, BMR#1 and #2, do ion for cleanliness.	ration for NDE, negate ess sheet. The proces e individual making tion of the change and #4 have a by ot signed off while not been negated.	ion circular welds, Several areas were	square groove welds d Code #7/8 was also of Unit #1 in the Is in one inch thick b-69.213a, 216c.1 and
Pullman Pr Jr Products PIABLO CAYPON MICLEAR POWER PLAIT	UMLITY AUDIT CHECKLIST	AUDIT CRITERION AUS-D1.0-69, AMS-D1.1-79, AMS 1-1, AIS	OBSERVATION	VI. The process sheets for RR133, BMR#1, #2, #3 and #4 do not listed for PG&E Drawing #460133. These process sheets and proce /11RT, BMR#1, #2, and #3 had hold points for Steps #1, #7 and #8 negated by field Engineer after documented QA review. These cha documented QA Approval prior to proceeding with the work.	Process sheets for RR133, BMR#1, #2, #3 and #4, and RR 2046-10/1 had a Clean hold point added after the work was performed. Thes explanation of the changes furnished on the process sheets. RR1 not have a documented QC visual examination of the weld preparat	The process sheet for RR133, RMR#1 had Step 6 - Visual and Prepar but there is no explanation for the change furnished on the process sheet for BMR#2 had Step 6 negated but there is no initial of the the change and the date of the change. Also there is no explanat furnished on the process sheet. The process sheets for BMR's #3 passed hold point. Step 6 - Visual and Preparation for NDE is m Step 9 - Final Visual and Dimensional hold point is. Step 6 has	VII. As a result of the findings concerning RR251 full penetratifurther investigation of Weld Code Procedure #7/9 was performed. examined with the following results.	A. Weld Code Procedure #7/8 was used to make approximately 58 in one inch thick material in the GW area of Unit #11. Wel used to make approximately 35 square groove welds in the GW area same thickness material (see attached lists). Square groove weld material is not one of the prequalified joint details of AWS D1.0 216h.1.
FORT P. ECV. 3/39/79		ACTIVITY: NONCONFORMING MATERIALS, PARTS	PROCENEL INCOMERENT	12. ESD 264.4.4.3 - Field QC Inspector advise the responsible person/persons of nonconforming work as required by other proce- dures.	13. ESB 243.9.9.1 - All welds shall be steel stamped with the weld number and the symbol of the weld- er(s) who tacks the fit-up, runs the root pass and completes the	<pre>weld. #4. ESD 243.9.9.2 - In case of a repair weld, the repair welder shall place his symbol under the RI EXAMPLE: Field Weld No. FW#76 Fit-up Root Pass YB</pre>	Complete BI Repair RI XE	15. ESB 264.4.4.C - Field QC Inspectors perform required inspec- tions and sign the process sheet indicating acceptance when it is determined that work is in compli- ance with applicable requirements.

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AUDIT CRITERION S AUDIT CRITERION S ANS-D1.0-69, Procedure #7/8 does not have b1.0-69.213a and b, 216c.1, cm qualified for the type b1.0-69.213a and b, 216c.1, cm section 2.1.24, 3.61 and ber of square groove welds and de in material of unknown s of these welds and is suspect by deal with theses welds and ified welding procedure. The code Procedure #7/8 was used and #61 on RR251. Full per cation Record for full per freetion Record for full per
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<pre>ind Procedure #7/8 was used ind #61 on RR251. Full per (retaining clip) on the fia of AWS D1.0-69.213a. !well ation Record for full pene</pre>
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17.2 states that joint for her thon those prequalifie ided they shall have been J. The AISC Commentary, p ier than weld and joint de may be tsec, provided th ode authority and are exe

PAGE 5	UNSCHEDULED AUDIT NO.: 32	DATE: Aug/Sept., 1982	XV ESD 243, ESD 201,	AISC, Weld Code #7/8		or General Requirements tructural Use, states than Quenched and Tem- ted welding procedures full penetration circular beam. This type weld is de Procedure #7/8 to make Specification 8833XR ; AISC Part 5.1.17.2 ; AISC Part 5.1.17.2 the full penetration a Base Material (Metal) ial (Metal) Repair is e welds to be considered ddress full penetration tes the methods used in ge of a W shape beam that shall conform to Section cticn 3, Article 308, iece or member which is if on the fall within the considered as AWS pre- lied bolt holes by making procedure used shail have i.0-69 as required by
Pullman P ver Products DIABLO CAVYON NUCLEAR POWER PLANT	QUALITY AUDIT CHECKLIST	AUDIT CRITERION	TUPPERENCE DOCUPENTS: ESD 264.	COMPONENTS AWS-D1.0-69, AWS-D1.1-79, AWS 1-1,	OBSERVATION	It can also be noted that ASTM A6 - Standard Specification for Son
FURT , 1 FOV. 7/6/78 FOV. 3/39/79			· ACTIVITY:	NONCONFORMING MATERIALS, PARTS OR	PROCEAM REQUIRERENT	 19. prior to subsequent work. 20. ESD 243.13.4.4.C - As a mini- mum QC Inspector requirements shall be to conduct visual examination of the weld preparation for clean- leness. 21. Contract Spec 8833XR, Section 21.24 - All welding procedure submitted shall be prepared and qualified in accordance with AWS- D1.0-69 or D1.1-72. 22. Contract Spec 8833XR, Section qualified in accordance with AWS- D1.0-69 or D1.1-72. 23.61 - Welding shall comply with the welding requirements of the AISC and all applicable re- quirements of the AMS. Controlling authority shall be the AMS. 23. Contract Spec 8833XR, Section 2.3.63 - All welders, welding machine operators, and welding pro- cedures shall be qualified in accord ance with the AMS, Code for Welding in Building Construction.

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FOULED F NO. : 32	1 Aug/Sept.,198 550 201, 1 Code #7/8	on No. AWSI-1 le noted first chnique. rdance with d Code proce- netration elds, and ecification elds, and ecification elds, and ecification netration for base metal d a deposit base metal d a deposit conform to D1.1-79. S, states repairing of ip, states repairing of is states repairing of is states repairing of se metal ceptable on circular isions of isions of
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UALITY AUDIT CHECKLIST	IS OR COMPONENTS AUDIT CRITERION SUPPONENTS FSD 264, ESD 266, ESD 2666, ESD 266, ESD 266, ESD 266, ESD 266, ESD 266, ESD	OBSERVATION II thas also been suggested that Pullman's Welding Technique Special toould be used to make the full penetration circular welds. It she toould be used to make the full penetration circular welds. It she sheets that this technique will be used for by Pullman Power Products process sheet. The process sheets reference ANSI-Plana Power Products process sheet. The process sheets reference and one to base metal built-ups. Under Welding Technique, paragraph E, to point details illustrate a base metal built-up will conform in all aspects of this point details illustrate a base metal built-up. It requires a back with the comment "built-up will conform in all aspects of the biller metal for the full thickness of the base metal built-up as required." A full penetration weld for the biller metal for the full thickness of the base metal. This do MAS states that it a Technique Specification for SMM of ASIM A36. Section 7 of AMS bases are able weld with only a portion of the biller metal for the full thickness of the base metal built-up. Adversation of the base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base metal built-up. It requires a back the joint details of AMS-1 for base pand built and the joint detail
	ACTIVITY : NONCONFORMING MATERIALS, PARTS	 24. ESD 243.9.1.1 - Welding shall comply with the welding requirements of the AISC and all applicating and requires. ments of the AISC and all applicating requirements of the AMS. Controlling authority shall be the AMS. 25. ESD 243.3 - References: a. Standard Code for Welding in Building Construction, of the American Welding Society' (AMS). b. Specification for the Design from tural Steel for Building of the American Institute of Steel Construction (AISC). c. American Institute of Steel Constructions (ASIM). 26. AMS D1.0-69.213a - Joints that tions (ASIM). 26. AMS D1.0-69.213a - Joints that tions (ASIM). 26. AMS D1.0-69.213a - Joints that tions (ASIM). 26. AMS D1.0-69.213a - Joints that the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed in Articles 214, 215, 216, 217, 218 and 219 and which are welded with the requirements of Sections 3 and 4 are designed as prequalified, and may be set of a sprequalified, and may be set of a sprequalified.
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PORT F- FOV. 7/6/78 FOV. 3/39/79				NONCONFORMING MATERIALS. PARTS 0	PROCEAN INQUE REPEAT	30. AWS D1.0-69.216.c.1 - Complete penetration groove welds made by manual SMAW process, which may be used without performing the joint welding procedure qualification tests prescribed by Article 502, are listed in the following para- graphs (1) through (12). These welds are subject to the limitation specified in paragraphs 216(a) and (b). 1. Square groove welds in butt, tee and corner joints in material not more than 1/4 inch thick, 1. Square groove welds in butt, tee and corner joints in material not more than 1/4 inch thick, as follows: 1. The specified thickness of material is the maximum nominal thickness that may be used. 32. AISC V.1.17.2 (1973) - Weld grooves for complete and partial penetrations welds procedure quali- fication under the provisions of fication under the provisions of

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10 6 SEVIL	AUDIT NO.: 32	DATE: Aug/Sept. 1982	243, ESD 20'.	. Weld Cole #7/8				
DIABLO CATYON WICLEAR PLATT	DULL'IN AUDIT CHECKLIST	AUDIT CRITERION	NONCONFORMING MATERIALS, PARTS OR COMPONENTS ANS-D1.0-69. AUS-D1.1.70 AUS. 1.00000000000000000000000000000000000	PROGRAM REQUIREMENT OBSERVATION	procedure qualification. Joint forms, details, welding processes, or welding procedures other than those included in the foregoing may be employed provided they shall have been qualified in accordance with the requirements of ANS D1.0- 69.	33. ASIM A6.9.5.1.2 (1982)- (Repair by Welding: Steels other than Quenched and Tempered) The manufactor or processor shall establish and follow documented welding procedures that are appro- priate for the material being	ESD 243.9.7.1 - Fillet weld size shall be as designated on the draw- ing. Maximum oversize shall be plus 1/8".	
						A-	174	2

7.: F.6 From: X. N. Ton Subject: audit conducted without authorization. In conversation on 7/22/22 I directed Al Fideon that all fature andit schedules prochen. and checklists shall be agained by the Fill QA/OC Manyor a directed by \$50 -263 jan. 7.3 . 3 Ale Ander is conducting an autotichich I have not reviewed a schoole, procedure, or decklist. to and and meeting was not fill with the applicable supervising pronnel site for Water on Part Water. Jan 9- 13-82 13.54+.82 Level 2. Former 9/13/02 The andit item than Kanen objects to so the result interimed innestigation of U. I. M. #32 which the approved buck isd by pro: Kanen. The continued miningature item have not had a preanded conference a approvally Isanold Hundon 9-13-82 ATT#2

/ .
Pullman Power Products
rev. 3/30/79 (
DIABLO CANYON
NUCLEAR POWER PLANT PAGE 2 OF 2
AUDIT ACTION REQUEST
FILE NO.: XV AUDIT NO.: 32 A.A.R. NO.: 2
OBSERVATION CODE: 1 & 2 ACTIVITY AUDITED: Nonconforming Welds
AUDIT DATE: 8-3 to 8-6-82
REFERENCE DOCUMENTS . BSD 201 AVE DI 0 (0
ESD 201. AWS D1.0-69
FINDING: CONTINUED FROM PAGE 1:
 The copper backing materials used on the welds are not one of the listed steels allowed by AWS D1.0-69.102a and D1.0-69.102b for backing. This is a noncompliance to AWS D1.0-69. 102a and D1.0-69.102b.
SUSPECTED CAUSE:
2. The copper backing bars were used because they would absorb heat and not fuse with the we'd deposit and be easily removed so that another item could absorb heat and not fuse with the
Source and the stand so that another free could be bolted to the flange.
IF NO - PLEASE EXPLAIN:
ATT
: DATE: MILLANT Z
DATE:
APPROVED BY: DATE:

3472 00 3

FW 60

251 R.C.

FIELD SUPERINTENDENT / SKETTERS

FIED DIRECTICN NOTES

DATE HOTTES STGHATTRE 7-19-82 EXISTING HOLE TO BE OPENED UP PER SKETCH BELOW TO ALLOW FOR WELD ACCESS . rapziu Fez willows FLANGE 1 CF W18×45 BACKING D. Dunna BAR - -7/2/82 1200T PASS INSDECTION DELETED RELAVIE THERE IS NO ROOT PASS IN THIS CASE. BACKING BAR TO BE DEMIVED, WELD BALK GROUND, BALK WRAED AND THEN GROUND FLUSH Film 1 ATT#2

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547 3 OF 3 FW 60 251 RE

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COMMENT	SIGNATURE
-82 MT. INFO (1) L.I. 1/4" @ BETTONSide LOF	7 June
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(2)L.1. # 5/14"+3/14	I Malan - D
Weld was etclod w/ 10-20% dumaning Analifato solution	. A.J.I
creating was found in wellmotal and in the ficin mas	
The likely cause of cracking ups (oper (cis) attain	Jén.
from the cooper backing strip that was used .	1 1
22 M.T. INFO - MULTI L.I: TOTAL SUMOF 22	2"
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MT-INFO-MULTI LI. TOTALSUMOFZ"	1.
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Pullman Power Products

DIABLO CANYON NUCLEAR POWER PLANT

PAGE 3 OF 3

AUDIT ACTION REQUEST

FILE NO.: XV	AUDIT NO.: 32	A.A.R. NO.:	
OBSERVATION CODE: 1 & 2	ACTIVITY AUDITED:	Nonconforming	Welds
AUDIT DATE: 8-3 to 8-6-8	2		
PEFERENCE DOCUMENTS : ES	D 243, AWS Helding Code, AISC		

SUSPECTED CAUSE CONTINUED:

F-125 rev. 7/6/78

rev. 3/30/79

4. The original holes welded had a diameter of 7/8". The original welds had to be removed due to MT indications. The welds were ground out to a diameter of 1" in preparation for the repair welding.

