

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of)	
PACIFIC GAS AND ELECTRIC)	Docket Nos. 50-275
COMPANY)	50-323
(Diablo Canyon Nuclear Power)	(Construction Quality Assurance)
Plant, Units 1 and 2))	

AFFIDAVIT OF F. C. BREISMEISTER, C. M. NEARY, H. W. KARNER, R. D. KERR

STATE OF CALIFORNIA)	
COUNTY OF SAN LUIS OBISPO)	ss.

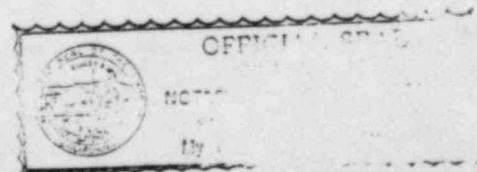
The above, being duly sworn, depose and say:

I, Fred C. Breismeister, am Manager of the Research and Engineering/
Materials and Quality Services Department, San Francisco Office, for the
Bechtel Group.

I, C. M. Neary, am Quality Engineering Group Welding Engineer for the
Pullman Power Products Corporation.

I, H. W. Karner, am Quality Assurance/Quality Control Manager for the
Pullman Power Products Corporation.

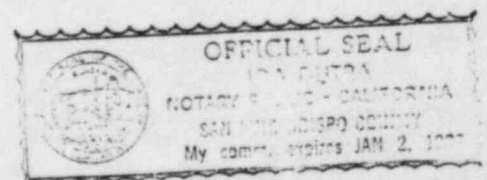
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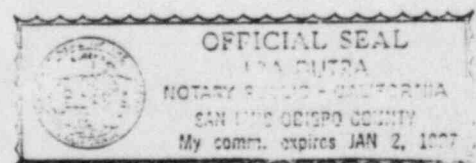
I, R. D. Kerr, am Senior Welding Engineer for the Pacific Gas and Electric Company.

A preliminary overview of the issues, and a review of fundamentals is provided here to assist in putting certain allegations into proper perspective.

1. Many of Messrs. Hudson's and Lockert's allegations are concerned with the use of the ASME and AWS Codes for welding at Diablo Canyon. To avoid needless repetition in the response to each individual allegation, a summary of the major differences between these codes and an explanation of the application of these codes at Diablo Canyon are provided below.
2. All welding of pipe and pipe supports is required by the Diablo Canyon FSAR licensing commitments to meet ANSI B31.7 or B31.1 Codes. These two codes require that all welding procedures and welders be qualified in accordance with ASME Section IX.
3. All welding of pipe rupture restraints is required by contract specification to meet the AWS D1.0 and/or D1.1 Code, using appropriately qualified welding procedures and welders.
4. The qualification requirements for welders are very similar and often identical for both the ASME IX and AWS D1.1 Codes. On a construction project like Diablo Canyon, considerable efficiency can be gained by using welders qualified to a single code. This conclusion has also been reached at other nuclear power projects.

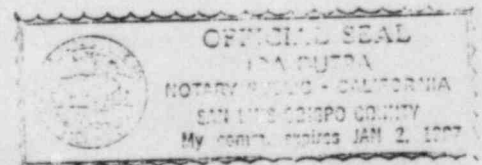


5. Many organizations have evaluated the effect of qualifying welders to only ASME IX and have determined that it would not adversely affect safety. Since the ASME Code is required by regulation (10 CFR 50.55a), ASME Section IX is selected as the qualification code instead of the AWS Code. Therefore, welders have been qualified to the requirements of ASME IX and allowed to weld on work covered by both the ASME and AWS Codes. This practice has been accepted by the NRC Staff.
6. On several occasions during the 1970s, Pullman and PGandE discussed the acceptability of using welders qualified to ASME IX for welding on the rupture restraints which are covered by AWS D1.1. It was agreed that this practice was consistent with general industry practice and acceptable since it did not adversely affect safety.
7. In June 1983, PGandE initiated an NCR (DCO-83-RM-N002) to document the fact that it was acceptable for ASME IX qualified welders to weld rupture restraints. Contract specification 8833XR was also revised to reflect this fact by Change Notice number 17.
8. In addition to the minor differences between welder qualification requirements, there were other differences between ASME IX requirements for welding procedure specifications (WPSs) and those for AWS D1.1.
9. All WPSs for ASME IX must be qualified by first welding a coupon and then destructively testing the welded coupon. This qualification test is recorded in a Procedure Qualification Record (PQR) and is used as the technical basis for the WPS. Some items in the code, termed "Essential Variables", require requalification if the WPS is to change from the

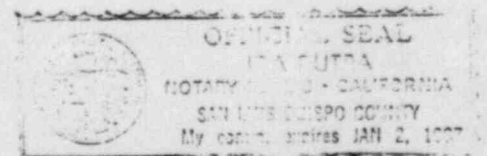


variables in the test welds that are documented in the PQR (e.g., a change in type of post-weld heat treatment would require requalification). Other items, called "non-essential variables", may be freely changed on the WPS (e.g., the joint configuration) without conducting a new qualification test and preparing a new PQR. Additionally, certain other items, such as product form (e.g. plate, pipe, tube, shape), are not required to be qualified or required to be specifically addressed in the WPS.

10. AWS D1.1 does not always require that a WPS be qualified by testing and documented with an associated PQR. If the WPS is written in accordance with restrictions within AWS D1.1, the WPS is termed "prequalified" and no PQR is needed. AWS D1.1 also has essential variables, though not all the variables are the same as those specified in ASME IX. AWS D1.1 also gives the Engineer (in this case, PGandE) the authority and responsibility to approve materials, welding processes, and other variables which do not conform to the prequalified requirements of AWS D1.1 if the Engineer is convinced that the item is technically acceptable.
11. PGandE has had welding engineers from its corporate offices routinely review and approve welding procedures used at Diablo Canyon. For AWS D1.1 welding, this review and approval constituted PGandE authorization for use of items not prequalified by AWS D1.1.
12. There are three primary differences between ASME IX and AWS D1.1 Code requirements for welding procedures which Hudson and Lockert stress in their allegations:



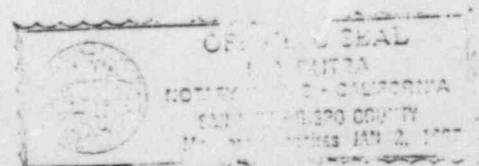
- i) Some materials permitted in ASME IX are not specifically listed as acceptable in AWS D1.1. This is because ASME IX is concerned with welding of pipe, pressure vessels, and their supports while AWS is concerned with structural welding. For example, A515 material is a material which has excellent weldability, as indicated by its classification of P-1 in the ASME Section IX Code. However, A515 is not listed in the AWS D1.1 Code because it is a plate material not commonly used in building or bridge structures. PGandE, using its authority under AWS D1.1 as the Engineer, has allowed this material to be used in the fabrication of rupture restraints.
- ii) The gas tungsten arc welding (GTAW) process is recognized in ASME IX, but is not described in AWS D1.1. ASME Section IX is concerned with pipe and pressure vessel welding, where GTAW is frequently used, while AWS D1.1 is concerned with structural welding, where GTAW is rarely used because it is a slower, more expensive, higher quality welding process than those processes used for structural welding. However, PGandE, using its authority as the Engineer, has allowed GTAW to be used in the fabrication of rupture restraints based upon its qualification by Pullman in accordance with ASME IX.
- iii) The allowed joint configuration is a non-essential variable for ASME Section IX, but is an essential variable for AWS D1.1. AWS D1.1 has defined many joint configurations as



prequalified, and they may be used without performing qualification tests. Both codes require that the allowed joint configurations be described in the WPS or in documents which are used in conjunction with the WPS. Pullman has controlled the allowed joint configurations by instructions on the WPS, by welding technique specifications, and by reference to other procedures (i.e., ESD 223 and ESD 243). Mr. Hudson identified a few specific instances in his QA audits where unauthorized joint configurations were used. In each instance, as described below, proper corrective action was taken to resolve the matter under the Pullman and PGandE QA programs.

13. Both the ASME Section IX and AWS D1.1 Codes place no restriction on the product form (e.g., plate, pipe, tube, shape) that a WPS may be used to weld. Both codes consider this a non-essential variable. Therefore, a fillet weld may be made on pipe, plate, tube, or flange beams using the same WPS which may have been qualified by test welds on pipe or, in the case of D1.1, may be prequalified.
14. Finally, ASME IX and AWS D1.1 contain many similarities, and a single WPS can meet the requirements of both codes.

The following constitute specific responses to each Joint Intervenor's (J.) allegation, using the JI allegation numbers as contained in their Motion to Reopen for identification.

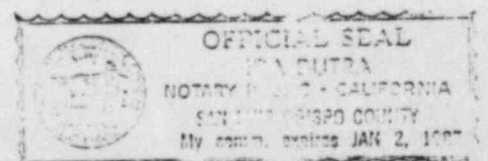


JI #8, Motion at 11.

It is alleged that:

In some cases PG&E changed its contract specifications through cryptic, unexplained notes without controlled review and approval, as required. This violation covered the qualifications standard for all pipe rupture restraint welders before July 10, 1979. (citing Hudson Aff. at 8 and related exhibits.)

15. PGandE did modify and clarify contract requirements via letters and memoranda, but these modifications had no bearing on the adequacy of welds for pipe rupture restraints. Pullman Power Products has received direction from PGandE on several occasions that welder performance qualification for rupture restraints may be performed in accordance with AWS D1.1 or ASME IX. This change was incorporated in specification 8833XR with Change Notice number 17.
16. In substance, this concern has had no effect on quality, as the welder qualification requirements of AWS D1.1 and ASME IX are quite similar and often identical. The allegor would lead one to believe these two codes are very different on the subject of welder qualification, which is not true.
17. Because there were some differences, PGandE initiated NCR DCO-83-RM-N002 on June 10, 1983. A detailed analysis confirmed that the differences between the two codes were insignificant.
18. Furthermore, the Pullman requirements for welder qualifications, ESD-216, adequately reflect both contract and technically correct welder qualification requirements. Properly qualified welders have been used to fabricate rupture restraints.
19. The NRC staff has accepted the use of ASME Section IX qualified welders in lieu of AWS qualified welders at numerous nuclear power plant sites.