5. The welds as originally called out as Plug welds were considered to be prequalified joint details and capable of being welded with Code #7/8. But as full penetration circular welds (actual field condition) they are not prequalified welds.

5

RECOMMENDED CORRECTIVE ACTION CONTINUED:

3. Review all Rupture Restraint drawings and identify for Corrective Action all full penetration circular welds classified as Plug welds which do not fuse one member of a lap or Tjoint to the other member.

FOLLOW UP: ACTIVITY CONTLIES IF NO - PLEASE EXPLAIN:	WITH APPROVED	CORRECTIVE A	CTION	NO
	DATE :	ATTH	=2	
A.A.R. CLOSED BY:	na na na serie se constante y de la constante de activitada de la constante da constante da constante da const Na seconda constante da constante	DATE :	ACUS EXECTIONEDISCICATOR EXECUTION ACTIVATION AND ACTIV	NITERAL CONTRACTOR CONTRACTOR
APPROVED BY:	k W Naroch des Neurope and an and a statistical statistica 1	DATE :	na mana ana ang ang ang ang ang ang ang ang	non de part de la constantina de secues
	n na han na hanna na hanna na han an han na han na hanna han na hanna na hanna na han ng hang ana han na han h	an a share a san a s		

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DIABLO CANYON NUCLEAR POWER PLANT

PAGE 2 OF 3

AUDIT ACTION REQUEST

FILE NO. :	XV	AUDIT NO. :	EDULED 32	A.A.R. NO.:	1
OBSERVATION	CODE: 1 & 2	ACTIVITY	AUDITED:	NONCONFORMING	WELDS
AUDIT DATE :	8-3 to 8-6-82	Research and a second			
	CCI	242 AUG			

REPARENCE DOCUMENTS: ESU 243, AWS Welding Code, AISC

FINDING: CONTINUED FROM PAGE 1:

2. The Plug weld symbol used on the process sheets does not meet AWS Design of Standard Symbols and they do not give the size of the Plug weld and the angle of countersink per the requirements of AWS A.2.4 - 79.5.2, 5.3, Figure 1 and Appendix C. This is an item of concern requiring supervisory attention.

2. The process sheet call out for a Plug weld does not meet the AWS definition of a Plug weld. The welds are not made through a hole in one member of a lap or T-joint fusing one member to another. The welds were made in the flange of a W13x45 with a copper backing bar. The call for a Plug weld does not meet the USE Requirements of AISC. The Plug welds are not

ed to transmit shear in a lap joint or to prevent buckling of lapped parts or to joint conpent parts of built up members. This is a noncompliance to the American Welding Society Suctural Welding Code and AISC V.1.17.12.

4. FW's #60R1 and #61R1, made as Plug welds, violate the requirement that minimum center-tocenter spacing of Plug welds shall be four times the diameter of the hole. The center-tocenter spacing of the welds is 3-5/8". The R1 hole diameters were 1". The required spacing should have been 4". This is a noncompliance to AWS D1.0-69.215c.

5. Weld Procedure Code #7/8 was used to make the full penetration circular welds of FW#60 and #61. Full penetration circular welds made with copper backing bars on the flange of a w shape beam are not prequalified joint details of AWS D1.0-69.213a. Weld Procedure Code =7/8 does not have a Procedure Qualification Record for full penetration circular welds as required by AWS D1.0-69.213b when joint details differ from those prescribed by Articles 214, 215, 216, 217, 218 and 219. There is no established or documented welding procedure for full conformance to ESD 243.9.1.1; PG&E Contract Specification 3833XR, Section 2.3.61 and 3.63; AWS D1.0-69.213a and b, 501 and 502; AISC Part 5.1.17.2 and ASTM A6.9.5.1.2.

FOLLOW UP: ACTIVITY COMPLIES IF NO - PLEASE EXPLAIN:	WITH	APPROVED	COF	RECTIVE	ACTIO)N YES	NO
A.A.R. CLOSED BY:		DATE :	A	TT	#	2	of all block bit, and all the all and a sec
APPROVED BY:	NAMES IN CONTRACTOR AND IN	anna ann ann an an an an an an an an an		DATE : DATE :		BUTD ANTONISAN AND AN AND AN AN AN	and and a second of the second of the second

AUDIT #32-AAR #1

CORRECTIVE ACTION TAKEN:

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Response to findings 1, 4 & 5.

These items were addressed to the Pullman Corporate Weld Engineering staff. The following is their response in part:

- The actual welds made are not properly described by either weld symbol. The actual weld made is a base metal repair, as filler metal is being added to a single piece of base metal. No welding symbols exist for base metal repairs. It should be noted that the plug symbol more closely describes the actual weld than the square groove symbol.
- Since the actual welds made are not plug welds (base metal repairs) the acceptance criteria of AWS D1.0-69 does not apply.
- 5. Base metal repairs are not addressed in AWS D1.0-69. AWS only addresses weld joints between two or more pieces of base metal. Therefore, these welds do not violate AWS D1.0-69 or any of the other referenced documents.

ESD 243.1.1, 2.1 and 3.0

Le Hater Joe Watson OC Leadman

ATT#2

Én: 5-125 19V. 7/5/78 12V. 3/30/70

Pullman Power Products

DIABLO CANYON NUCLEAR POWER PLANT

PACE 1 05 3

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	AUDIT ACTION PEQUEST
FILE 10. : XV	AUDIT NO.: 32 ALA R 10
OBSERVATION CODE :	1 & 2 ACTIVITY AUDITED AND CONTRACT
AUDIT DATE: 8-3 to	8-6-82
REFERENCE DOCUMENTS	5: ESD 242 AUG 11 2 11
nin water and dealers a state store store and an and discourses and shows a state to store the store	ESD 243, AWS Welding Code, AISC
1. Process sheets have	TRAINT 251, FW#60, #60R1, #61, #61RI, Unit #2
symbol (). The pro The sketch appears to ca noncompliance with ESD 2	cess sheets weld symbols per DQ335 is suppose to be a Plug wel all for a square groove weld with a convex contour. This is a 243.5.2.3.AContinued on page 2
SUSPECTED CALLER	DATE: 8-13-82 ACK'D 34: Ene DATE . 10/29/
& 2. Unknown	ontinued on page 3
to Plug weld the holes and field conditions should in the second state of the second s	submitted Design Question #335 to PG&E asking if it was accept, nd PG&E agreed. Field Engineer D.D. indicated that the actual have been called a base material repair instead of a Plug weld
. The process sheets ar leing made with full pene . A Discrepancy Report requalified welds	nd the sketch #251RR-WA be revised to show base metal repairs etration circular welds instead of with Plug welds. be initiated to PG&E identifying that the welds.
Continued on page 3	are made with a procedure not qualified for the type weld.
CORRECTIVE ACTION TA	DUE DATE: (1-12.82
See attached sheet	
TAKEN BY:	11/1
STEPS TO PREVENT REC	URRENCE :
not applicades.	Zieren
annidered base .	netal repairs.
TAKEN BYGAL RECA.	ADDROITED Die 1/1
FOLLOW OF: ACTIVITY	Y COMPLIES WITH APPROVED CORPECTIVE ACTION
in 12 12 adam	YIO YO
A.R. CLOSED BY:	DATE: 2-17.83
CONTRACTOR OF THE OWNER.	DATE: 2-17.33
PPROVED BY:	Munn DATE: . /



Pullman Power Products

Mr. J. Arnold Pacific Gas & Electric Co.

January 14, 1983

PG&E has reviewed and accepted our welding procedures for use on Rupture Restraints.

Is it mandatory that Pullman Power Products qualify a Procedure Qualification Record for this joint detail and every joint detail not considered a prequalified joint by A.W.S.?

Thank you for your prompt attention.

Harol & Karn

Harold W. Karner QA/QC Manager

ATT#2

HWK/dd

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This procedure outlines the requirements for weld repairing of the defective rupture restraints. All welding repairs shall be made in accordance with AWS D1.1-79, Structural Welding Code - Steel.

2.0 BASE MATERIAL

The Base Material shall conform to any one, or any combination, of the follow ASTM A-36, A-441, A-572, A-515, A-516 and A-500. For shapes, A-515 shall not used.

3.0 FILLER METAL

The Filler Metal shall conform to ASME Filler Metal Specification SFA 5.1, Ty E-7018_

4.0 POSITION

Welding shall be done in all positions.

5.0 PREHEAT AND INTERPASS TEMPERATURE

5.1 The minimum preheat temperature shall be as specified below. The minimum interpass temperature shall be the minimum specified preheat temperature and the maximum interpass and preheat temperature shall be 800°F.

Metal Thickness	Temperature
Up to 3/4"	50°F*
Over 3/4" through 1-1/2" .	150°F
Over 1-1/2" through 2-1/2"	225°F
Over 2-1/2"	300°F

5.2 The specified preheat and interpass temperature shall be maintained unthe completion of each weld. Suitable preheat equipment and/or person: shall be provided to assure compliance with requirements during period: of inactivity.

Plates to be flame dried when below 70°F

NUMPERIE NESTIGINE 1 Repair Procedure

Procedure llo. 0077 Page: 2 0: FOR INFORMATION

POST WELD HEAT TREATMENT

ONLY.

The completed welds shall not be given a post weld heat treatment.

7.0 WELDING PROCESS

All welding shall be done with the manual shielded metal arc welding process_

PREPARATION OF BASE METAL OR CAVITY FOR WELDING 8.0

- The edges or surface of the parts to be repaired shall be prepared by 8.1 flame cutting, air arc gouging, machining, drilling, grinding or any combination of these methods.
- All flame cutting and arc gouging of weld preparations shall be performe 8.2 using the preheat temperatures specified for welding.
- All flame cut and/or air arc gouged surfaces shall be ground to bright 8.3
- After surface preparation, all repair areas shall be magnetic particle 8.4 examined using Department of Engineering Research Procedure No. 3212, "Magnetic Particle Examination of Welds in Pipe Rupture Restraints."
- ELECTRICAL CHARACTERISTICS 9.0

The current used shall be DC Reverse Polarity.

10.0 WELDING TECHNIQUE

10.1.5

10.1 A Welding Technique Sheet shall be prepared for each repair. The Technique Sheet shall be submitted to P G and E for approval and shall include, as a minimum, the following information:

10.1.1 The configuration of the repair cavity or groove.

- 10.1.2 The sequence of welding, including the electride sizes to be used, along with the voltage and amperage to be used with each electrode size. Extra care is required to sequence all weld repairs so that residual stresses and distortion are minimized. Coped corner holes are not to be filled with weld metal.
- The preheat requirements for the repair. 10.1.3
- 10.1.4 Peening requirements, if desired.

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pitinter des mines that

All special instructions concerning cleaning, weaking, or appearance of the weld_

" Dimini

WELDING TECHNIQUE - Continued

EQR INFORMATION ONLY

10.1 (continued)

- TO: 1.6 The Nondestructive Test requirements for the repair.

10.2 Revision to the Technique Sheets shall be made only with the approval. of P G and E.

NONDESTRUCTIVE TESTING 11.0

The completed weld repairs are to be nondestructively examined in accordance with the requirements of Engineering Specification 8833XR. The required examinations shall be performed at least 48 hours after completion of all full penetration and partial penetration welds which are thicker than 1/2 The examination of other welds may take place at any time after completion o the weld.

R Film Ken Department of Engineering Research

7.12 Items Not Subject to Quality Assurance: In addition to the requirements of Paragraph 7.1, inspection and testing shall be performed for these items in accordance with Paragraph 7.2 through 7.4 following.

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Revision 10

Structural Steel

7.13 Ultrasonic Test: Where indicated on drawings, ultrasonic tests shall be performed on all steel plates and accepted in accordance with ASTM A578 with S1, S2, S3, and S4. The acceptance level of S2. should be in accordance with Level 1, except that in Paragraph 6.1. Condition (3) should read "cannot be encompassed by a 1 (one) inch diameter circle;" Paragraph 6.2, Condition (2) should read "individually can be encompassed by a 1 (one) inch diameter circle", and Condition (4) should read "collectively cannot be encompassed by a 1 (one) inch diameter circle".

7.14 Overlayed Areas: Welded joints so specified on the design drawings shall be propared for firring as follows:

7.141 Ultrasonically examine the area per Paragraph 7.13 above.

7.142 Overlay the area with one layer of weld metal by one of " the Pacific Gas and Electric approved procedures_ Overlay only the area to be covered by the completed weld.

7.143 Grind or machine the area smooth and repeat ultrasonic examination as above.

7.144 Fir the attaching piece to the overlayed ares and proceed with fabrication-

*7.2 Welding Inspection: Welding inspection shall be performed and welds. approved in accordance with the provisions of the Code for Welding in Building Construction, of the American Welding Society, D1.0-69, by a qualified welding inspector as follows: (1) Filler welds other than multiple pass fillet welds shall be visually inspected upor completion; multiple pass filler welds shall be visually inspected for fit ap, after root pass and after weld has been completed; (2): full penetration welds shall be inspected as follows:

*7.21: Complete ultrasonic inspection shall be made on all connections stilizing full penetration welds. In the event of doubtful identification of the type of defect revealed by ultrasonic methods, radiographic or other means may be employed to define the type or extent of the defect. Weld defects revealed by inspection according to acceptance criteria specified in: AWS Code D1.0 shall be cut out and repaired or replaced in a manner approved by the Engineer. Rediographic or other means may be employed in connections not suitable for inspection by ultrasonic means. Ultrasonic inspection shall be made in accordance with the principles outlined in a section entitled "VItrasonic Weld Inspection", Chapter 6, Page 6.54 of Welding Handbook, Fundamentals of Welding, Section 1, AWS 1968: Above shall apply except otherwise specified im Paragraph 7.5. the state of the s

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SPECIFICATION

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ENGINEERING DEPARTMENT

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PAGE 11 DE

- 1. The greatest dimension of the defect is larger than 2/3 of the effective throat thickness or weld size or 3/4".
- The defect is closer than three times its greatest dimensic to the end of a groove weld subject to primary tensile stre
 A group of such defects in a line when:
 - a. The sum of the greatest dimension of all such defects i larger than the effective joint thickness or weld size any length of six times the effective joint thickness or weld size. When the length of the weld being examined less than six times the effective throat thickness or w size, the permissible sum of the greatest dimensions st be proportionally less than the effective throat thickness or weld size.
 - b. The space between two such defects which are adjacent i less than three times the greatest dimension of the lar of the defects in the pair being considered.
- 8. Individual defects having a greatest dimension of less than 3/. if:
 - 1. The sum of their greatest dimension exceed 3/8" in any line inch of weld.

· 2.5 Welding Inspection and Documentation

2.5.1 Welding inspection shall be performed in accordance with American Welding Society, DI.D-69 by a qualified welding inspector as follows: (1) Verify material, clean and fit-up. (2) Verify pre-heat temperature. (3) Inspect root pass. (Multiple pass filet and partial penetration groove). (4) Deleted. (5) Inspect weld complete. (6) Final visual will include clean-up for U.T. (7) All full penetration welds shall be U.T. inspected. All operations will be documented on restraint process sheet. (Attachment 8

2.6. Corrections

- 2.6.1 A piece or member containing welding which is unsatisfactory or wr indicates inferior workmanship may be corrected by measures listed hereunder when an approved Discrepancy Report (DR) is received.
- 2.6.2 Defective or unsound welds or base metal shall be corrected either by removing and replacing the entire weld, or as follows:
 - A. Overlap or excessive convexity: reduce by removal of excess weld metal.

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FOR INFORMATIONODILY ATT&

DATE OF ISSUE

PREPARED BY R. Flok



RG

Hon. Victor Gilinsky, Commissioner United States Nuclear Regulatory Commission 1717 H Street Washington, D.C. 20555

From: Harold Hudson - Former Pullman Power Products Quality Assurance Inspector, Quality Control Inspector, Quality Assurance Program Internal Auditor and Lead Auditor. 1015 EL MORO AVE. (805) 528-5970

Date: 11-14-83 Los 0605- CA. 93402

To:

Subject: Deviations From Pullman Power Products' Weld Procedure Codes and Pacific Gas & Electric's Contract Specification #8711 and #8835XR Quality Assurance and Welding Requirements: At The Diablo Canyon Muclear Plant Project, Units #1 and #2.

This report identifies major breakdowns in the PG&E Contract Specifications #8711 and #8833XR Quality Assurance Programs for the welding of Pipe Supports and Pipe Rupture Restraints by Pullman Power Products at the Diablo Canyon Nuclear Plant Project, Units #1 and #2.

There have been deviations from the PG&E approved Weld Procedure Specifications. Welding has been performed using Weld Procedure Specifications that were not qualified for, and did not provide welding specifications for , the base metals, structural steel shapes, and joint configurations used. These deviations have spanned the whole construction program for Pipe Supports and Pipe Rupture Restraints and includes the current Design Modification construction program for Pipe Supports. The Weld Procedure Codes referenced in this report have been approved by PG&E but it is alleged that there is no documented authorization from PG&E allowing Pullman to deviate from the approved Weld Procedure Specifications.

Weld Procedure Specifications have been prepared and used by Pullman, and approved by PG&E that were not properly qualified per the A.W.S. Code as required by C.S. #8833XR.

Welding has been performed which did not comply with the Weld Procedure Codes and processes specified on Process Sheets and approved by the proper authorities. Fullman QA/QC Management has attempted to justify/cover up this breach of Quality Assurance by implying that Production had the authority to disregard the Process Sheet instructions.

There have been deviations from PG&E's C.S. #8711 and #8833XR welding requirements for which there are no PG&E Contract Specification Change Notices and/or proper Management authorization.

Quality Assurance/Quality Control discrepancies are as follows. All No CAMP KING A HAR ALL ALL HARBORN HAR AND CAMP HAR 401354217 WHA HARBORN HAR SALL 35P HARA

- Deviations from PG&E approved Weld Procedure Code 7/8 I. Weld Procedure Specifications. See attachment #1A.
 - Pipe Supports PG&E Contract Specification #8711. The deviations listed below apply to the current A. Design Modification construction program and to the original construction program.

Code 7/8 used to weld structural steel shapes in addition to piping and plate. The following structural shapes deviate from the PG&E approved

- W shapes wide flange. a.
- b. S,M,H and I beam.
- Channel iron C and MC. C.
- Angle iron equal and unequal. d.
- T section. e.

W. P. S. :

1.

- Code 7/8 used to weld Tube Steel (ASTM A500 grade 2. B). square and rectangular, in addition to pipe and plate. The welding of Tube Steel deviates from the PG&E approved W.P.S.(quiling for fully of pipers.)
- Code 7/8 used to weld Threaded Weld Studs (used 3. to bolt plates to civil steel) in addition to pipe and plate. The welding of Threaded Weld (A307) -> Studs deviates from the PG&E approved W.P.S.

These studs are welded using double bevel groove welds. Double bevel groove weld is not one of Code 7/8's page 2 joint configuration details. The welding of a double bevel groove weld with Code 7/8 deviates from the PG&E approved W.P.S.

Process Sheets for welding Threaded Weld Studs with double bevel groove welds require back grinding of the root pass. Back grinding of a groove weld root pass is not included in the PG&E approved W.P.S. and is a deviation from Code 7/8. Code 7/8 requires the use of a backing strip for the groove welds detailed.

See Hanger #78-282SL, Dwg. #2-sk-78-282SL-RO, DCN#10775, and Pipe Support Design Tolerance Clarification Form #QF-2-2055. This Hanger is on Line S6-63-IV, a Design Class I, Code Class A line, Unit #2.

spidentel included by 7/smps,



- 4. Code 7/8 used to weld steel other than ASME Section IX, Pl materials. ASTM A500 grade B (tube steel) is not an ASME Section IX, Pl material and the welding of it deviates from the PG&E approved W.P.S. This steel is not referenced in the 1968 Edition of the ASME Code or any subsequent edition.
 - Code 7/8 used to weld joint configurations not detailed on page 2 sketches of the W.P.S. The following joint configurations deviate from the PG&E approved W.P.S.
 - a. Flare bevel groove welds (used on ASTM A500 grade B tube steel).

Pipe Support Process Sheets have a QC hold point for Groove and Full Penetration welds to verify the fit up for proper bevel and gap as required by ESD #264 (Process and Planning Control). But the process sheets for many Flare bevel groove weld do not include the QC inspection for fit up. In these cases, Engineering has not included Flare bevel groove welds under the special instructions to have a QC hold point inspection for fit up. These Flare bevel groove welds have not had the required ESD #264 and process sheet QC inspection for proper bevel and gap. Some Flare bevel groove welds have been welded as open butt joints without backing as required by the Code 7/8 W.P.S. Some process sheets do have the required QC hold point inspection. The fit up inspection has not been consistently Implemented in the current Design Modification construction program.

- b. Partial penetration groove welds.
- c. Partial penetration groove welds in skewed T joints.
- d. Full penetration groove welds in skewed T joints.
- e. Fillet welds in skewed T joints.
- f. Double bevel groove welds (no backing strip used).
- g. Groove welds without backing strips.
- h. Partial penetration square groove welds (also called seal welds or butt welds).



- B. Pipe Rupture Restraints PG&E Contract Specification #8833XR.
 - Code 7/8 used to weld steels other than ASME Section IX, Pl materials. The following steels deviate from the PG&E approved W.P.S. (see attachment #2, Pullman Unscheduled Internal Audit #32, and attachment #3, Pullman Unscheduled Internal Audit # 35). These steels are not referenced in the 1968 Edition of the ASME Code or any subsequent editions.
 - a. ASTM A441.
 - b. ASTM A572 grade 42 and 50,
 - c. ASTM A500 grade B.
 - d. ASTM A588.
 - Code 7/8 used to weld structural steel shapes in addition to pipe and plate. The following structural shapes deviate from the PG&E approved W.P.S. (see attachment #3, Pullman Unscheduled Internal Audit #35).
 - a. W shapes wide flange.
 - b. Tube steel (ASTM A500 grade B).
 - Code 7/8 used to weld joint configurations not prequalified per A.W.S Dl.O-69 or without Procedure Qualification Records or not detailed on page 2 sketches of the W.P.S. The following joint configurations deviate from the PG&E approved W.P.S. (see attachments #2 and #3, Pullman Unscheduled Internal Audits #32 and #35).
 - a. Full penetration square groove welds in one inch thick material. # 37
 - b. Full penetration circular welds (called plug welds by Pullman) in the flange or web of W shape beams.
- c. Full penetration, single bevel groove welds in skewed T joints, in 1 1/4 inch thick material with the flanges of the beam beveled from the top side and coped on the bottom side to facilitate a backing bar fit up, with a 1/2 inch root gap.