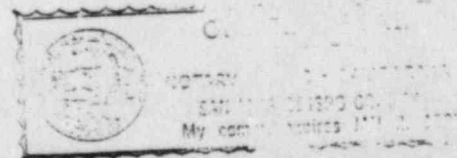


JI #9, Motion at 11.

It is alleged that:

Indeterminate welder qualifications extend back as far as 1972. The Pullman lead auditor's review of deficient weld rod and weld process sheets demonstrated the impossibility of verifying early welder qualifications by reconstructing weld rod and process records, as asserted by Pullman in response to 1977 Nuclear Service Corporation findings that the qualifications could not be established for welders in late 1972. Pullman had relied on these records to rebut the NSC findings, but the documents contained contradictory data. (citing Hudson Aff. at 11-12.)

20. Pullman welder qualifications are documented in the Pullman "Ninety-Day Welders' Log". This documentation is maintained according to the ASME Code requirements, and has been in existence since before 1972.
21. The NRC had conducted a special investigation in November and December of 1983, which included inspections of Pullman welder qualification documentation. The results of this investigation were documented in NRC Region V inspection report No. 50-275/83-37. As a result of the special inspections, the NRC concluded that records of welder qualification prior to 1972 were available and were in acceptable order (see attached Exhibit 1, pp. 32-33, item 34).
22. In addition, the NRC performed inspections of the Ninety-Day Welders' Log for the period from 1972 to 1978, which provides documentary evidence of welder performance during a specific period to assure qualification within code requirements. The NRC concluded that, based upon the records available, no code or procedural violation can be determined for the period examined (see Exhibit 1, p. 18, item 18). The



NRC found that the log was sufficiently detailed to determine welder qualifications and compliance with code requirements (see Exhibit 1, p. 19, item 19).

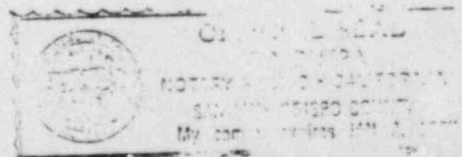
23. Furthermore, the NRC considered that the method historically used by Pullman was sufficient and adequate to document and verify welder qualification, and is in compliance with ASME IX (see Exhibit 1, p. 20, item 20). The NRC also found that the Pullman practice and procedures for documenting and maintaining welder qualification status was adequate (see Exhibit 1, p. 20, item 21). Finally, the NRC found that the Pullman practice for welder qualification tracking was consistent with the ASME IX (see Exhibit 1, p. 22, item 22). PGandE concurs with these findings and believes that the system assured proper maintenance of welder qualification.

JI #10, Motion at 11-12.

It is alleged that:

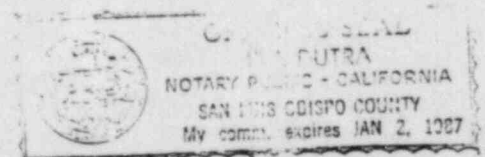
Pullman's former internal auditor learned that ASME-based procedure Code 7/8 has been used improperly to weld tube steel on pipe supports, which involves a different type of metal than the material covered by ASME procedures. In fact, tube steel is so unique that the AWS Code has a special section for it. (citing Hudson Aff. at 4-5.)

24. All piping, including valves, fittings and supports are required to meet the ANSI B31.1 or B31.7 Codes, by FSAR licensing commitments. These ANSI Codes specify ASME IX as the applicable welding code and not the



AWS Code. Therefore, WPS 7/8 is a proper welding procedure for welding pipe supports since it is qualified in accordance with ASME IX requirements.

25. ASME Section IX does not restrict the qualification of weld procedures to a product form such as plate, pipe, or tubes. Instead of specifying product form, qualification is based upon composition, weldability, and mechanical properties of the materials to be welded. Mr. Hudson is apparently concerned that the A500 tube steel used for pipe supports is not explicitly listed in ASME Section IX.
26. An engineering comparison of A36 steel (which is explicitly defined in Section IX as a P-1 material) and the A500 tube steel reveals that the material characteristics are equivalent from the standpoint of composition, weldability, and mechanical properties. Additionally, ASME Code Case N-71-9 stated in 1980 that A500 is an acceptable material that may be welded with a P-1 WPS such as 7/8 and used in welded construction of ASME Section III Class 1, 2, 3 and MC component supports. The A36 specification references A500 for tubular products.
27. Consequently, the welding of A500 tube steel with WPS 7/8 is acceptable within the requirements and implementation of ASME Section IX.
28. The allegation is erroneous in citing special requirements of the AWS Code. Those special requirements apply to special structures such as offshore oil platforms and do not apply to the use of A500 tube steel at Diablo Canyon. Contrary to the allegation, A500 is not a "different type of metal" and may be used in an ordinary building. Special welding requirements are not needed because A500 is a plain carbon steel with excellent welding characteristics.



JI #11, 12, and 13, Motion at 12.

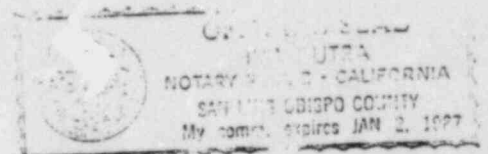
It is alleged that:

Code 7/8 was improperly used to weld threaded weld studs which bolt plates to civil steel on Class I safety-related pipe supports, although the welding process for these studs is not listed within Code 7/8 and bears almost no resemblance to the work legally covered by Code 7/8. (citing Hudson Aff. at 5.)

When a QC inspector reported to management that Code 7/8 was being improperly used to weld threaded studs to the containment liner, Pullman QA manager Harold Karner responded that thousands of studs had been welded that way and yanked the inspector from the assignment. The containment liner is so significant that these studs are the only hardware which can be welded to the surface. (citing Lockert Aff. at A7-8.)

The welding for threaded studs even violated the requirements of Code 7/8, which calls for the use of a backing bar. Instead, process sheets operated by the construction department imposed backgrinding, which is a totally different operation. (citing Hudson Aff. at 5.)

29. Contrary to the allegation, the shielded metal arc welding (SMAW) process used to weld the studs is specified in WPS 7/8. Additionally, the allegation in the Motion is incorrect in stating that studs are the only hardware which can be welded to the containment liner. Pullman installation procedure, ESD 223, paragraph 6.8.2.6 permits Nelson studs, A307 Gr. 8, A36, A515, and A516 materials to be welded to the liner plate. The ASME Code Section VIII, the applicable code, specifically allows such attachments.
30. With respect to the backing technique, the WPS 7/8 describes the use of a backing bar, whereas the studs are welded on one side, backgouged to sound metal, and then welded from the gouge side. Both backing bars and



back gouging serve the same purpose by providing backing for the weld puddle and assuring full weld fusion to the weld root. The back gouging and back welding operations were controlled by the process sheets.

Therefore, even though back gouging is not specifically identified in WPS 7/8, it is equivalent to the use of a backing bar. In addition, the welding of studs using WPS 7/8 is qualified in accordance with ASME IX.

31. Contrary to Mr. Lockert's reference to WPS 7/8, the WPS being used when Mr. Lockert expressed his concern to Pullman supervision was WPS-203, which utilizes the GTAW process. WPS-203 specified the GTAW process, an ASME IX qualified welding procedure, that is qualified for all the essential variables necessary to install the studs.
32. Finally, Mr. Lockert was not "yanked" from this assignment. As stated in his own affidavit (Lockert at p. A8), Mr. Lockert was not required to inspect the referenced welds to the approved procedures due to his reservations, and another inspector was asked to perform the inspection.

Jl #14 and 15, Motion at 12.

It is alleged that:

Pullman also overextended Code 7/8 by welding common hardware bolts, instead of the threaded studs that theoretically were welded to the containment liner. Construction crews turned the bolts into rough threaded studs by cutting the heads off and chiseling the end until it was pointed. (citing 1/16/84, Anon. Aff. at 3-4.)

Since they came from common hardware bolts of A 307 material, the homemade studs neither have controlled chemical contents such as carbon limitations, nor material traceability. As a result, it is uncertain whether the welds will hold for such suspect material. (citing 1/16/84, Anon. Aff. at 3-4 and 1/12/84, Anon. Aff. at A8.)

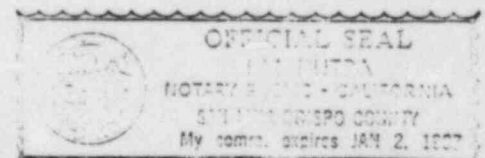


33. The studs referred to in this allegation are not "common hardware bolts" with uncontrolled chemistry as alleged. In fact, these studs comply with all the requirements for A307 Gr. B steel. A307 Gr. B bolts are included as a referenced product form in A36. Thus, A307 Gr. B bolts are A36 material. A36 material is a P-1 material and is weldable using WPS 7/8. The use of A307 Gr. B bolts as a P-1 material is further verified by ASME Section III (the code which superseded ANSI B31.7 for nuclear construction). Additionally, as discussed in response to JI #11, 12 and 13, these studs were properly welded using WPS 7/8.
34. The bolts were altered to obtain a chisel end to provide double bevel groove which would afford the full penetration weld specified. This "chisel" configuration is obtained from a threaded stud or a bolt with the head removed. The result is the same as if a threaded stud had been used and has no affect on the weld groove and quality.
35. Contrary to the allegation, both the threaded stud and bolt material meets all specification and code requirements for weldability, chemical composition, strength, and traceability. Furthermore, all welded studs were torque tested, which demonstrated the adequacy of the installation.

JI #16, Motion at 12-13.

It is alleged that:

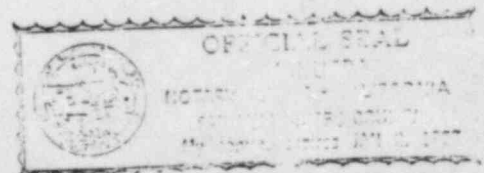
Code 7/8 has been used to weld at least eight pipe support joint configurations, including flare bevel groove welds, and double groove welds, not covered by 7/8. Each configuration represents a unique essential welding variable and legally must have its own approved weld procedure specification detailing the joint configuration. (citing 1/16/84, Anon. Aff. at 3-4 [sic, actually citing Hudson Aff. at 5] and Lockert Aff. at A10-11.)



36. Contrary to the allegation, Mr. Lockert's concerns relate to the application of WPS 7/8 to rupture restraint welding, not to pipe support welding. This issue is discussed in response to JI # 19, 21, and 25 below.
37. The allegation of the Motion is not supported by the facts and is, in fact, correctly contradicted by one of its own affidavits. Mr. Hudson's allegation is based upon a false premise: that joint configuration is an essential variable for pipe support welding. In fact, Mr. Lockert correctly notes that joint configuration is not an essential variable for ASME pipe support welding (see Lockert Aff. at A10).
38. For pipe support welding, WPS 7/8 is qualified per ASME Section IX for all the joint details listed by Mr. Hudson. Even though the joint details are not listed in the WPS, adequate control was exercised to assure that the WPS was not used beyond its qualifications. In all cases, acceptable pipe support welds were completed which met code and specification requirements. Each joint configuration is not an essential variable and there need not be a WPS for each configuration.

JI #17, Motion at 13.

Code 7/8 has been used improperly on pipe rupture restraints to weld five types of metal different from the ASME-approved P-1 material. These restraints prevent a pipe ruptured during an earthquake from whipping back and forth, which could damage the rest of the equipment. (citing 1/16/84 Anon. Aff. at 3-4 [sic, actually citing Hudson Aff. at 6.])



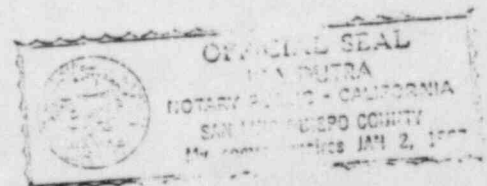
39. The allegation has no technical merit. The five metals (A441, A572 Gr. 42 and 50, A500 Gr. B, and A588) are permitted and prequalified in the AWS D1.1 Code. AWS D1.1 is the controlling code for rupture restraint welding. Additionally, the allegation is incorrect because these five metals are not significantly different from ASME P-1 materials.
40. Mr. Hudson's Unscheduled Audit #35 identified these five materials as not specifically listed in WPS 7/8. The corrective action for this audit finding was to revise ESD 243 and AWS 1-1 so that all five materials were addressed.
41. Mr. Hudson has brought forward an old problem, which was previously identified and corrected pursuant to a properly functioning QA program.

JI #18, Motion at 13.

It is alleged that:

Code 7/8 was improperly used to weld two structural steel shapes on pipe restraints that are not covered by the procedure -- W shapes and tube steel. (citing 1/16/84 Anon. Aff. at 3-4 [sic, actually citing Hudson Aff. at 6.])

42. WPS 7/8 is a properly qualified ASME welding procedure in accordance with ASME Section IX. It was used for rupture restraint work under the AWS D1.1 Code as discussed in response to JI #21. As used on rupture restraints, this WPS, with supporting documents, is a prequalified WPS.
43. AWS D1.1 does not require that a prequalified WPS be limited to a particular product form (e.g., plate, pipe, tube, or W shapes). WPS



7/8, in conjunction with ESD 243, is such a prequalified AWS D1.1 procedure, which may be used on all product forms (such as W shapes and tube steel). Mr. Hudson's allegation stems from his misunderstanding of code requirements.

JI #19, Motion at 13.

It is alleged that:

Code 7/8 was improperly used for 11 pipe rupture restraint joint configurations beyond any possible scope of the procedure. Among other distinctions, the welding involved different thicknesses and techniques than covered by the approved procedures. (citing 1/16/84 Anon. Aff. at 3-4 [sic, actually citing Hudson Aff. at 6.])

44. This condition was identified by Mr. Hudson in his unscheduled audit #35.
45. The fact that these 11 joint configurations are not explicitly described in WPS 7/8 is not significant. Nine of the joint configurations are acceptable and prequalified to the AWS D1.1 Code and therefore, required no corrective action. The tenth was also accepted and is discussed in JI #20 below. One other joint configuration was identified, removed, and repaired as part of the corrective actions.
46. No merit can be found in the allegation that differing thicknesses and techniques were used than those included in the procedure. The WPS clearly addresses that it is qualified for all thicknesses for rupture restraint welding. There has been no change in the welding technique from the description in the WPS (including the Technique Specification and the ESD).
47. The NRC investigated this allegation and determined that the use of WPS 7/8 for AWS application is acceptable. They found its use would have no adverse effect on safety. (Ref: Diablo Canyon SSER-21, page 2-208.)

JI #20, Motion at 13.

It is alleged that:

In some cases pipe rupture restraint welding was conducted without even lip service to any weld procedure. To illustrate, in one example, pipe rupture restraint square groove welds were conducted without any established or documented procedure that applied to the work in question. (citing 1/16/84 Anon. Aff. at 3-4 [sic, actually citing Hudson Aff. at 6.]

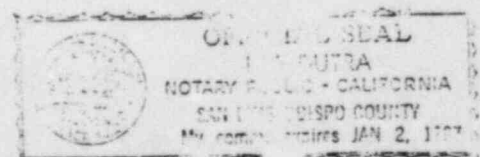
48. This is the same issue as identified in JI #19 above. This discrepancy was identified by Mr. Hudson in December 1, 1982, Unscheduled Audit #35. DR 4899 was initiated to resolve the use of the square groove joint. A test coupon was welded and tested qualifying this weld configuration in accordance with AWS D1.1 requirements.
49. Since the audit finding has been closed, this allegation no longer has any merit. Contrary to the allegation, this is an excellent example of the QA program identifying and resolving a documentation deficiency. The hardware was acceptable as originally constructed.

JI #21, Motion at 13.

It is alleged that:

Pullman improperly substituted an inferior AWS substitute called weld technique specification AWS D1.1 (sic) as corrective action for use of ASME procedures. Unfortunately, there is no such recognized QA concept as a weld technique specification. It cannot substitute for an approved procedure. (citing Lockert Aff. at All.)

50. The allegation is not correct because Weld Technique Specification AWS 1-1 was not a substitute for a qualified WPS, but a supplement to WPS 7/8. AWS 1-1 was properly approved by Pullman and PGandE.
51. Welding Technique Specification AWS 1-1 was used to amend WPS 7/8, a properly qualified WPS. This amendment method is an acceptable approach



to modify a WPS. The technique specification was principally issued to more closely control repairs to rupture restraints with heavy sections. The WPS 7/8, when used in conjunction with Welding Technique Specification AWS 1-1, meets and exceeds AWS D1.1 requirements. Separate qualification of WPS 7/8, with supplemental AWS 1-1, is not required since the combination of the two documents fulfills the prequalification requirements of AWS D1.1. AWS 1-1 was approved by PGandE Engineering in December 1979, as is appropriate for AWS D1.1.

52. This point of concern was investigated by the NRC in January of 1984, and the NRC concluded the above practices were acceptable.

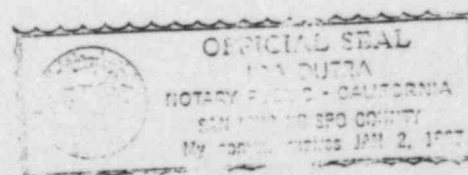
(Ref: Diablo Canyon SSER-21, page 2-208.)

JI #23, Motion at 14.

It is alleged that:

The Pullman QA manager failed to respond to inspector Lockert's November 12, 1983 written notification of the improper substitution of a welding technique for an approved procedure. (citing Lockert Aff. at A12.)

53. Contrary to the allegation, Mr. Lockert did receive a response to the concerns in his informal memorandum. A written response to a memorandum of this type is not required by established procedures. However, the memorandum was subsequently sent to Mr. Neary, who prepared a written response for Mr. Karner. Even though a written response was not required, Mr. Lockert states in his affidavit, at A14 and A15, that on December 9, he talked personally to Mr. Neary concerning his questions and/or concerns with respect to WPS 7/8 and technique specification AWS 1-1. Thus, the facts make clear that this allegation is without substance.



JI #25, Motion at 14.

Even if Weld Technique Specification No. AWS 1-1 were an approved procedure, the scope of its use was inadequate. It only covered the work in a weld crack repair program on pipe rupture restraints. (citing Lockert Aff. at 5-6.) The misuse of Code 7/8 far exceeds the use of pipe rupture restraints, and none of the pipe supports. (citing Hudson Aff. at 7.)

54. This allegation is false because AWS 1-1 was appropriately approved and applied. AWS 1-1 was originated in 1979 to remedy cracking found in heavy section field welds on the rupture restraints. The Weld Technique Specification was never intended to be applied to all rupture restraint welds, but only on those welds in thicker sections. AWS 1-1 was developed as a result of research performed by PGandE and approved by PGandE in 1979.
55. All older heavy section welds in rupture restraints were reinspected beginning in 1979 and repaired, as necessary, to requirements in AWS 1-1.
56. New welds of rupture restraints are also made to the requirements in AWS 1-1 or to the superseding revision of ESD-243, which included the AWS 1-1 requirements.
57. There is no technical necessity or code requirement to apply AWS 1-1 to pipe supports because the material thickness and the inherent weld restraint are not sufficient to warrant the special procedures that are required on heavy thickness rupture restraints. Additionally, the governing code for pipe supports is ASME IX, not AWS D1.1. Therefore, the last allegation concerning the "misuse of Code 7/8" is not warranted or supported by the facts.

JI #26, Motion at 14.

It is alleged that:

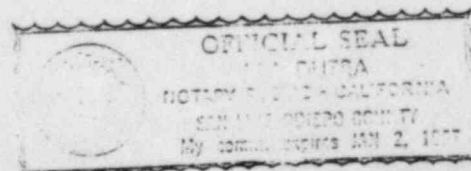
AWS 1-1 failed to fully correct the improper use of Code 7/8 for welding in the weld crack repair program, due to use of an unacceptable steel whose reliability was not proven. (citing Hudson Aff. at 7.)