An OrnHruck 8833XR 3. Sidemal audit a for E

to facilitate a back of this no forthe 1/2 inch root gap. Marker Wor welding this grap

- d. Unspecified size fillet weld using a 3/16 inch diameter weld rod as filler in the joint of the rounded section of tube steel where it joints a flat surface (flare bevel groove weld).
- 4. Code 7/8 used to weld joint configurations not detailed on page 2 sketches of the W.P.S. The following joint configurations deviate from the PG&E approved W.P.S. (see attachment*3, Pullman Unscheduled Internal Audit #35).
 - a. Double bevel groove welds (no backing strip used).
 - b. Flare bevel groove welds (used on ASTM A500 grade B tube steel).
 - c. Partial penetration groove welds.
 - d. Full penetration groove welds in skewed T joints.
 - e. Square groove welds.
 - f. Fillet welds in skewed T joints.
 - g. Seal welds (Pullman terminlogy).

Welding Technique Specification No. AWS 1-1 specifies that this document has been formulated to clarify the technique for applications of Weld Code 7/8 as applied to AWS welding only. It also specifies that this technique will be used in accordance with Pullman Power Products' Process Sheet. See attachment #4.

I interpret this to mean that when AWS 1-1 is referenced on a Pullman Process Sheet it will be used to clarify the technique for application of Weld Code 7/8 for AWS welding. If AWS 1-1 is not referenced on a Process Sheet its tecnniques will not be applicable to the welding being performed. If the Process Sheet references Weld Code 7/8, then the Weld Procedure Specifications of Code 7/8 apply to the welding being performed and AWS 1-1 will not be used to clarify the application of Weld Code 7/8.

AWS 1-1 has basically been referenced on Process Sheets used by Pullman in its Pipe Rupture Restraint Crack Repair Program. It is not referenced on every Pipe Rupture Restraint welding Process Sheet. Weld Code 7/8 without any reference to AWS 1-1 is referenced on most Process Sheets used in Pullman's Pipe Rupture Restraint construction program.

SEE FOOTNOTES * ON PAGE 32. 5. Pipe Rupture Restraint welding performed to Weld Code 7/8 becomes subject to the deviations from Code 7/8 listed above. AWS 1-1 was formulated in 1979 as a result of the identification of a major cracking problem in restraints and was to be used to clarify the application of Code 7/8 for AWS welding (Pipe Rupture Restraints). But AWS 1-1 was not implemented in the general Pipe Rupture Restraint construction program. This is a serious deficiency in the Quality Assurance of Pipe Rupture Restraint welding.

- 6. Welding Technique Specification No. AWS 1-1 states It Is A Specification For Shielded Metal Arc Welding Of ASTM A515 In Accordance With AWS D1.1-79. This is not a valid statement (see attachment # 3 , Unscheduled Internal Audit #35).
 - a. ASTM A515 is not listed as a steel base metal to be welded in AWS D1.1-79.8.2, 9.2 or 10.2.
 - b. <u>AWS 1-1</u> states that the supporting Procedure Qualification Records are prequalified. This is not a valid statement. Since ASTM A515 steel is not one of the listed specifications of steel base metal to be welded under AWS D1.1-79, it cannot be included as part of a prequalified pr edure qualification of AWS D1.1-79.
 - c. The is no evidence that the procedure for welding ASTM A515 has been established by qualification in accordance with AWS DL.1-79.5.2 as required by AWS DL.1-79.8.2.3 when a steel other than those listed in AWS DL.1-79.8.2.1 is proposed for welded construction. It is Pullman's responsibility per AWS DL.1-79.8.2.3 to establish the welding procedure by qualification.
 - d. This raises the following questions. Why did Pullman's Cognizant Welding Engineer prepare AWS 1-1 stating the P.Q.R.s were prequalified when ASTM A515 clearly is not? Why was AWS 1-1
 > approved by Pullman's QA/QC Manager and PGAE Management without this descrepancy being identified.

AWS 1-1, revision 4, dated 12-20-79, was prepared by V.J. Casey acting as the Cognizant Welding Engineer (see attachment #4). Mr. Casey was never a member of the Pullman Engineering staff. A Pullman Interoffice Correspondence, dated 12-4-79, states that Mr. Casey "is hereby appointed assistant QA/QC Manager" (see attachment #5). Yet 16 days later he prepares a revision to the Weld Procedure Specification as the Cognizant Welding Engineer. Mr Casey



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responsibility, i.e., preparing a Weld Procedure Specification and performing welding engineer functions. This raises the question of the qualification of QA personnel (V. Casey) to perform this function and the problem of requiring the Field QA Organization to audit its own performance.

- II. Structural Steel Pipe Supports not designed, fabricated and erected to the American Welding Society Code per PG&E Contract Specification #8711 requirements.
 - Pullman's ESD #223 (Installation and Inspection of A. Pipe Supports) does not require Pipe Supports to be designed, fabricated or erected in compliance with the A.W.S.Structural Welding Code. Structural Steel Pipe Supports are not required to comply with any national standard or code. Pipe Support Engineering Specifications are per Pullman and PG&E (Project Team) Management and reviewed and approved by PG&E's Resident Mechanical Engineer and/or Project Management.
 - Β. PG&E Contract Specification #8711, Section 3, Fabricating and Erection Requirements, paragraph 2.1 (Code Requirements) specifies that all piping furnished hereunder shall be designed and fabricated to comply with applicable standards of the ASTM. ANSI. ASME, MSS, AWS, and PFI.

The reference to "AWS" is to the American Welding Society's Structural Welding Code. The applicable portion of piping that would require compliance to the AWS Code would be Structural Steel Pipe Supports. ESD 223. 5.2.1 specifies that Pipe Supports material consists of structural steel shapes, plates and bars.

It is alleged that Contract Specification #8711 requires Structural Steel Pipe Supports to be designed, fabricated and erected to the AWS Code. It is alleged that this requirement has not been incorporated into Pullman Power Products' and PG&E's Engineering Specifications. It is alleged that fabrication and erection of Structural Steel Pipe Supports have not been done in compliance to the AWS Code.

C.S. #8711, Section 1, Scope of Work, paragraph 1.1 states this Specification covers erecting the main systems piping and furnishing, fabricating, and

erecting the balance of the power plant piping, including valves, hangers, and supports. Section 2, Description of Work, paragraph 2.129 specifies that work included involves furnishing and installing of supports for all systems erected hereunder. Paragraph 3.12, Work Excluded, deletes furnishing and installing of all structural steel except as noted in paragraph 2.129 above.

Pipe Supports are "covered" by and "included" in the Contract Specification Scope of Work and Description of Work. Pipe Supports are the only structural steel items which are not excluded from the work of the Specification. Structural Steel Pipe Supports should be designed, fabricated and erected to the AWS Code as referenced in the Code Requirements of C.S. #8711.

C.S. #8711, Section 1, paragraph 2.1 specifies that work shall comply with the requirements of the Specific and General Conditions of this Specification. It also states all work shall be performed in accordance with this Specification and the accompanying drawings. Section 3, paragraph 1.1 specifies that this section (Fabricating and Erection Requirements) covers the material, fabrication, and erection requirements for power piping (piping includes valves, hangers and supports). Paragraph 1.4 of Section 3 specifies that all work shall be installed in strict conformance with this Specification and no deviations from these requirements shall be permitted without approval of Company (PG&E).

Structural Steel Pipe Supports, there design, fabrication, and erection, are covered by the Scope of Work and included in the Description of Work which requires compliance to the Specific Conditions of this Specification. The Specific Conditions of Section 3.2.1 (Code Requirements) requires all piping (piping includes valves, hangers, and supports per Section 1.1.1) shall be designed and fabricated to comply with all applicable standards of the AWS Code and other referenced Codes. But Pullman and PG&E have deviated from strict conformance with the Specification by not implementing all applicable Code Requirements. Structural Steel Pipe Supports, included as part of piping, are not designed and fabricated per the AWS Code. There is no documented authorization from PG&E to deviate from this Code Requirement.

C. C.S. #8711, Section 4, Contractor's Quality Assurance Requirements, paragraph 2.3 defines Material to include material, structures (structural steel pipe supports) and other items furnished by the Contractor to complete the requirements of this Specification. Paragraph 2.4 defines Work to include all activities by the Contractor to complete the requirements of this Specification.

D. C.S. #8711, Section 4, Contractor's Quality Assurance Requirements, paragraph 1.1, specifies that this section establishes the requirements for Contractor's quality assurance program for the control of quality of material suppled and work performed under this Specification. Paragraph 1.2 goes on to specify that QA requirements shall apply to all material and work included in systems or portions of systems designated in Table I of Section 3. Pipe Supports that are included in systems designated in Table I require compliance to Section 4 QA requirements.

Section 4, paragraph 3.24, Material and Work Procurement Control, specifies that Contractor shall assure that Material and Work furnished under this Specification (this includes Structural Steel Pipe Supports) conform to the applicable specifications, drawings, codes, and other requirements necessary to provide the quality desired.

The applicable Code for the design, fabrication and erection of Structural Steel Pipe Supports is the AWS Code.

- E. C.S. #8711 requires Structural Steel Pipe Supports to be designed, fabricated and erected to the applicable Code. That Code as referenced under Specification Section 3 Code Requirements is the AWS Code. Pullman Power Products and PG&E have not implemented the requirement to design, fabricate, and erect Structural Steel Pipe Supports to the AWS Code and are in nonconformance to Contract Specification #8711 and AWS Code requirements. There is no PG&E approved Contract Specification Change Notice authorizing this deviation.
- III. There are deviations from PG&E Contract Specification #8833XR (Pipe Rupture Restraints) for which there are no Contract Specification Change Notices and/or the Contract Specification has not been revised to reflect the actual practice being implemented. This raises the question of whether these deviations from the Contract Specification requirements have been properly authorized, and reviewed and approved by the appropriate PG&E Management individuals.

Contract Specification #8833XR, General Conditions, paragraphs 5.5 and 5.6 give instructions for changing the Contract requirements when requested by the Contractor (Pullman Power Products). The Contractor must submitt "a written statement clearly indicating the requested changes and obtain Constructors (per General Conditions defination, Constructor is the Company's Vice President - General Construction or his authorized representative) written prior approval thereof". This "written prior approval" must be had before Contractor can incorporate the Specification change into his own Engineering Specifications which are also subject to approval of Constructor. In addition, "Request by Contractor for any changes in the requirements of the Specification shall be brought to the attention of Constructor for written approval of Engineer" (per General Conditions defination, Engineer is the Company's Vice President - Engineering or his authorized representative). Request by the Contractor (Pullman) for changes to C.S. #8833XR must have the written approval of both the Vice President - General Construction and the Vice President - Engineering or their authorized representatives.

C.S. #8833XR does not give any information on procedure to be followed when PG&E initiates a change/deviation from Contract Specification requirements. There are no Contract instructions specifying who has the authority to order changes/deviations from the Contract Specification requirements and who has to approve these changes/deviations. This deficiency has resulted in questionabe deviations from the Specification welding requirements.

It is alleged that the following deviations from C.S. #8833XR have been directed by a questionable authority or have not followed C.S.#8833XR General Condition requirements and have not had the appropriate approval by PG&E Management individuals. The Nuclear Regulatory Commission should determine if these deviations were Contractor (Pullman) requested or at the direction of PG&E and if they have been reviewed and approved by the appropriate PG&E Management individuals.

A. Pipe Rupture Restraint welders, qualified prior to 7-10-79, were not qualified to the AWS Code for Welding In Building Construction per C.S. #8833XR Section 2.3.63 (see attachment #3, Unscheduled Internal Audit # 35). These welders were qualifed to ASME Section IX Code per Pullman's ESD 216 requirements.

ESD 216 (Welders Performance Qualifications), prior to 7-10-79, specified that all welders performance qualification shall be carried out in strict accordance with ASME Section IX. PG&E did not issue a Contract Specification Change Notice authorizing this deviation from the C.S. #8833XR requirement. Pipe Rupture Restraint welders not qualified to the AWS Code is a nonconformance to the AWS Code and Contract Specification #8833XR Section 2.3.63.

ESD 243 (Pipe Rupture Restraints), from the 10-15-74 issue to the 6-9-81 revision, stated in paragraph 2.8 that all welders shall be qualified in accordance with AWS D1.0-69. But a note was added to the procedure contradicting this requirement. The note stated that welder qualification in accordance with ASME Section IX may be used in lieu of AWS D1.0-69 (see attachment #3, for copy of ESD 243 note). This paragraph through the various revisions of ESD 243 up to 6-9-81 was approved first by PG&E's J. Holley and then later revisions approved by M. Tresler. The 6-9-81 revision to ESD 243 specified welders shall be qualified per ESD 216. ESD 216 was revised on 7-10-79 to require welders to be qualified to AWS D1.1-79 where applicable (Pipe Rupture Restraints). This change in procedure resulted from the welding deficiencies identified on PG&E Nonconformance Reports # DC1-79-RM-010 and #DC2-79-RM-011 (see attachment #6, Unscheduled Internal Audit # 29 for copies)which resulted in the Pipe Rupture Restraint Crack Repair Program. Since 7-10-79 Pipe Rupture Restraint welders are required to qualified to AWS D1.1-79.

It is alleged that the use of welders qualified to ASME Code Section IX (not qualified to the AWS Code as required by C.S. #8833XR) contributed to the causing of rejectable welds identified in PG&E's Nonconformance Reports.

Several questions should be addressed by the Nuclear Regulatory Commission concerning this issue.

- Was the "Note" that was added to ESD 243 allowing use of ASME Code Section IX to qualify Pipe Rupture Restraint welders initiated by Pullman or PG&E?
- 2. If the "Note" was initiated by Pullman, does this deviation comply with the General Condition requirements? Was there a written statement clearly indicating the requested change and did it have prior written approval of the V.P. General Construction or his authorized representative? It is alleged that there was no such statement. Was the "Note" approved by both the V.P. General Construction and V.P. Engineering or their authorized representatives? It is alleged

that J. Holley and subsequently M. Tresler were not the authorized representatives of both the Vice President - General Construction and Vice President - Engineering and did not have the authority to approve use of ASME Code Section IX for qualifying Pipe Rupture Restraint welders, in violation of C.S. #8833XR Section 2.3.63 requirement.

- 3. If PG&E initated the "Note", is the approval signature of J. Holley and subsequently M. Tresler the appropriate level of approval for a deviation from the C.S. requirement? If so, is there docmented evidence of their authority? It is alleged that the use of ASME Code Section IX to qualify Pipe Rupture Restraint welders in violation of C.S. #8833XR Section 2.3.63 did not have the proper authorized PG&E approval signatures.
- 4. Did PG&E's J. Holley and subsequently M. Tresler use the AWS DL.O-69.503 Building Commissioner authority to, at his discretion, accept properly documented evidence of previous qualification tests? If so, were J. Holley and M. Tresler qualified to act as the Building Commissioner? Where is it documented that they had this authority to act as the Building Commissioner? Why was just a PG&E approval added to the ESD 243.2.8 (10-15-74 to 6-9-81 revisions) note and not a Contract Specification Change Notice issued? Does not the PG&E Contract Specification requirement have precedent over Pullman Engineering Specifications?

If the Building Commissioner authority to accept previous qualification tests was used, would ASME Section IX qualification test (piping and boiler) be an acceptable substitute for an AWS qualification test (structural steel) or does the AWS mean a previous AWS qualification test? C.S. #8835XR specifically references the AWS Code for qualifying welders. Can the AWS Building Commissioner authority be used, in direct violation of C.S. #8835XR, to authorize use of ASME Section IX to qualify welders and supersede the Contract Specification?

B. Weld Procedure Code 7/8 and other welding procedures do not have provisions for testing the heat affected zone of welds for notch impact strength as required by C.S. #8833XR Section 2.3.6 (see attachment#3, Unscheduled Internal Audit # 35). There is no PG&E Contract Specification Change Notice or any other offical PG&E notification authorizing this deviation from the Contract requirement.

There is an M.W. Kellogg (Pullman) Interoffice Correspondence, dated 1-22-74, from R. Fink, Field QAFQC Manager, addressed to PG&E's J. Holley, asking if weld procedures used on rupture restraints require charpy impact tests. There is a response, but it is not on PG&E letterhead or any type of PG&E Correspondence. The response by "JAH" on 1-23-74 is in pencil on the M.W. Kellogg Interoffice Correspondence and states "no" (see attachment #3, for a copy of the Kellogg IOC).

Does a statement by an PG&E official on an M.W. Kellogg Interoffice Correspondence have the authority to authorize a deviation from the C.S. requirement?

It is alleged that this deviation from C.S. #8833XR Section 2.3.6 as authorized by "JAH" is of questionable authority and does not have the appropriate approval by PG&E Management individuals.

C. Full penetration welds less than 9/16" effective throat have not been subjected to ultrasonic examination since July 1979. C.S. #8833AR Section 2.7.21 specifies that complete ultrasonic inspection shall be made on all connections utilizing full penetration welds. There is no Contract Specification Change Notice authorizing the deletion of full penetration welds less than 9/16" effective throat from ultrasonic examination and the C.S. has not been revised to reflect the current practice of ultrasonic examing only full penetration welds greater than 9/16" effective throat (see attachment # , Unscheduled Internal Audit # 29, AAR #4).

It is alleged that the deletion of full penetration welds less than 9/16" effective throat from UT inspection has not been properly authorized, and reviewed and approved by the appropriate PG&E Management individuals.

As a result of the identification of rejectable defects in Pipe Rupture Restraint field welds on PG&E Nonconformance Reports #DC1-79-RM-OlO and #DC2-79-RM-Oll and the implementation of PG&E's Diablo Canyon Rupture Restraint General Repair Procedure #8833XR-1 (see attachment #6, Unscheduled Internal Audit# 29, for copies) PG&E instructed Pullman (verbally per Pullman QA/QC Management) to utilize PG&E Ultrasonic Procedure #3523 for ultrasonic examination of all rupture (Mestraint welds. Pullman incorporated the use of PG&E UT Procedure #3523 into its QA Instruction # 143 (see attachment #6) which was approved for construction by PG&E Resident Engineer V.L. Killpack and C.A. Hemstock on 7-11-79. PG&E UT Procedure # 3523 did not address full penetration welds less than 9/16" in thickness. ESD 234 - Ultrasonic Inspection AWS DL.O-69, which was used to UT all full penetration rupture restraint welds prior to 7-11-79, was deleted from use at this time. Because PG&E UT Procedure #3523 addressed only full penetration welds greater than 9/16" in thickness (QAI #143 referenced PG&E #3523 and also only addressed full penetration welds greated than 9/16" in thickness) and no other UT procedure was utilized which addressed full penetration welds less than 9/16" in thickness, these welds were deleted from UT inspection. QAI #143 was incorporated into ESD 243 - Pipe Rupture Restraints, on the 6-9-81 revision and was approved by PG&E Resident Mechanical Engineer J.A. Ammon.

No Contract Specification Change Notice was issued deleting full penetration welds less than 9/16" effective throat from ultrasonic inspection as required by C.S. #8833XR Section 2.7.21. C.S. #8833XR was not revised to reflect the actual practice of ultrasonic inspection of only full penetration welds greater than 9/16" effective throat.

Of special note is that neither Diablo Canyon Rupture Restraint General Repair Procedure #88552R-1 nor NCR's #DC1-79-RM-010 and #DC2-79-RM-011 directed the deletion of full penetraion welds less that 9/16" effective throat from UT inspection. To the contrary, Procedure #8833XR-1.11 specified that "completed weld repairs are to be nondestructively examined in accordance with the requirements of Engineering Specification 8833XR". The two Nonconformance Reports required under Corrective Action to Prevent Recurrence that "all Pipe Rupture Restraint welding, except for fillet welds smaller than 1/2", accomplished under Specification 8833XR will be examined by Magnetic Particle Inspection in addition to the presently required ultrasonic inspection! The "presently required ultrasonic inspection" per C.S. #8833XR Section 2.7.21 was that all full penetraion welds required complete ultrasonic inspection.

The following questions should be addressed by the Nuclear Regulatory Commission.

- 1. Who initiated the deletion of UT inspection of full penetration welds less than 9/16" effective throat? Is there any documented evidence of the origin of this deviation?
- 2. Was this deletion from C.S. requirement properly authorized, and reviewed and approved by PG&E Management individuals? Why was no Contract Specification Change Notice issued or the C.S revised to reflect the actual practice implemented?

- 3. Why was this deletion incorporated into Pullman's QAI #143 and ESD 243 and approved by PG&E onsite Engineering, when PG&E Procedure 8833XR-1 specified that complete weld repairs were to be nondestructively examined in accordance with C.S. #8833XR which required all full penetration welds to be UT examined and when the two NCR's required welding to be examined to the presently required ultrasonic inspection?
- IV. ESD 234-Ultrasonic Inspection Groove Welds AWS D1.0-69, was used prior to July 1979 to ultrasonic inspect Pipe Rupture Restraint full penetraion groove welds made by ASME Code Section IX qualified welders. During the time period ESD 234 was in use, Pullman did not have a documented Procedure Qualification Record. Pullman used the procedure without performing a procedure qualification test. There was no documented evidence of a proven demostration that ESD 234 would identify rejectable defects.

A P.Q.R. was not established until 1982 (after the fact) when this discrepancy was identified on Pullman Internal Audit #101 (see attachment #7).

Subsequently PG&E issued Nonconformance Reports #DC1-82-RM-NOOl and #DC2-82-RM-NOO2 (see attachment #3) which identified that full penetraton field welds which were completed and ultrasonically accepted by Pullman using ESD 234 had rejectable indications. PG&E proposed an investigation of a 10% sampling of full penetraion field welds to identify the extend of the problem and if a trend exists. The offical out come of this investigation is not known by this person.

But sources have informed me that approximately 236 Unit # 1 welds were examined and a large number of rejectable indications were identified. These sources also stated that at the direction of PG&E/Bechtel the ultrasonic testing frequency was changed to reduce the number of identified rejectable indications and that subsequently these welds were accepted as is. Magnaflux Corporation employees, who performed these UT examinations, also stated to me that they were finding large numbers of rejectable indications and that the mechanics of the testing was being changed by Bechtel to reduce the number of rejectable indications found.

The Nuclear Regulatory Commission should review and investigate the PG&E Nonconformance Reports' full penetration groove weld UT examination program for irregularities and/or the basis for accepting welds with report able indications.

- V. Deviations from PG&E Approved Weld Procedure Code 88/89 Weld Procedure Specifications. See attachment #9.
- A prediction 18. Pipe Supports - PG&E Contract Specification #8711. The deviations listed below apply to the current Design Modification construction program and to the original construction program.
 - 1. Code 88/89 used to weld carbon steel plate and structural steel shapes. This deviates from the approved PG&E Weld Procedure Specification for carbon steel piping, GTAW (root), and SMAW (built up).
 - Code 88/89 is suspected to have other deviations 2. as listed under Code 7/8 findings.
 - Pipe Rupture Restraints PG&E Contract Specification в. #8833XR.
 - Code 88/89 used to weld carbon steel plate and 1. structural steel shapes. This deviates from the approved PG&E Weld Procedure Specification for carbon steel piping, GTAW (root), and SMAW (built . up).
 - Code 88/89 is suspected to have other deviations 2. as listed under Code 7/8 findings.
 - Code 88/89 was not prepared and qualified in accordance with AWS DL.0-69, Code for Welding in 3. Building Construction, as required in C.S. #8833XR Section 2.1.24. Code 88/89 process of Gas Tunsten Arc Welding the root pass and Shielded Metal Arc Welding the remainer of the weld is not addressed in the AWS D1.0-69 Code. The procedure was qualified in accordance with ASME Code Section IX and approved for use by PG&E. There is no Contract Specification Change Notice authorizing this deviation from the Contract Specification requirment to qualify the welding procedure per the AWS Code.
 - 4. Welding Technique Specification No. AWS 1-3 states this document has been formulated to clarify the technique for applications of Weld Code 88/89 procedures as applied to AWS welding only. See attachment #10. This W.P.S. was issued on 8-9-79
 - AWS 1-3 states it is a Technique Specification a. for GTAW root, SMAW fill of A-36, A-441, A-572, A-515, and A-516 in any applicable combination i accordance with AWS D1.1-79. This is not a valid statement. The Gas Tunsten Arc Welding process is not addressed in AWS D1.1-79. Therefore AWS 1-3 cannot be used to weld in accordance with AWS D1.1-79.