58. This allegation is false: the steel in question is acceptable. The basis for this allegation is that AWS 1-1 listed A515 steel as a acceptable base material, while this material is not listed as a prequalified material in AWS D1.1
59. This item was identified in Mr. Hudson's Unscheduled Audit #35, AAR #1 and documented as a discrepancy on DR #5832.
60. The discrepancy occurred since A515 is a qualified P-1 material under ASME Section IX, but not prequalified under AWS D1.1. However, AWS D1.1 permits the use of steel which is not prequalified when the Engineer is satisfied with the steel's weldability. A515 is listed as weldable in ASME Section IX (P-1 material). The excellent weldability of the steel was known to the Engineer (PGandE) and approved as acceptable on technique sheet AWS 1-1 on December 27, 1979, in accordance with AWS D1.1 and subsequently included in ESD-243. Therefore, A515 may be welded at Diablo Canyon by WPS 7/8 and AWS 1-1 in compliance with AWS D1.1.

JI #28, Motion at 14-15.

It is alleged that:

The PG&E contract requirement for Charpy, or notch impact strength tests, was improperly waived for Code 7/8 and other welding procedures on pipe rupture restraints. Charpy tests are necessary to be sure the welds installed



under the procedure can meet relevant design and professional code requirements for strength. In 1974 this fundamental requirement was waived without required engineering review and approval when a PG&E piping superintendent answered a Pullman letter with a one-word pencilled response: "No." (citing Hudson Aff. at 8-9.)

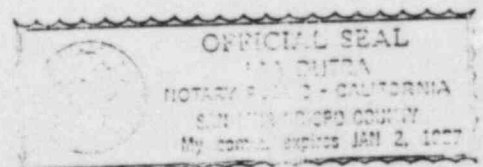
61. This allegation is factually incorrect. The "relevant design and professional code," AWS D1.1, used for rupture restraints, does not require Charpy impact test. The requirement for Charpy impact tests in Contract Specification 8833XR was deleted by PGandE Specification Change Notice #9. This Change Notice revised the requirement for impact testing of the weld heat affected zone so that it is required only when specified by PGandE on design drawings. This Specification Change Notice was approved by PGandE's Engineering Department on February 12, 1975.
62. Additionally, during a recent NRC inspection, the issue of notch toughness for rupture restraint welds was addressed by Pullman. An engineering evaluation was made to determine the rupture restraint material most susceptible to toughness degradation. This evaluation identified A588 as the rupture restraint material most susceptible to toughness degradation.
63. Charpy impact data from prior welding procedure qualification tests were then used to demonstrate adequate toughness of A588 weldments made using Pullman weld procedures. The Charpy impact data for the weld heat affected zone and deposited weld metal exceeded the toughness of the unwelded base metal.

· JI #30, Motion at 15.

It is alleged that:

Through loopholes in its Engineering Specification ESD 223, Pullman improperly granted itself a generic exemption from AWS design, fabrication, and erection requirements for all structural steel pipe support welding. Writing off the rules in this fashion violated the PG&E contract specifications without known documented authorization from PG&E to deviate from the Code requirement, which is still in the contract. (citing Hudson Aff. at 8.)

64. This allegation has absolutely no merit. Pullman ESD 223 correctly specifies that pipe supports shall be fabricated in accordance with ANSI B31.1, B31.7 and ASME IX requirements which is completely consistent with PGandE Contract Specification No. 8711. Therefore, there was no loophole and no generic exemption.
65. The governing portion of Specification 8711 for Welding is Section 3, Subsection 4.0. This section clearly spells out that all welding shall be in accordance with ANSI B31.1, B31.7 and ASME IX. Paragraph 4.1 specifies that all welders shall qualify in accordance with ASME IX. Paragraph 4.12 specifies that all welding procedures shall be qualified in accordance with ASME IX.
66. Pullman's welding program for piping and pipe supports fully meets the requirements of ANSI B31.1, B31.7 and ASME IX, which are the only requirements in Specification 8711 applicable to pipe supports.



JI #31, Motion at 15.

It is alleged that:

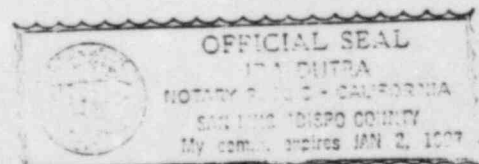
Another weld procedure, Code 88/89 for carbon steel piping, has been used to weld pipe support structural steel shapes and plates during both original construction and repair work in the current design modifications. This practice goes beyond the boundaries of the procedure, which does not cover structural steel shapes. (citing Hudson Aff. at 9.)

67. Welding of pipe supports falls under the requirements of the ANSI B31.1 B31.7 and ASME IX Codes. WPS 88/89 has been properly qualified in accordance with ASME IX.
68. WPS 88/89 includes a statement that it is qualified for "Carbon Steel (P-1) piping." However, this procedure is also qualified to weld pipe supports, as well as piping, in accordance with ANSI B31.1, B31.7 and ASME IX requirements.
69. ASME IX does not restrict the qualification of a WPS to a particular product form, such as pipe, plate, or a structural shape. Instead, ASME only requires qualification on the basis of material characteristics.
70. Therefore, although WPS 88/89 does not explicitly state it, WPS 88/89 is qualified for pipe, plate, and structural shapes used in pipe supports. Based on these facts, the allegation has no support. The facts indicate that the allegor did not understand, or would not accept, contract and code requirements.

JI #32, Motion at 15.

It is alleged that:

In violation of the contract specification, Code 88/89 has been used to weld carbon steel plates and structural



steel shapes to rupture restraints with two welding processes -- Shielded Metal Welding (SMAW) and Gas Tungsten Arc Welding (GTAW). The latter is not covered by the relevant AWS section. (citing Hudson Aff. at 9.)

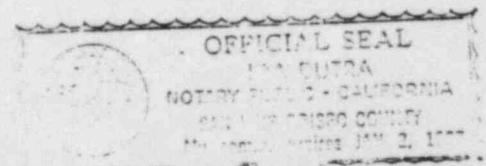
71. While the GTAW process is not a prequalified process in AWS D1.1, AWS D1.1 does allow the qualification of any welding process as part of a welding procedure that is employed in executing AWS Code work.
72. WPS 88/89 was qualified in accordance with the AWS D1.1 provisions for an unlisted process. The Engineer (PGandE), in accordance with the authority granted by AWS D1.1 for accepting an unlisted process, approved the WPS. This acceptance was based on the existing ASME procedure qualification records. As stated before, the NRC has evaluated this allegation and determined there was no safety significance. (Ref: Diablo Canyon SSER-21, p. 2-208.)

JI #33, Motion at 15.

It is alleged that:

Analogous to Code 7/8, PG&E improperly responded to the misuse of Code 88/89 by issuing a No. AWS 1-3 weld technique specification that also calls for use of the GTAW welding process and A515 base metal not covered by the relevant AWS code provision. (citing Hudson Aff. at 9.)

73. This allegation is false. Even though A-515 material is not covered under the AWS D1.1 as a prequalified material, the Engineer (PGandE) can approve other materials if the weldability of the non-prequalified material is demonstrated to the Engineer's satisfaction.
74. PG&E approved the use of the A-515 material in question. The excellent weldability of the steel was known to the Engineer since it is listed in



ASME IX as a P-1 material. This fact is documented by the PGandE approval of AWS 1-3.

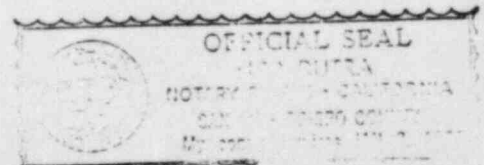
75. Additionally, as discussed in response to JI #32, even though the GTAW process is not explicitly approved as an AWS D1.1 prequalified provision, this welding process was approved for this work by the Engineer (PGandE) as allowed by AWS D1.1. AWS 1-3 was properly issued by Pullman and approved by PGandE. There is no substantiation that WPS 88/89 was misused.
76. Furthermore, above and beyond code requirements, Pullman performed a specific weld procedure qualification test, involving the use of A-515 material and the GTAW welding process which demonstrated the adequacy of the material and the weld process.
77. In light of these facts, it can be seen the allegation has no effect on the quality of plant construction, since the fabrication met all code and contract requirements.

JI #36, Motion at 16.

It is alleged that:

As of January 1984 Pullman welders are still working under welding procedures that are not qualified for their assignments, despite repeated audit and inspection findings. As a result, it is clear that PGandE and Pullman's violations were deliberate. (citing Hudson Aff. at 13.)

78. It is patently false to state that PGandE and Pullman were deliberately violating requirements. The fact, as discussed in responses above, is that Pullman and PGandE were in compliance with the appropriate



requirements. It is also apparent that Mr. Hudson did not understand the requirements and would not personally accept the well documented, technically valid justification for the use of ASME qualified WPSs and ASME qualified GTAW and the Engineer's approved materials for miscellaneous structural steel.

JI #37, 38, and 39, Motion at 16-17.

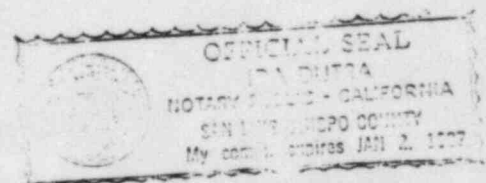
It is alleged that:

As of October 1983 Pullman did not regularly calibrate its welding machines and failed to issue equipment that would control the amperage for welds. (citing Lockert Aff. at A7.) This mechanical gap further contributes to uncontrolled welding.

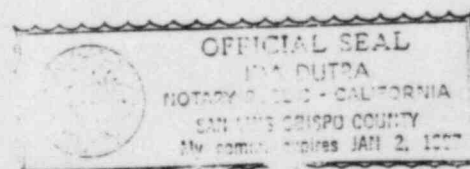
Since 1977 Pullman has used GTAW welding machines that violate contract specifications, due to the absence of electrical current controls and an on-off switch. The commitments in Diablo Canyon's Final Safety Analysis Report depend upon the use of reliable welding machines. (citing Lockert Aff. at 1, A5-6.)

The effect of improper equipment was that welds consistently were contaminated with tungsten. The faulty equipment also contributed to holes in the center of the weld pools. (citing Lockert Aff. at 1, A6.)

79. There are no requirements, codes or otherwise, relating to periodic calibration of welding machines. However, Pullman does include in its Welder Audit Program a requirement for measurement of the actual welding amperage using calibrated tong testers. This program was implemented on a three month frequency for each welder, and indicates excellent compliance by the welders to the requirements of the WPS.



80. The motion does not accurately reflect Mr Lockert's concern as expressed in his affidavit. Instead of "on-off switches," Mr. Lockert alleges that high frequency arc starting is not currently used for Pullman welding.
81. It is true that high frequency arc starting is not used for most Pullman welding at Diablo Canyon. However, specific GTAW joints as specified by PGandE, are completed using weld equipment that allows high frequency arc starting. The majority of welds are completed without the high frequency arc starting since the scratch starting method is more than adequate to achieve a sound joint. There are no code or licensing requirements specifying the type of welding equipment. Each GTAW welder is required to prove that he has ability to make sound production welds by successfully completing welder qualification tests using the scratch starting method.
82. In addition, Mr. Lockert is correct in stating that the contract requires the availability of gas tungsten arc welding equipment with high frequency arc starting. When beneficial, this equipment is supplied. Contrary to the allegation, Pullman had never violated the contract, since PGandE supplies the welding equipment as allowed by Contract Specification 8711, Section 1, Paragraph 3.21. This action by PGandE superseded any contractual obligations which Pullman might otherwise have. Mr. Lockert has simply cited the contract out of context.
83. Mr. Lockert's allegation that use of the scratch start produced defective welds (welds contaminated with tungsten from the electrode) is



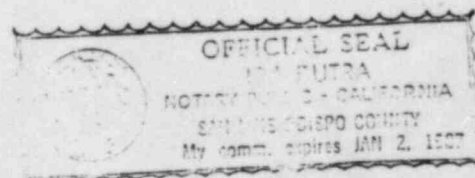
not true. Contrary to the allegation, scratch starting is not the primary cause of tungsten inclusions. The principal cause is poor welding technique, such as dipping the tungsten in the weld pool. Tungsten inclusions are readily observable in radiographic examination. A recent review by the NRC of 100 weld radiographs showed no rejectable tungsten inclusions. All of these welds were completed with the scratch start method.

84. The allegation that welding equipment without stepless current controls was used is correct for most welds at Diablo Canyon. Again, welding equipment with stepless control is available and is used at Diablo Canyon when beneficial. However, welds do not require this type control and therefore, most welds are completed with other equipment. Also, contrary to the allegation, the welds produced without stepless controls would not be defective for this reason. This is confirmed at the beginning with the welder qualification test and through nondestructive testing of the completed weld. PG&E also provided this welding equipment. Welds completed using this non-stepless welding equipment therefore meet all contract and code requirements.

JI #40, Motion at 17.

It is alleged that:

Pullman QA manager Harold Karner (sic) refused to honor the contract specification on grounds that PG&E was not enforcing it, even after Mr. Lockert explained the severe effect on the quality of the welds. Mr. Karner also failed to answer Mr. Lockert's September 20, 1983 memorandum on the problem, as of December 15, 1983 when Mr. Lockert was dismissed. (citing Lockert Aff. at 1, A6.)



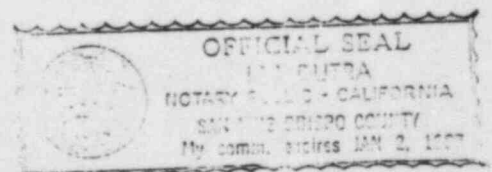
85. As explained above, this allegation has neither technical merit nor contractual merit as PGandE provides the welding machines. Contrary to the allegation that Pullman took no action on Mr. Lockert's stated concern about the lack of high frequency start capability on Pullman's GTAW machines, Mr. Karner had telephone conversations with PGandE's Russ Taylor of the QA Department soon after Mr. Lockert's concerns were brought to his attention.
86. There is no procedural requirement that Mr. Karner reply to informal memos such as the one submitted by Mr. Lockert on September 20, 1983. Mr. Lockert alleges that Mr. Karner dismissed Mr. Lockert's concern about the unacceptability of the Pullman GTAW machines with the statement, "if PGandE doesn't enforce the contract Pullman does not intend to". Mr. Karner has no recollection of making this statement and, in fact, such a statement makes little sense because PGandE, itself, supplies the welding machines used by Pullman.

JI #41, Motion at 17.

It is alleged that:

When Mr. Lockert notified PG&E's Nuclear Plant Operations welding engineer that the deficient GTAW machines might be the reason for some 200 welds that failed X-rays, the engineer directed Mr. Lockert not to discuss the matter with him further. (citing Lockert Aff. at A12.) This incident suggests that the violations were intentional within the PG&E organization as well.

87. There appears to be some lack of correlation between the above allegation and the actual information contained in Mr. Lockert's affidavit at p. A12. Mr. Lockert states that he had "heard of" 200



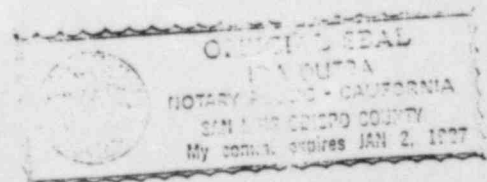
welds that had failed to meet radiographic standards and that he contacted a PGandE NPO Welding Engineer, Mr. Dave Stupi, to discuss the issue. However, this matter is not within the scope of Mr. Stupi's responsibilities, which include operations matters, not those related to constructions activities. Mr. Lockert admits that Mr. Stupi asked for some time to research the issue and that, after doing his research, Mr. Stupi reported his findings to Mr. Lockert (see Exhibit 2, attached). Those findings were that this was a QA issue. Mr. Stupi then referred Mr. Lockert to another PGandE engineer, Mr. Russ Taylor of PGandE QA. This referral was appropriate because the subject matter at this time appeared to concern QA documentation rather than welding. The drafter of the allegation has conveniently ignored this fact. The entire incident reflects the proper handling by PGandE and Pullman of a situation such as this, rather than an effort to cover up a violation as alleged. It is also clear that Mr. Lockert had gone far from normal and appropriate channels in pursuing this baseless issue with plant operations personnel.

88. As discussed in response to JI #37 to 40, Mr. Lockert's concern has absolutely no foundation from a technical substance viewpoint, from a contractual viewpoint or from a quality viewpoint.

JI #42, Motion at 17.

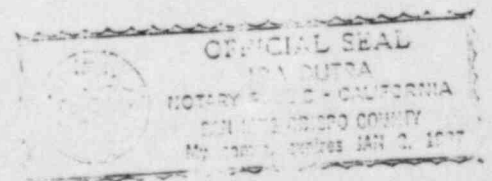
It is alleged that:

From 1969 through 1983, Pullman's procedures for storage of certain electrodes used for welding were deficient. Although the minimum AWS storage temperature for the



electrodes was 250°F, Pullman's procedures permitted storage at 225°F, ten percent below the minimum. (citing Lockert Aff. at 3, A10, A37.) The reduced temperature can cause the weld metal to deteriorate before it is used.

89. The Pullman procedure in question, ESD-202, was written to ASME Code requirements. This code, through material specifications, recommends holding oven temperatures from 50 to 250°F above ambient temperatures.
90. The 250°F temperature mentioned by Mr. Lockert is a prequalified provision of the AWS D1.1 Code. The electrodes are stored at this temperature to assure that they do not adsorb appreciable moisture during storage and use.
91. In one of Bechtel's test programs, oven temperatures of 200°F were qualified and have been accepted by the NRC staff (see Exhibit 3, attached).
92. While ESD-202 required the ovens to be at least 225°F, the Pullman practice at Diablo Canyon was to have the holding oven temperature at 250°F. Each holding oven is subjected to temperature verification check on a daily basis. These records indicated the holding ovens were normally at or above 250°. Additionally, when welding electrodes are withdrawn, they are stored in small heated portable cans/ovens at convenient locations in the work area. This is beyond either the ASME or AWS Code requirements and further assures that the welding electrodes will not adsorb moisture. The temperature of these heated portable cans/ovens is at least 225°F and is verified on a monthly basis.



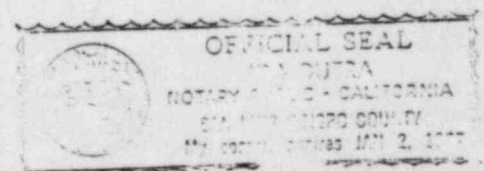
93. The allegation that the reduced storage oven temperature can cause the weld metal to deteriorate before it is used is false. An oven temperature of 225°F will not lead to electrode degradation. As described above, Pullman utilized techniques well beyond any required by the code or technical necessity in order to assure quality welding.

JI #43, Motion at 17.

It is alleged that:

Although on October 31 management officials promised to correct the weld rod storage violations, the corrective action was ineffective. As of December 15, 1983, the electrodes were still being stored at 225°F. (citing Lockert Aff. at A17.)

94. As discussed in response to JI #42, this allegation has no technical merit. On October 31, 1983, Mr. Lockert forwarded a memorandum to Mr. Harold Karner (Pullman QA/QC Manager) questioning the holding temperature of the rod ovens (see Exhibit 4, attached).
95. On November 11, 1983, Mr. Lyautey replied to Mr. Lockert's memo, pointing out the basis of the holding oven temperature (225°F) specified in the Procedure ESD-202 (see Exhibit 5, attached).
96. On November 17, 1983, Mr. Lyautey also initiated a Discrepancy Report on the holding oven temperature. The affected procedures were revised on December 20, 1983, and the discrepancy report was finally dispositioned on February 6, 1984.
97. Based upon the actions of Pullman described above, it is clear that Mr. Lockert's concern was adequately addressed even though the change did not improve the welding program or the hardware.