- b. AWS 1-3 states it is a Technique Specification for GTAW root and SMAW fill of A-515 in accordance with AWS DL.1-79 Code. This is not a valid statement. A-515 is not listed as a steel base metal to be welded in AWS DL.1-79. 8.2, 9.2, or 10.2. Therefore AWS 1-3 cannot be used to weld A-515 steel in accordance with AWS DL.1-79 Code.
- c. AWS 1-3 states this technique is qualified for welding of material of unlimited thickness in accordance with AWS Dl.1-79. Again AWS Dl.1-79 does not address the GTAW process and therefore cannot be used to weld material of unlimited thickness in accordance with AWS Dl.1-79 Code.
- 5. Weld Procedure Code 88/89, prior to 8-9-79, was used by Pullman to weld Pipe Rupture Restraints. PG&E allowed Pullman to use a welding procedure which was not prepared and qualified to the AWS Code. On 8-9-79 AWS 1-3 was issued to clarify the techniques for application of Weld Code 88/89 as applied to AWS welding only. But AWS 1-3 was not prepared and qualified per AWS D1.1-79 Code as stated by Pullman in the W.P.S. These discrepancies raise several questions.
 - a. Did PG&E use the power of the AWS Code Building Commissioner (Building Commissioner refers to the offical or bureau who is delegated to enforce the local building law or specification or other construction regulations) as referenced in AWS D1.0-69, paragraph 101.c and 502, to authorize the use of Code 88/89 and subsequently AWS 1-3 for Pipe Rupture Restraint welding even through the procedures were not prepared and qualified in accordance with the applicable AWS Code.

Pullman's QA/QC Manager, H. Karner, in a letter dated 2-5-82 (see attachment #(1) indicates that PG&E acting as the AWS Code Building Commissioner approved Code 88/89 based on evidence of previous qualification (ASME Section IX) of the joint welding proccedures to be employed. If this is true, how could PG&E approve a welding procedure for AWS welding when the welding process is not even addressed in the AWS Code? If PG&E used theAWS's Building Commissioner authority to approve use of these specifications, why was a Contract Specification Change Notice not issued?

- b. PG&E's Rupture Restraint Group Supervisor R. Torstrom, in a letter to Pullman, dated 4-14-82, directed Pullman to discontinue use of Code 88/89 and AWS 1-3 for Rupture Restraint welding pending a FG&E review of the procedures (see attachment #12). The results of this PG&E review should be identified to and reviewed by the NRC. If PG&E found the procedures acceptable, what was the basis for this decision? If the procedures were found unacceptable, what corrective action has been taken for welds made using these procedures? Is this corrective action adequate?
- c. AWS 1-3 was prepared by Pullman's Cognizant Welding Engineer K. Freed and approved by the Field QA/QC Manager D. Geske. It should be determined why these individuals prepared and approved a welding specification for the GTAW process claiming it was qualified for welding of materials in accordance with AWS D1.1-79 when this was clearly not the case. It should be determined why PG&E approved AWS 1-3 when it was not qualified per AWS D1.1-79 as stated in the Specification.

It is alleged that there has been a breakdown in the Quality Assurance Program for Welding Procedure Qualification as related To Weld Procedure Code 88/89 and AWS 1-3.

- VI. Pullman Power Products has used Weld Procedure Code 92/93 to weld Pipe Rupture Restraints when Process Sheets specified Weld Procedure Code 7/8. Per a 8-15-78 Pullman Interoffice Correspondence by the Assistant QA/QC Manager (see attachment # 3), Code 92/93 was accepted as a suitable substitute without change to the process sheets. This has resulted in serious Quality Assurance Program deficiencies.
 - A. The Interoffice Correspondence states that Weld Codes 7/8 and 92/93 are qualified to allow welding of unlimited thickness on structural members under AWS requirements and that technical aspects of both procedures are the same. These are not valid statements.
 - 1. Code 92/93 Weld Procedure Specification Preparation of Base Material - states the edges or surfaces of the parts to be jointed by welding shall essentially form the geometry of the weld shown on Page 2 as detailed on the attached

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sketches. The page 2 sketches show two types of structural steel joint details: Fillet weld, which is included in the Procedure Specification, and Partial Joint Penetraion Square Groove Weld. The fillet weld is a prequalified joint of AWS D1.0-69 and can be welded in unlimited thickness when done per AWS requirements. Per AWS D1.0-69.217. c.1, .2, and .3, Partial Penetration Square Groove welds which are prequalified joint details can only be made in material 1/4 inch thick or less. It is alleged that there is no Procedure Qualification Record documenting the performance of a joint welding procedure qualification test for Partial Penetration Square Groove welds in material greater than 1/4 inch in thickness as required by AWS D1.0-69.213.b. Without a Procedure Qualification Record, Code 92/93 would not be qualified to weld Partial Penetration Square Groove welds in material of unlimited thickness as stated in Code 92/93 W.P.S .- Base Metal Thickness.

Code 7/8 is qualified per AWS to make fillet welds and single bevel Groove welds in plate of unlimited thickness.

Code 92/93 W.P.S. states it is a Procedure Spec-2. ification for: Carbon steel piping, SMAW (root and built up), for socket welds, fillet welds, and for the welding on of couplings. The only structural steel related item in the W.P.S. is fillet welds. Page 2 sketches detail a fillet weld in structural steel plate. But structural steel plate (as a general item to be welded) is not listed in the Procedure Specification. The structural steel Partial Penetration Square Groove weld shown on Page 2 sketches and any other AWS groove welds would have to be made in plate or shapes. Structural steel plate and shapes are not specified in the Procedure Specification. Any structural steel groove welds made with Code 92/93 would be in nonconformance to Code 92/93 Weld Procedure Specification. It is alleged that Code 92/93 was used to weld Pipe Rupture Restraint Groove welds in plate or shapes in nonconformance to the W.P.S.

Code 7/8 is a Procedure Specification for welding carbon steel plate with fillet and single bevel full penetration groove welds as detailed on Page 2 Sketches.

3. The Tack Weld For Set Up is not the same for Code 92/93 and Code 7/8. Code 92/93 W.P.S. for Tack Weld For Set Up states the GTAW process using

filler metal type listed on Page 2 may be used with or without backup purge in 1/16", 3/32" or 1/8" diameter and that the filler metal type is E70S-2 or -6. Code 7/8 W.P.S. requires tack welds shall be made using the SMAW process and does not specify the GTAW process in any part of the W.P.S. Code 7/8 Page 2 filler metal type is E7015,16 or 18.

- 4. Gas For Torch Shield requirements are not the same for Code 92/93 and Code 7/8. Code 92/93 W.P.S. for Gas Torch Shield states nominal composition of argon, 99.995% minimum purity (for GTAW process). Code 7/8 W.P.S. for Gas For Torch Shield states none (Code 7/8 does not use GTAW process which requires a gas for torch shield).
- 5. Code 92/93 specifies an additional welding process which is not addressed in Code 7/8 or the AWS D1.0-69 Code. Code 92/93 W.P.S. for Welding Process states welding shall be done by the SMAW process and that GTAW tack welding shall be done using a nonconsumable electrode of 2% Thoriated Tungsten, EWTH 2. Code 7/8 W.P.S. for Welding Process states welding shall be done by the SMAW process with a backing strip (this includes tack welds).
- 6. Weld backing requirements are not the same for Code 92/93 and Code 7/8. Code 92/93 Spec. No. is P1-OB-F4-SMAW-2G-5G. Code 7/8 Spec. No. is P1-BR-F4-SMAW-2G-5G. OB stands for Open Butt. BR stands for Backing Ring (piping terminlogy). OB and BR are two different methods of fitting up (setting up) the joint to be welded. Code 92/93 W.P.S. for Backing Strip states none (Open Butt). Code 7/8 W.P.S. for Backing Strip states the welded joints shall utilize a backing strip. AWS D1.0-69.409.g specifies that complete penetration groove welds made without the use of backing shall have the root of the inital weld gouged, chipped or otherwise removed to sound metal before welding is started from the second side. Code 92/93 does not require this action.
- 7. Weld joint details are not the same except for fillet welds for Code 92/93 and Code 7/8. Code 92/93 W.P.S Page 2 Sketch Joint Details specify piping socket and coupling welds, and structural steel fillet and parital joint penetration square groove welds. Code 7/8 W.P.S. Page 2 Sketch Joint Details specify pipe full penetration single vee groove welds, and full penetration single bevel groove welds and fillet welds in plate.

8. Welding Techniques are not the same for Code 92/93 and Code 7/8. There are differencies in AMPs and maximum volts allowed for various sizes of filler metal. See attachment #13, for for copies of the W.P.S.s.

The 8-15-78 Interoffice Correspondence statement that technical aspects of Code 92/93 and Code 7/8 are the same is not valid. There are differencies between the two W.P.S.'s involving joint details, tacking the joints, welding processes to be used, backing requirements and welding techniques.

The Interoffice Correspondence and Code 92/93 (Base Metal Thickness) statement that it is qualified to allow welding of unlimited thickness on structural members under AWS requirement is not valid. Structural steel plate and shapes of any thickness are not included in the Procedure Specification. The only AWS groove weld detailed in the W.P.S. is not prequalified by AWS DL.O-69 for welding in unlimited thickness and it is alleged that there is no Procedure Qualification Record documenting that the weld joint detail is qualified for unlimited material thickness.

The use of Code 92/93 to weld Pipe Rupture Restraints when process sheets specified Code 7/8 and the attempted justification of it by Pullman QA/QC Management is a major breach in the Quality Assurance Program for welding.

- B. There are additional Quality Assurance deficiencies in the use of Code 92/93 to weld Pipe Rupture Restraints per AWS DL.O-69 and PG&E Contract Specification #8833KR requirements.
 - Per the 8-15-78 Interoffice Correspondence, Welders were transfered from piping functions to Pipe Rupture Restraint work because work load requirement in fabrication and erection of restraints required an increase in welder population. Per the I.O.C. the welders qualifications were based on Weld Code 92/93. These welders are not qualified to weld structural steel Pipe Rupture Restraints based on Code 92/93.
 - Welders qualified to Weld Code 92/93 were qualified per ASME Code Section IX. C.S. #8833XR section 2.3.63 specifies all welders shall be qualified in accordance with the AWS Code for Welding in Building Construction.

Code 92/93 welders were not qualified in accordance with the AWS Code. There is no Contract Specification Change Notice authorizing a deviation from the Contract requirement (see section III.A. of this report concerning welder qualifications deviating from Contract requirements).

- 2. Per the 8-15-78 Interoffice Correspondence, the wolder's weld rod was requisitioned using Code 92/93 and the Process Sheets specified Code 7/8 as the required weld procedure. The I.O.C. goes onto state the use of Code 92/93 and welders qualified to Code 92/93 was accepted without changing the Process Sheets to reflect the actual welding conditions. This situation is a nonconformance to Contract Specification #8833XR Section 3 Quality Assurance requirements and indicates a breakdown in the assurance of quality welding of Pipe Rupture Restraints.
 - a. Pullman has not complied with C.S. #8833XR Section 3.4.1211 Records requirement to use, collect, and maintain records and data essential to document the quality of work performed. Per this section Records are considered one of the principal forms of objective evidence of quality, and procedures shall assure that records are complete and reliable.

Field welds have been made using Code 92/93 and the welder's weld rod requisition records indicated Code 92/93 as the required weld procedure. But the work performance records (Process Sheets) specified the welding process should be done by Code 7/8. These Process Sheets were prepared by Pullman Engineering and approved by Pullman QA/QC Department and the Engineering Department. The welding records are not complete nor reliable and do not adquately document the quality of work performed. The records do not agree on the welding procedure used to make these welds.

b. The failure to change Process Sheets to reflect the actual welding procedure used is a nonconfermance to C.S. #8833XR Section 3.4.122 Document Control which requires records and documentation which involves activities affecting quality be current, adequate, complete and available for use in work performed under this specification. These Process Sheets, which are suppose to control field welding, are not current, adequate or complete, and do not assure quality welding with the referenced weld procedure.

- d. Of equal importance is the fact that field personnel (Production, Engineering and Quality Control) disregarded the Process Sheets' (the controlling document for field welding) instructions to use Code 7/8 to make these welds and substituted their own unauthorized and unapproved weld procedure (Code 92/93) to perform the welding. This raises the question of how much control there was over field personnel compliance to Qualtiy Assurance requirements. It is evident that there was very little control.
- e. Another aspect of this breach of Quality Assurance is the attempt by Pullman QA/QC Management to justify the above discrepancies, after the fact, by issuing an Interoffice Correspondence stating Code 92/93 was accepted as a suitable substitute for Code 7/8. Who determined that Code 92/93 was a suitable substitute? Who approved this substitute after the fact? Is there any documented evidence that PG&E approved this substitution? It is alleged that PG&E has not approved of this substitution.