JI #45, Motion at 18.

It is alleged that:

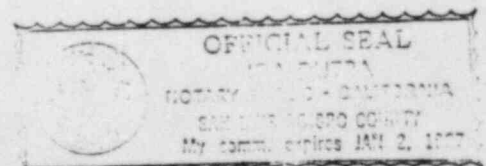
QC management told inspectors not to perform inspections when construction objected. An example occurred on September 1, 1983, when a welder refused Mr. Lockert permission to check for compliance with contract requirements for the flow of argon gas. QC management directed Mr. Lockert to perform his inspection elsewhere. (citing Lockert Aff. at A5-6.)

98. At no time did Pullman QC Management establish a policy of deferring to construction (production personnel) when they voiced an objection. During the incident referred to in the Attachment to Mr. Lockert's affidavit at A5-6, Mr. Lockert asked for a flow meter at or close to the welder. In fact, the required flow meter was located at the gas bottles which in turn were located on a different elevation. The location of the flow meter complied with the applicable procedure. Although he was advised of this condition Mr. Lockert apparently did not accept this situation but was overruled by his QC supervisor, Mr. Merle Edgerton.
99. The JI Motion is in error because the contract does not require checks of argon gas flow. The contract requires regulators, but not flow meters.

JI #46, Motion at 18.

It is alleged that:

On September 26, 1983, five Pullman QA managers refused a QC inspector's request for copies of the welding procedures for whose compliance he was responsible. (citing Lockert Aff. at A7.) This left the inspector partially in the dark as he attempted to perform his duties.

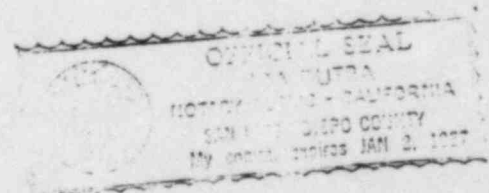


100. Contrary to the allegation in the Motion that Mr. Lockert requested Pullman's welding procedures from "five Pullman QA managers," Mr. Lockert's affidavit states that he requested the procedures from his Pullman superiors.
101. There are no requirements in the Pullman procedures that every inspector should have his own copies of all of the welding procedures. There are multiple, controlled sets of welding procedures available at various locations in the plant for use by all personnel as controlled by ESU-269. Such distribution includes QC inspectors, QC leads, engineers, superintendents, and general foremen.
102. When Mr. Lockert requested the procedures from his superiors, he was told that there were sufficient copies available for his use and that he did not need a personal copy. Mr. Lockert indicates that Mr. Karner's response was that sufficient copies of the weld procedures had already been issued and that the logistics of controlling too many copies could become unmanageable. It is indeed true that in order to maintain proper control, every effort is made to assure that unnecessary copies of weld procedures are not issued. In any event, the information requested by Mr. Lockert was readily available and there was no reason for him to be "partially in the dark," as is alleged in the motion.

JI #48 and 49, Motion at 18-19.

It is alleged that:

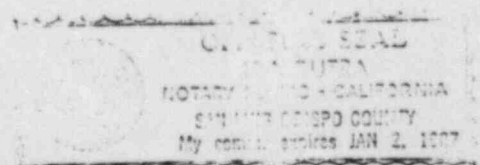
Process sheets that guide quality control coverage did not consistently call for inspections of fitup for flare bevel groove welds. Since this was one of the joint



configurations not covered by the 7/8 procedure in the first place, the loophole leaves the quality of the ensuing weld doubly unreliable. This uncontrolled work has been occurring as part of the current design modification construction work. (citing Hudson Aff. at 5-6.)

PG&E informally exempted flare bevel welds from QC fitup inspections, without proper engineering review and approval. The loophole violated engineering specification ESD 264, which requires inspections of groove welds and full penetration welds. (citing Hudson Aff. at 5-6.)

103. Mr. Hudson is apparently concerned that the lack of fitup inspection may have been detrimental to the quality of flare bevel groove welds.
104. Flare bevel groove welds are partial penetration welds and occur when rectangular tubes with rounded corners are placed next to another piece of steel. The root of the weld, where the two pieces contact each other, is not required to be welded. The two pieces of steel may actually touch each other or there may be a gap when the pieces are fitup prior to welding.
105. The fitup does not affect the required weld. If there is a gap, the weld will be larger and stronger than needed. Fitup inspection of flare joints would, therefore, simply be a waste of time.
106. Flare joints are prequalified for structural applications and may be used without performing qualification tests. This allegation has no effect on structural integrity or safety.
107. Mr. Hudson's allegation regarding a violation of ESD 264 is completely false. As explained above, fitup inspection for flare joints would be a waste of time. ESD-264 and ESD-223 require fitup inspection of flare bevel joints only in one situation. In those individual situations, fitup inspections have been done. In all other cases, ESD-264 and ESD-223 do not require any fitup inspection for flare bevel joints.



108. The "informal exemptions" from PGandE that Mr. Hudson notes, are memoranda clarifying PGandE's intent for flare bevel fitup inspection, and are intended to assure that the ESD-264 is properly implementing engineering requirements.
109. In summary, PGandE and Pullman did not act improperly, and lack of fitup inspection for flare bevel joints was appropriate.

JI #53, 54, and 55, Motion at 19-20.

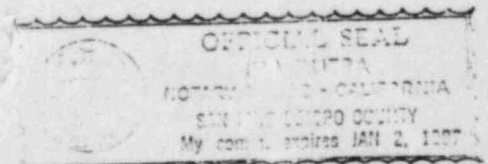
It is alleged that:

On April 14, 1983 Discrepancy Report (DR) on 1972 welding failed to recognize the relevance of unauthorized, unapproved procedure changes instituted by a production foreman. In this case the violation involved substituting a different weld rod for the material required by procedure. (citing Hudson Aff. at 11.) The failure of QC to recognize the violation suggests that weld procedure noncompliance may be routine.

Pullman QC inspectors failed to reject welds in 1972 that were performed to the wrong welding process, although the two types of welding do not look alike. Such a glaring omission raises serious questions about the reliability of 1972 QC inspections. (citing Hudson Aff. at 11.)

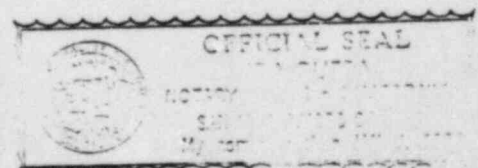
In the April 1983 Discrepancy Report, Pullman's QC program still failed to recognize as a QA weakness the inability of inspectors in 1972 to notice that the wrong type of weld had been performed. Since Bechtel and PG&E management reviewed the DR three times, the 1972 welding QA breakdown persisted until at least 1983, from the field to upper management of PG&E, Bechtel and Pullman. (citing Hudson Aff. at 12.)

110. These allegations relate to use of one qualified, approved, and acceptable WPS in place of another such WPS. In 1972, Pullman's QC inspection emphasis was on the physical weld quality including surface finish and contour. Later, emphasis on documentation details and



quality control inspections increased as discrepancies in documentation, though minor, were apparent. A review performed by PGandE shows that the overall incident rate of such documentation deviations was low, and in all cases acceptable welds were made. Additionally, information on the electrode requisition form always included the correct weld material/lot data. This statement has been substantiated by a study performed of a sample of 300 welds made during the period from 1972 through 1975. The overall documentation deviation rate for welds during this period was found to be about 3.7%, and no welds were physically rejectable. Further, the documentation deviation rate improved as administrative quality requirements were increasingly emphasized. The welds in 1975 showed no documentation deviations from the specified process sheet weld procedure.

111. The allegation draws a false inference from these minor documentation deficiencies. Mr. Hudson would have one believe that the documentation was 100% correct and that the cause of the deficiencies was the inability of the QC inspectors to detect which weld process was being used. This was not the case; the QC inspectors' deficiencies were in not reconciling the inconsistencies between the actual weld and information on the process sheets to obtain the type of "paper trail" one desires today.
112. In addition, the subject discrepancies were discovered during a Pullman internal system documentation review and were identified on a memo by a Pullman QA representative in the mid-1970s (see attached Exhibit 6), again showing an active, properly functioning QA program.



113. While documentation discrepancies existed in the past, they were identified by the quality system and corrected. The items cited did not in any way indicate a breakdown in the quality system nor a breakdown in the quality of the product.

JI #56, Motion at 20.

It is alleged that:

Uncontrolled welding has been matched by uncontrolled weld repairs. The most significant violations involve undocumented removal of welds. Safety-related welds have been completely removed without any QC record of their disappearance. The records reflected QC-accepted welds where none existed. (citing Hudson Aff. at 6.)

114. This allegation is groundless since it is based upon an isolated discrepancy identified and corrected by the QA program. Mr. Hudson discovered two welds which had been removed without proper documentation as part of his Unscheduled Audit #32 in August 1982.

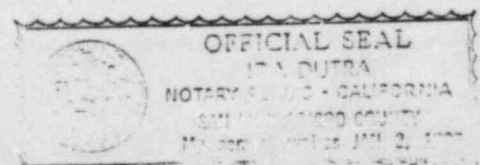
115. The situation was investigated and determined to be an isolated incident. The involved personnel received instruction in the procedural requirements and the documentation was corrected.

116. On the basis of this corrective action, Mr. Hudson closed the finding on February 18, 1983, without any additional recommended corrective action.

JI #57, Motion at 20.

It is alleged that:

In other cases welds have been repaired without revising the relevant drawings to note the differences. For example, on October 10, 1983 Mr. Lockert observed fillet welds being ground back and was informed that the drawings were not being revised. Although the work in question occurred in Unit II, the program was equally uncontrolled for Unit I. (citing Lockert Aff. at A8.)