This report has shown that Code 7/8 and Code 92/93 technical aspects are not the same. This report has shown that Code 92/93 is not qualified to allow welding on unlimited thickness on structural members under AWS requirements. Code 92/93 is not a suitable substitute for Code 7/8. It is alleged that Pullman QA/QC Management has attempted to cover up a serious breach in the Quality Assurance Program for welding Pipe Rupture Restraints by merely issuing an Interoffice Correspondence to File which stated, after the fact, that the substitution of one weld procedure for another was acceptable.

The records used to document these Pipe Rupture Restraint welds do not provide a means to determine, control, and assure the quality of work performed to predetermined requirements. This is a major breach in the Quality Assurance Program for welding Pipe Rupture Restraints.

VII. During Pipe Support Design Modification construction work. Pullman Power Products discovered that welding done in 1972 of Pipe Attachments to the Unit #1 Containment Dome, Spray Ring Piping System, had not been performed to welding procedures specified on Process Sheets and Weld Rod Requisitions.

Pullman Discrepancy Report #4713, dated 4-14-83, (see attachment #14) stated the Discrepant Item to be "Incorrect Reference To WPS On Process Sheet And Rod Requisitions. Pipe Attachment Welds Various Hangers. Code Class B". Under Explanation of Discrepancy, DR#4713 stated "welds were identified as having the wrong weld procedure referenced on the Process Sheet and the rod requisition". DR#4713 also stated "further investigation identified additonal differences between process sheets and rod requisitions". Three conditions were identified / by DR #4713.

- Condition 1. The process sheets and rod requisitions referenced WPS 128, which is for the GTAW process and uses ER-308 bare wire. Coated electrodes E-308-16 were issued per the weld rod requisition. Visual examination of the attachment welds confirmed that the SMAW process was used. The correct weld procedure reference should have been 15/16. Welders were all qualified for SMAW welding of stainless steel.
- Condition 2. The process sheets reference WPS 128 (GTAW process using ER-308 bare wire). The rod requisitions reference WPS 140, which uses a combination of processes, both GTAW (ER-308 bare wire) and SMAW (E-308 coated electrodes). Coated electrodes were issued per the weld rod requisitions. The correct weld procedure reference should have been 15/16. Welders were all qualified for SMAW welding of stainless steel.
- Condition 3. The process sheets reference WPS 128 (GTAW process using ER-308 bare wire). The rod requisitions reference WPS 140, which uses a combination of processes, both GTAW (ER-308 bare wire) and SMAW (E-308 coated electrodes). Bare wire was issued per the weld rod requisitions. The correct weld procedure reference should be 128.

The DR#4713 Recommended Disposition to Accept As Is was approved by the Pullman Field QA/QC Manager H. Karner, PG&E/Bechtel Management individuals and PG&E General Construction Quality Control.



It is alleged that DR#4713 misrepresents the discrepancies identified inorder to cover up more significant Quality Assurance/Quality Control discrepancies. It is alleged that the discrepancies as addressed by DR#4713 do not identify the fact that the Production Dept. disregarded the Weld Procedure Code and subsequently the Welding Process specified on the approved Process Sheets (the controlling field document for welding) and substituted their own unauthorized and unapproved Weld Procedure Code resulting in the use of a different Welding Process to perform Pipe Attachment welding. DR#4713 does not address the breakdown in the Quality Assurance/Quality Control Program of welding to predetermined (specified) and preapproved procedures and processes during the 1972 period.

A. DR#4713 states the Discrepant Item to be "Incorrect Reference To WPS On Process Sheet and Rod Requisition" and under Explanation of Discrepancy states "welds were identified as having the wrong weld procedure referenced on the Process Sheet and rod requisition". DR#4713 also states under Conditions 1 and 2 that "the correct weld procedure reference should have been 15/16". These are not valid statements and are an attempt to misrepresent/cover up the breakdown in the Quality Assurance/Quality Control Program of welding to predetermined and preapproved procedures and processes during the 1972 period.

DR#4713, Conditions 1 and 2 identified that the Process Sheets specified WPS 128 (GTAW Process using ER-308 bare wire). These Process Sheets (see attachment #14) were prepared by Engineering (attached process sheets do not reference who prepared them but normally it is an Engineering function to prepare process sheets), and approved by the AI (Authorized Inspector Third Party - State of California), the QA/QC Manager (R.F.) and the Eng. Dept. (Chief Field Engineer). Weld Procedure Code 128 is the correct reference for the welding of the Pipe Attachments because it was specified by Engineering and approved by the Third Party Inspector and the appropriate M.W.Kellogg(Pullman) Management authorities. Production disregarded the approved process sheet specified Weld Procedure Code and substituted their own unauthorized and unapproved Weld Procedure Code (Code 15/16) which resulted in the welds being made by a different welding process (SMAW) than originally intended and approved. The DR#4713 statements of "wrong weld procedure referenced on the Process Sheet" and "the correct weld procedure reference should have been 15/ 16" cannot be substantiated. Production Dept. does not have the authority to disregard approved Process Sheet specified welding procedures and use welding procedures that they choose.

DR#4713 Condition 1 identified that the Rod Requistions referenced WPS 128. This means that the Production Foreman who filled out the Weld Rod Requisitions referenced Code 128 as the proper procedure to be used for the welding. But when the Rod Requis-ition was filled in the Rod Room, the QA Inspector issued coated electrodes E-308-16 and so marked the requisition and initialed it. The wrong rod was issued from the Rod Room and inorder for the rod to be used, a different welding process (SMAW) and a different Weld Procedure Code (Code 15/16) had to be used and was used. A compound error had been made. The QA Inspector issued the wrong rod and Production accepted the wrong rod and proceeded to substitute an unauthorized and unapproved Weld Procedure and Weld Process so that they could weld the rod issued to them. This illustrates a breakdown in the QA/QC Program of welding to predetermined (specified) and preapproved procedures and processes.

DR#4713 Condition 2 identified that Process Sheets referenced WPS 128. But when the Production Foreman filled out the Weld Rod Requisitions he referenced WPS 140. Production deviated from the predetermined (specified) and preapproved weld procedure (WPS128-GTAW-ER-308 bare wire) and selected his own unauthorized and unapproved weld procedure (WPS140, combin-ation of processes, both GTAW -ER-308 bare wire and SMAW-E-308 coated electrodes). In this case adding another welding process. This QA/QC discrepancy is further complicated by the QA Inspector in the Rod Room issuing just coated electrodes (E-308), only part of the Rod Regusition required material. This caused Production to have to select a third weld procedure (Code 15/16) inorder to use just the coated electrodes issued. The resulting SMAW process, actually used to perform the welding, deviated from the originally specified and approved Process Sheet Weld Procedure Code and Welding Process and the Weld Procedure and Welding Processes referenced on the Weld Rod Pequisition. Again this illustrates a breakdown in the QA/QC Program of welding to predetermined (specified) and preapproved procedures and processes.

DR#4713 Condition 3 identified the Process Sheets referenced WPS 128. As in Condition 2 the Production Foreman referenced WPS 140 on his Weld Rod Requisitions. Only in this case the QA Inspector in the Rod Room issued bare wire resulting in welding being performed to WPS 128 as specified on the Process Sheets.

To further complicate the breakdown in Quality Assurance/Quality Control is the fact the Process Sheets had a hold point for Visual Inspection. The Quality Control Visual Inspections were signed off on the Process Sheets as acceptable without any of the various discrepancies being identified. A visual inspection was made of the welds in 1972 by the Quality Control Dept. assuring that the welds complied to Code 128 (GTAW Process) as specified on the Process Sheets.But DR#4713 states that a current visual examination of the attachment welds confirmed that the SMAW process was used at these locations. This raises the question, did QC Inspectors in 1972 know the difference in the visual appearance of GTAW and SMAW welding? Of special note is the fact that many of the Process Sheet inspections were made by R.F., the QA/QC Manager at that time.

- B. The above listed discrepancies pose a number of questions that should be addressed by the Nuclear Regulatory Commission.
 - 1. Why did the Rod Room QA Inspector under Condition 1 issue weld rod that deviated from the Code 128 bare wire specified on the Process Sheets and the Weld Rod Requisitions? Why did he deviate from the Rod Requisitions requirements for both types of electrodes under Condition 2 and 3?
 - 2. Was the QA Inspector verbally ordered to deviate from the Process Sheets and Rod Requisitions and if so by whom and by what authority?
 - 3. Are there other areas of welding (Piping, Pipe Attachments, Pipe Supports or Pipe Rupture Restraints) where the QA Inspector issued rod that deviated from Process Sheet or Rod Requisition requirements?
 - 4. Did Pullman investigate any other areas of welding done in 1972 for the same or similar problems?
 - 5. Why did the Production Foreman allow his welders to use different welding procedures and processes than the one specified on the Process Sheets and Rod Requisitions?
 - 6. Why, under Conditions 2 and 3, did the Production Foreman issue a Weld Rod Requisition that listed a Weld Procedure Specification that deviated from the approved Process Sheet specification?
 - 7. When was Code 15/16 initiated? Was Code 15/16 available for use in 1972?
 - 8. Why did the QC Inspectors not identify that a SMAW process was used instead of the specified GTAW process referenced on the Process Sheets?

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- 9. Was QA/QC Manager Ron Fink (who performed many of the visual inspections) qualified to perform welding Visual Inspections?
- 10. Did QA/QC Manager R. Fink know about the discrepancies and sign off the Visual Inspections indicating approval of the changes? If so, why wasn't the Process Sheets and Rod Requisitions changed to reflect the actual welding procedure used?
- 11. Is there a conflict of interest for the QA/ QC Manager who approved the Process Sheets to perform the Quality Control function of final visual inspection of welds?
- 12. Why was the QA/QC Manager performing a QC Inspector's job?
- 13. Why has the current Pullman QA/QC Manager misrepresented the discrepancies identified on DR#4713? Why didn't DR#4713 address the failure of Pipe Attachments to be welded to the predetermined and preapproved procedure and process as specified on the Process Sheets? The current QA/QC Manager , in his approval of DR#4713, is saying that the Weld Procedure Specification (Code 128-GTAW) specified and approved by three Management authorities on the Process Sheets (the controlling document for field welding) is incorrect. The QA/QC Manager's approval of DR#4713 is saying that a welding procedure and process (Code 15/16-SMAW), unauthorized and unapproved in 1972 by the AI (State of California), the QA/QC Manager and the Eng-ineering Dept. and not documented anywhere at the time of welding is the correct welding procedure and process.
- 14. DR#4713 was submitted to PG&E/Bechtel on at three occasions. The DR was returned to Pullman unapproved on at least two occasions (2-15-83 and 4-20-83). The 4-14-83 version of DR#4713 was approved on 4-25-83 by three PG&E/Bechtel Management individuals and by PG&E General Construction Quality Control. Why has PG&E/Bechtel Management approved DR#4713 when it misrepresents the discrepancies identified and does not address the more serious QA/QC discrepancy of welding not being performed to predetermined and preapproved procedures and processes as specified on the Process Sheets?
- 15. Is there a conspiracy by Pullman and PG&E/ Bechtel to cover up a condition adverse to quality concerning welding not being done

to a predetermined and preapproved procedure and process as specified on Process Sheets (the controlling document for field welding)?

C. DR#4713 states under Condition 1 and 2 that welders were all qualified for SMAW welding of stainless steel. It is alleged that at least one welder's qualification status cannot be assured for the time period involved (October and November 1972).

An attachment to DR#4713 list a Welder, stencil N, hat # 26,as making 10 of the field welds involved in DR#4713. These welds were made on 10-25-72, 10-26 and 31-72 and 11-1-72. The attachment indicates that Welder N's qualification date for Code 15/16 (SMAW) was 12-17-71.

The 1977 Nuclear Services Corporation Internal Audit of Pullman Power Products states in Criterion IX.10 that "the Ninety Day Welder's Log was not maintained from August 1972 to December 1972" and that "there is no Weekly Qualified Welders List for that time period to substantiate that welders were actually qualified".