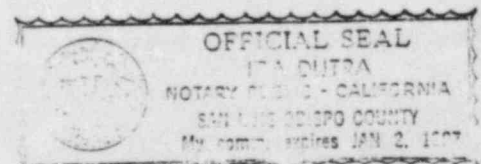


117. The allegation has no supporting evidence, such as the specific weld identification, so a direct response is impossible. It is, however, possible to describe how such grinding is controlled.
118. Mr. Lockert asserts that grinding occurred on an American Bridge shop weld on a rupture restraint. The grinding was performed in order to allow adjacent bolts to be properly torqued.
119. American Bridge drawings include specific instructions regarding the grinding of welds to allow bolt torqueing. All grinding is in accordance with these drawings. If grinding is required the operation is controlled by a process sheet. In those cases where the drawing does not address grinding, a Design Question is forwarded to PG&E for evaluation of whether grinding can be allowed.
120. In general any oversize weld may be ground to size to improve cosmetic contour, or to permit bolts, nuts and other mating parts to fit, without changing drawing.

JI #102, 103, and 104, Motion at 29-30.

It is alleged that:

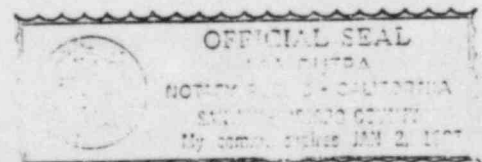
PG&E has stifled attempts by Pullman inspectors to report and correct faulty vendor welds. In July 1979 Pullman inspectors began to find significant numbers of cracked vendor welds from Boston Bergen and American Bridge. Until 1980 the inspectors wrote 19 Discrepancy Reports on the welds. In an April 3, 1980 memorandum, however, Mr. Marvin (sic) Leppke of PG&E directed Pullman to stop issuing Discrepancy Reports on these "shop" welds. (citing Hudson Aff. at 28.) As of November 8, 1983, the restrictions extended to Unit II pipe rupture restraint welds as well, for work that would be "absolutely unacceptable under any code." (citing Lockert Aff. at A12.)



The QA violations on the welds were not technicalities; the hardware was obviously defective. As one QC inspector noted, "These 'shop welds' are often very poorly done, in a fashion where no inspector could possibly accept the work if done on site. In particular, some of the earlier work supplied by Bostrom/Bergen Co. [sic] and by American Bridge is truly abominable. Some of the welds are so ragged that they will tear your clothing if you get too close." (citing 1/16/84, Anon. Aff. at 7.)

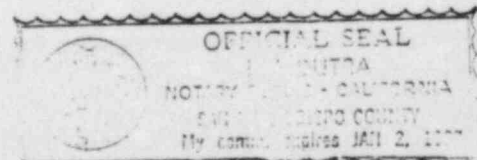
In 1982 PG&E repeated the improper restriction on QA for the same shop welds, by instructing Pullman to delete those welds from the formal walkdown program that represents a final visual check on quality. (citing 1/16/84, Anon. Aff. at 7.)

121. This series of allegations and the supporting affidavits neglect to place these circumstances in perspective and in fact do not accurately reflect instructions given by PGandE to the contractor. The identification of shop weld indications occurred during an extensive program developed and implemented to investigate, evaluate, and repair rupture restraint weldments. This program was started because cracked field welds were found by Pullman and PGandE personnel in Unit 1 rupture restraints during late 1978. The program was based upon magnetic particle and ultrasonic examinations of enough welds on installed restraints to obtain an adequate sampling for thorough engineering analysis, evaluation, and corrective action. As a result of these studies, engineering identified all shop welds which required examination. All of these welds were magnetic particle or ultrasonically examined and any defective weldments were repaired. This included both Units 1 and 2. This program is documented in PGandE NCR DC1-79-RM-010. PGandE reported the deficiency to the NRC per



10 CFR 50.55(e) verbally on April 4, 1979, and by letter dated May 3, 1979, and reported the resolution in a final report for Unit 1 dated December 9, 1980.

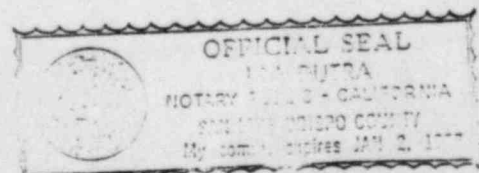
122. Allegation JI #102 and the Hudson affidavit on page 28 neglects to point out that this major repair program was underway and the identified shop welds were part of this program. Thus, the allegation and affidavit is out of context and the basis and subject of the Mr. M.E. Leppke memorandum dated April 3, 1980, has been avoided (see Exhibit 7, attached). This appears to be a deliberate omission since the allegation and affidavit also misquotes the memorandum, further clouding the issue. The PGandE memorandum states that sufficient data on shop welds had been received and that the Engineering Department would review the data and include its conclusions in the final rupture restraint report. It also states that Pullman need not report further test results on shop welds. The allegation and affidavit falsely indicates that Mr. Leppke directed Pullman to stop issuing Discrepancy Reports on shop welds.
123. Allegation JI #102 further indicates that as of November 8, 1983, the restrictions extended to Unit 2 pipe rupture restraint welds as well, for work that would be "absolutely unacceptable under any code." There is no evidence that this direction had been given by PGandE. Examination of the Lockert affidavit, page A12, which was cited, indicates that Mr. Lockert discussed his concerns about shop weld conditions in a rupture restraint directly underneath the Unit 2 pressurizer. Mr. Lockert alleges that Mr. Nolle said nothing could be done about the conditions because the welds belong to another contractor



and were already accepted. Mr. Nolle did not make such a statement. In fact, he discussed how Mr. Lockert could identify these problems by initiating a Discrepancy Report (see Exhibit 8, attached). There is no evidence which substantiates Mr. Lockert's allegation.

124. The allegation identified as JI #103 cites the affidavit included as Attachment 5, page 7, and is actually Attachment 4, page 7. The quotes in the allegation come from the affidavit and were used to illustrate the alleged PGandE attitude toward the quality of structural welds supplied by vendors. There is no identification of the alleged bad welds in the affidavit. Our inspection records including (1) those generated during the extensive rupture restraint repair program, (2) as-built walkdown efforts, (3) final walkdown records, (4) Deficient Condition Notices, (5) Discrepancy Reports, and (6) the recent Bostrom Bergen reinspection reports do not identify any condition remaining in the plant that could be described as the descriptions found in the affidavit. Aside from some cosmetically unattractive welds, there is no substance to this issue. The Motions' language is colorful and inflammatory, but not a basis upon which engineering or licensing decisions should be made.

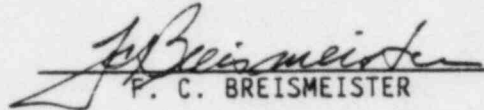
125. The affidavit further states that the 1982 PGandE memorandum said that since the plant was "over-designed," welds that looked defective were not a problem, and had in fact already been accepted, and so Pullman inspectors should ignore them. This is a total fabrication and distortion of the facts as can be seen by a review of the 1982 letter by Mr. Etzler. As a matter of fact, the letter directs that any problems

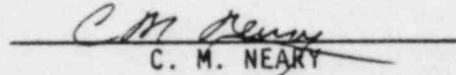


noted during the final walkdown were to be documented and included with the final walkdown package.

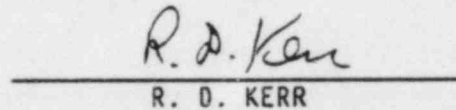
126. Allegation JI #104 and its cited affidavit are a total distortion of the facts as can be seen by examination of the 1982 letter (see Exhibit 9, attached.) PGandE did not delete shop welds from the final walkdown package, but in fact directed that identified problems be documented and included with the package.

Dated: March 19, 1984

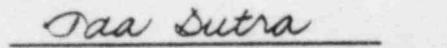

P. C. BREISMEISTER

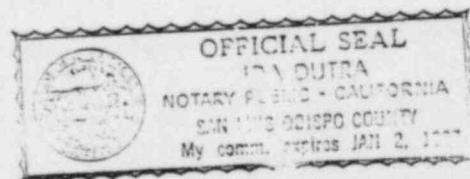

C. M. NEARY


H. W. KARNER


R. D. KERR

Subscribed and sworn to
before me this 19th day
of March, 1984.


Ida Dutra
Notary Public in and for the
County of San Luis Obispo
State of California
My commission expires
January 2, 1987



Exhibits

Exhibit 1 - NRC Region V Inspection Report No. 50-275/83-37 dated February 29, 1984.

Exhibit 2 - Affidavit of Mr. D. Stupi dated 3/19/84

Exhibit 3 - NRC Letter to Arizona Public Service Company, dated April 24, 1978).

Exhibit 4 - October 31, 1983, memorandum by Mr. Lockert

Exhibit 5 - November 11, 1983, memorandum by Mr. Lyautey

Exhibit 6 - Pullman QA memorandum

Exhibit 7 - April 3, 1980, memorandum by Mr. Leppke

Exhibit 8 - Affidavit of Mr. R. Nolle dated 3/18/84

Exhibit 9 - July 26, 1982, letter by Mr. Etzler



EXHIBIT NO. 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V

1450 MARIA LANE, SUITE 210
WALNUT CREEK, CALIFORNIA 94596

FEB 29 1984

Docket Nos. 50-275 and 50-323

Pacific Gas and Electric Company
77 Beale Street, Room 1435
San Francisco, California 94106

Attention: Mr. J. O. Schuyler, Vice President
Nuclear Power Generation

Gentlemen:

Subject: NRC Inspection of Diablo Canyon Units Nos. 1 and 2

This refers to the special inspection conducted by Messrs. D. F. Kirsch, T. M. Ross, and G. H. Hernandez of this office on November 14-18 and November 28 - December 9, 1983, of activities authorized by NRC License No. DPR-76 and Construction Permit No. CPFR-69, and to the discussion of our findings held with Mr. D. A. Rockwell and other members of your staff at the conclusion of the inspection.

Areas examined during this inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector.

Based on the results of this inspection, it appears that one of your activities was not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation, enclosed herewith as Appendix A.

Your response to this Notice is to be submitted in accordance with the provisions of 10 CFR 2.201 as stated in Appendix A, Notice of Violation.