Pullman's offical response to PG&E concerning the NSC Audit, dated 4-11-78, states under Criterion IX.10b that "there is a void in the 90 day weld log from August, 1972 to December, 1972. By reviewing welding records, a qualification status for this period has been reconstructed. All welders were found to be within the 90 day requalification period. Records are available for review".

A Pullman unsigned, undated, rought draft response states under Criterion IX.10b that a "90 Day Welders' Log will be maintained from August 1972 to December 1972. We are investigating this particular area and attempting to make an update of the log by checking weld rod requisitions during the missing period. A log will be reconstructed from this information".

A Pullman Interoffice Correspondence, dated 10-13-77, to E.F. Gerwin from W. Mitchell/J.P. Runyan, concerning N.S.C. Audit Comments states under Section IX.4.E that "further investigation in process - Log can be up dated by checking rod requisitions during void period".

Welder #N, per DR#4713, was originally qualified for Code 15/16 on 12-17-71. Welder #N made the DR#4713 welds in October and November of 1972 which was during the time period when the "Ninety Day Welders' Log" was not maintained and there was no "Weekly

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Qualified Welders List". The absence of the "Ninety Day Welders' Log" means that Welder #N cannot be assured to be qualified for the SMAW process by virtue of documented evidence of use of the SMAW process within a 90 day period. Pullman's procedure required a welder to requalify for a welding process in the event he hadn't worked with a process during a 90 day period. There are no original records to determined that Welder #N was qualified or had requalified for the SMAW process (Code 15/16) during the August to December 1972 period.

Pullman has stated that by reviewing welding records (rod requisitions) a qualification status for this period had been reconstructed. But DR#4713 identified that welding records (both process sheets and rod requisitions) are not accurate because of "incorrect reference to Weld Procedure Specification in Process Sheet and Rod Requisition". Pullman's reconstructed qualification status is based on documents that cannot be assured of having correct information.

Therefore the DR#4713 statement that welders were all qualified for SMAW welding of stainless steel is questionable. Any qualification records for Welder #N for the October - November 1972 period would be based on the reconstructed qualification status which inturn is based on welding records now known not to be correct. Welder #N cannot be assured to bave been qualified for SMAW (Code 15/16) as stated on DR#4713.

Contract Specification #8711 Section 4 (Contractors D. Quality Assurance Requirements), paragraph 2.2 states Quality Assurance comprises all those planned and systematic activities necessary to establish confidence that material (component or system) will perform satisfactory in service. Paragraph 2.3 states Quality Control comprises those quality assurance actions which provide a means to control the quality of the material to predetermined requirements, The Containment #1 Spray Ring Pipe Attachment welding as identified in DR#4713 and this report do not fall under Quality Assurance "planned and systematic activities" establishing confidence that material will perform satisfactory or under Quality Control actions providing a "means to control the quality of the material to predetermined requirements "

C.S. #8711 Section 4.3.23 states Contractor shall assure that special processes such as welding are controlled in accordance with applicable codes, standards, specifications, etc., and that special processes are accomplished by qualified personnel. The Containment #1 Spray Ring Pipe Attachment welding was not controlled in accordance with the approved Process Sheet Weld Procedure Specification and at least one welder's qualification states is in question.

C.S. #8711 Section 4.3.24 states Contractor shall assure that material and work furnished under this Specification conform to the applicable specifications, drawings, codes, and other requirements necessary to provide the quality desired. Containment #1 Spray Ring Pipe Attachment welding does not conform to the approved Process Sheet Weld Procedure Specification.

C.S. #8711 Section 4.3.28 states Contractor procedures shall assure that all conditions adverse to quality, such as deficiencies, deviations, nonconformances, etc., are promptly identified, reported, and corrected. DR#4713, as written, misrepresents/covers up the more significant breakdown in the QA/QC Program of not welding to predetermined and preapproved procedures and processes. DR#4713 states that the Process Sheets' predetermined (specified) and preapproved welding procedure was wrong and that Production's unauthorized and unapproved welding procedure was correct. This is Bull Shit generated by Pullman to keep 1972 welding (all areas) from become suspect. DR#4713 has not identified all conditions adverse to quality.

C.S. #8711 Section 4.3.29 states Contractor shall prepare, use, and maintain a records procedure adequate to document and assure quality of material and work. Records collected shall include workmanship reports and procedures. The Containment #1 Spray Ring Pipe Attachment Process Sheets and Weld Rod Requisitions (workmanship reports and procedures), prepared, used, and maintained by M.W. Kellogg (Pullman do not assure the quality of material and work.

The 1972 welding of Pipe Attachments to the Containment #1 Dome Spray Ring Piping System does not comply with C.S. #8711 Section 4 Quality Assurance requirements and cannot be assured of being quality welding.

E. The 1977 Nuclear Services Corporation Internal Audit of Pullman Power Products concludes under Criterion IX that "there is no confidence that welding done prior to early 1974 was performed in accordance with welding specification requirements". The Nuclear Services Corporation Audit Summary found that "Prior to early 1974, there is little evidence available to verify the adequacy of the work performed. The available evidence indicates that only a rudimentary quality control program existed and that control over the production organization was minimal". The discrepancies identified in DR#4713 and this report verify the Nuclear Services Corporation conclusions. There was no control over the Production Organization during the installation of Pipe Attachments to the Containment #1 Spray Ring Piping System and there is no assurance that welding was performed in accordance with welding specification requirements.

What is of paramount importance is the possibility of other welding (Piping, Pipe Attachments, Pipe Supports and Pipe Rupture Restraints) having the same or similar discrepancies as identified in DR# 4713 and this report or other conditions adverse to quality. The Nuclear Regulatory Commission should concern itself with reviewing all pre 1974 welding to assure that conditions adverse to quality do not exist.

The Nuclear Regulatroy Commission should address whether Pullman Power Products and PG&E/Bechtel have misrepresented the discrepancies identified in DR#4713 in an attempt to cover up a significant breakdown in the implementation of C.S. #8711 Quality Assurance requirements during the 1972 construction period.

This report has identified areas where Quality Assurance welding requirements have not been implemented and/or deviated from and/or there are unresolved questions. The purpose of this report is to identify to the Nuclear Regulatory Commission these areas of questionable Quality Assurance/Quality Control. The NRC should review these findings and allegations to determine their validity and/or the seriousness of the discrepancies and/or the adequacy of corrective action and investigate the unresolved questions raised.

There have been and there continues to be serious breaches in the PG&E and Pullman Power Products Quality Assurance Program at the Diablo Canyon Nuclear Plant. A thorough review of this Quality Assurance Program should be performed to provide the citizens of San Luis Obispo County and the State of California the assurance that construction is of the highest quality.

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FOOTNOTES

1. From Page 5, Section I.

Per a 10-13-83 Pullman Interoffice Correspondence, the current revision date referenced on Process Sheets for Weld Procedure Code 7/8 is 8-31-77 (see attachment # 1A). Attachment # 1C shows a similar Interoffice Correspondence dated 10-25-82 which specifies the current revision date for Code 7/8 to be 8-31-77. The deviations listed in this report are against the 1977 revision and earlier revisions of Code 7/8. As a result of the findings of Unscheduled Internal Audit # 35, Pullman is currently qualifying Code 7/8 to include the listed deviations in the Weld Procedure Specification. Code 7/8 was originally qualified on 11-25-69 and has been used by Pullman up to the present time. Welding that deviates from Code 7/8 has been going on since the start of construction at Diablo Canyon. Pullman is now qualifying Code 7/8 to weld these deviations in an "after the fact" manner. Where is there Quality Assurance in qualifying welding specifications after the welding has been performed?

Both PG&E C.S. #8711 Section 4.2.1 and #8833XR Section 3.2.1 define Quality Assurance as those planned and systematic actions necessary to establish confidence that material (equipment and systems) will perform satisfactory in service. Over a decade of unqualified welding without welding specifications does not establish confidence that material will perform satisfactory in service.

C.S. #8711.4.2.2 and #8833XR.3.2.2 define Quality Control as those Quality Assurance actions which provide a means to control the quality of material supplied (and work performed) to predetermined requirements. Over a decade of welding has not been performed to predetermined welding specifications. There has been no Quality Control over welding that was done to Code 7/8 but which actually deviated from the Weld Procedure Specifications.

C.S. #8711.4.3.21 and #8833XR.3.4.121 (Document Review) specifies that Contractor prepared documents such as specifications, procedures and instructions shall be reviewed for completeness, design adequacy and conformance to codes. It appears that in over a decade of use, Code 7/8 was never reviewed to determine if welding being performed complied with the Code 7/8 Weld Procedure Specifications. Not until Unscheduled Internal Audit #35 in March of 1983 was a review performed that identified deviations from the Weld Procedure Code. This is a serious breakdown in the Quality Assurance Program.

C.S. #8711.4.3.22 and #8833XR.3.4.122 (Document Control) specifies that Contractor shall assure that specifications, procedures and instructions which involve activities affecting quality are current, adequate, complete and available for use in work performed under these specifications. For over a

FOOTNOTES

1. (continued)

decade Pullman has not provided a Weld Procedure Specification that was current, adequate or complete for the type of welding required by PG&E design drawings. Pullman did not make available to the Production Dept. a welding specification capable of welding all the PG&E design drawing requirements. This is a serious breakdown in the Quality Assurance Program.

C.S.#8711.4.3.23 and #8833XR.3.4.128 (Qualification of Processes and Personnel) specifies that Contractor shall assure that special processes such as welding are controlled in accordance with applicable codes, standards, specifications, etc.. For over a decade Pullman has welded Pipe Supports and Pipe Rupture Restraints in an uncontrolled manner. Welding was performed which deviated from Code 7/8 specification requirements. Welding was performed for which there were no welding specifications. This is a most significant breach in the Quality Assurance Program for welding.

C.S.#8711.4.3.24 (Material and Work Procurement Control) specifies that Contractor shall assure that material and work furnished under this Specification conform to the applicable specifications, drawings, codes, and other requirements necessary to provide the quality desired. Much of the Pipe Support material and work does not conform to Code 7/8 Weld Procedure Specifications and cannot be assured of providing the quality desired.

The use of Weld Procedure Code 7/8 (the primary Pullman carbon steel welding procedure) to weld base metals, structural steel shapes, and joint configurations not specified in the Weld Procedure Specification is a significant breach of the Pullman/ PG&E Quality Assurance Program. The Nuclear Regulatory Commission must decide the ultimate effect of this breach; and whether after the fact qualifying of the procedure is acceptable; and whether the corrective action taken by Pullman/PG&E is really adequate to assure a sound Quality Assurance Program.

LIST OF ATTACHMENTS

Attachment Number

- 1. A. Weld Procedure Code 7/8.
 - B. Carbon Steel Shapes and Tube Steel.
 C. Pullman Interoffice Correspondence, 10-25-82, Subject -Current Revision Levels.
- 2. Pullman Unscheduled Internal Audit #32.
- Fullman Unscheduled Internal Audit#35
 ESD 243 Note
 M.W. Kellogg(Pullman) Interoffice Correspondence, 1-22-74, Subject - Rupture Restraints.
 - 4. Welding Technique Specification No. AWS 1-1, Rev. 4, 12-20-79.
 - 5. Pullman Interoffice Correspondence, 12-4-79, Subject Assistant QA/QC Manager.
- 6. Pullman Unscheduled Internal Audit #29.
 - PG&E Nonconformance Report #DC1-79-RM-010.
 - PG&E Nonconformance Report #DC2-79-RM-011.
 - PG&E Diablo Canyon Rupture Restraint General Repair Procedure #8833XR-1.
 - Pullman Quality Assurance Instruction #143.
- 7. Pullman Internal Audit #101.
- 8. PG&E Nonconformance Reports #DC1-82-RM-NOO1 and #DC2-82-RM-NOO2.
- 9. Weld Procedure Code 88/89.
- 10. Welding Technique Specification No. AWS 1-3.
- 11. Pullman Letter to PG&E's John Ammon/R.Torstorm, 2-5-82, Subject-Weld Procedure 88/89 and AWS 1-3.
- 12. PG&E Field Memorandum to John Ryan, 4-4-82.

13. Pullman Interoffice Correspondence, 9-15-78, Subject -Authorized Weld Procedures - AWS.
Weld Procedure Code 92/93.
Weld Procedure Code 7/8.

- 14. Discrepancy Report #4713.
 - DR#4712
 - DR#4715
 - DR#4716

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