In accordance with 10 CFR 2.790(a), a copy of this letter and the enclosures will be placed in the NRC Public Document Room unless you notify this office, by telephone, within ten days of the date of this letter and submit written application to withhold information contained therein within thirty days of the date of this letter. Such application must be consistent with the requirements of 2.790(b)(1).

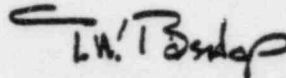
Pacific Gas and Electric Company

-2-

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Sincerely,



T. W. Bishop, Director
Division of Reactor Safety and
Projects

Enclosures:

- A. Notice of Violation
- B. Inspection Report
Nos. 50-275/83-37 and 50-323/83-25 with Attachment 1

cc w/enclosures:

- P. A. Crane, PG&E
- W. A. Raymond, PG&E
- S. M. Skidmore, PG&E
- R. D. Etzler, PG&E (Diablo Canyon)
- R. C. Thornberry, PG&E (Diablo Canyon)

APPENDIX A

NOTICE OF VIOLATION

Pacific Gas and Electric Company
77 Beale Street
Room 1435
San Francisco, California 94106

Docket No. 50-275
License No. DPR-76
Docket No. 50-323
Construction Permit No. CPPR-69

As a result of the inspection conducted on November 14-18 and November 28 - December 9, 1983, and in accordance with NRC Enforcement Policy, 10 CFR Part 2, Appendix C, the following violation was identified:

Section 17.1.5 of the FSAR (dated October 1978) and the Pacific Gas and Electric Company Quality Assurance Manual Section V (dated August 15, 1978) states, in part, that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings...and shall be accomplished in accordance with these instructions, procedures, or drawings...."

Engineering Standard Diablo (ESD) No. 237, "Quality Assurance Inspector Training Program," dated February 26, 1974, states in paragraph 2.3 that, "All personnel engaged as Field QA Inspectors involved in the inspection of weldments, interpretation of Engineering Specifications and Welding Procedures, and documentation work, shall be required to complete an indoctrination period as described in Section 4 of this specification." Paragraph 4.1 states that, "The indoctrination period for the Field Q.A. Inspectors described in Section 2.3 shall contain as a minimum, but not necessarily limited to, the following courses:

Visual Inspection	Welding Procedures
Welding Inspection	Welding Processes
Basic Q.A.	

Other courses offered as optional are:

Welding	Steam Power Plant Fundamentals
Basic Power Plant Instruction	Welding & Piping Engineer. Technology
Introducing Nuclear Power	(I.C.S.)

The Visual Inspection and Welding Inspection tests shall be administered and controlled by the N.D.E. Training Officer. All N.D.T. training, qualifications and certifications will be covered by ESD-235."

Paragraph 4.2 states that, "Tests used for the indoctrination courses for Field Q. A. Inspectors shall be:

1. For Basic Q.A. Test-ESD's.
2. For Weld Procedure Test-Approved Welding Procedures.
3. For the Weld Process Test, Welder Qualification Card and Pipefitter's Manual.
4. For Welding Inspection Qualifications, General Welding Information.
5. Visual Inspection Qualifications-General Dynamics NDT Introduction."

A Nuclear Services Corporation (NSC) Audit dated October 27, 1977, identified in Criterion IX, Finding No. 3 (of the audit) twenty-eight individuals which were alleged to have begun performing their duties without fulfilling the Pullman Power Products procedural requirements for certification and qualification of Quality Assurance (Welding) Inspectors.

Contrary to the above requirements of the FSAR and Pullman procedures, the inspector identified on November 15, 1983 that in virtually all cases the individuals hired after September 25, 1973, named in the NSC audit finding (who were assigned to perform welding inspections), began inspecting and accepting weldments, before completing the required training, taking the required examinations, and before being certified as a welding inspector. It is noted that the Pullman Power Products response to this Nuclear Services Corporation finding states, in part that, "All current inspectors have been qualified by test as outlined in ESD-237. The requirement for qualification and certification of field inspector were added in ESD-237 on September 25, 1973 to reflect the requirements of ANSI N45.2.6, just published. Persons hired before this time were not necessarily tested at time of hire. Subsequent to 1973, the records indicate that all inspection personnel received required training and examination." However, the Pullman response is silent with regards to inspectors performing inspections prior to certification.

This is a Severity Level IV Violation (Supplement II).

Pursuant to the provisions of 10 CFR 2.201, Pacific Gas and Electric Company is hereby required to submit to this office within thirty days of the date of this notice a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further items of noncompliance; and (3) the date when full compliance will be achieved. Consideration may be given to extending your response time for good cause shown.

2/29/84
Date

H. L. Canter
H. L. Canter, Chief
Reactor Projects Section No. 3

DETAILS

1. Individuals Contacted

a. Pacific Gas and Electric Company (PG&E)

R. D. Etzler, Project Superintendent
*D. A. Rockwell, Project Field Engineer
*M. E. Leppke, Onsite Project Engineer
*C. L. Eldridge, Quality Control Manager (Nuclear Operations)
*W. K. Glenn, Quality Control Supervisor
*T. E. Pierce, Quality Control Engineer
*M. N. Norem, Lead Startup Engineer
*J. Arnold, Resident Mechanical Engineer
*R. Taylor, Quality Assurance Engineer

b. Pullman Power Products Corporation (PPP)

*H. W. Karner, Quality Assurance/Quality Control Manager
*F. J. Lyautey, Assistant Quality Assurance/Quality Control Manager
*J. Guyler, Internal Auditor

* Denotes attendees at the NRC exit management meeting on November 18, 1983.

No NRC Management Meeting was held with the licensee at the conclusion of the NRC inspection which ended on December 9, 1983.

In addition, Mr. M. M. Mendonca, the NRC Senior Resident Inspector, and Mr. T. Polich, NRC Reactor Inspector, were present at the exit management meeting.

2. Introduction:

The Nuclear Regulatory Commission (NRC) staff performed an unannounced in-depth inspection to review the validity of the NSC audit findings and evaluate the adequacy of the Pullman and PG&E responses to the NSC audit findings.

Licensee and contractor actions in response to the NSC audit findings had been previously reviewed by the staff. Inspection Report 50-275/83-34 documented this inspection and concluded that problems identified in the NSC audit were properly addressed and resolved by the licensee's Quality Assurance Program. This previous inspection did not include an in-depth review of each and every NSC audit finding; but instead evaluated the results of the licensee's and PPP's response and specifically addressed three particular NSC findings that required further clarification. Based upon Inspection Report 83-34 and other reviews conducted by the NRC inspection program, the staff (in October 1983) provided an affidavit to the Atomic Safety and Licensing Appeal Board concluding that the PPP Quality Assurance Program did not suffer major breakdowns which could have significant adverse impact on construction activities.

The staff inspection effort documented in this report represents a much more in-depth examination of specific NSC audit findings and their impact on PPP construction quality assurance.

3. Purpose:

The goal of this inspection effort was threefold:

- (a) To assess whether the NSC audit findings represented a major defect in the Pullman or PG&E management of quality programs.
- (b) To establish an additional level of assurance that Pullman Power Products and the licensee's responses to the NSC audit findings were accurate, appropriate, and effective in resolving all issues pertinent to compliance with codes and regulations.
- (c) To assess any NSC audit findings which appeared to identify noncompliance with accepted standards, codes and regulations.

4. Scope of Inspection Plan:

The NRC inspection effort involved a review of all NSC audit findings listed in the NSC report issued October 24, 1977. In conjunction, a face value assessment was performed to assess the adequacy and completeness of the responses provided by Pullman Power Products and the licensee (dated April 11, 1978 and June 16, 1978, respectively) to each of the NSC findings. A selection of the more significant NSC audit findings was generated by the NRC. These selected items formed the basis for the NRC's on-site examinations.

The NSC audit identified 175 total findings. The staff considered that 110 of these audit findings could be interpreted as apparent deficiencies. The NRC had previously examined three of the NSC audit findings. Those findings are documented in NRC Inspection Report 50-275/83-34. Of the 110 apparent deficiencies, the NRC staff selected 47 of the most significant items, giving priority to those findings which could reasonably impact upon construction quality. Thus, about 45% of the NSC identified deficiencies were examined in an in-depth manner by the staff. (This examination represents about 70% of the principal deficiencies cited by the Joint Interveners in their supplementary motion to reopen the record on construction quality assurance based upon the results of the NSC audit).

Those NSC findings selected as high priority topics for the NRC inspection were based on the following rationale:

- (a) Audit findings which appeared to have the greatest potential for manifestation in poor quality work in the field.
- (b) Audit findings which specifically reference characteristics of poor field work practice.
- (c) Those findings that appear to be in noncompliance with accepted standards, codes and regulations.

Where the NSC findings involved a potential for disputes over NDE results, the NRC contracted with an independent consultant to examine the field work and records for compliance with code requirements. To establish whether adequate control over weld delta ferrite content had been implemented in the shop and field, a sample of twenty-five stainless steel welds was chosen and examined for delta ferrite content. These welds were chosen from small bore piping which contain both field and shop welds. To establish whether inking of numbers onto radiographs was a wide-spread practice or if the NSC finding represented an isolated instance, 102 field weld radiographs were selected to verify field weld and radiographic interpretation adequacy. The 102 welds examined were selected from several of the more important safety systems; including the Reactor Coolant System (system 7), safety injection system (system 9), containment spray system (system 12), main steam system (system 4), chemical and volume control system (system 8) and residual heat removal system (system 10). In addition, four specific welds, from among those identified in the NSC findings, were examined to establish whether the surface preparation was acceptable for nondestructive examination. Liquid penetrant testing of these four field welds was performed to ascertain the degree of actual compliance with acceptance standards. The above items were selected to provide an independent feel of the Pullman work, rather than solely relying on information provided by licensee records.

The NRC also reviewed the non-conformance reports (NCR's) and minor variation reports (MVR's) issued by the licensee as a result of an audit, conducted by the PG&E Q.A. department, of the PPP Q.A. program, issued June 13, 1978. Corrective actions identified by these NCRs and MVRs were evaluated for adequacy and implementation, and appeared acceptable.

The NSC Audit Findings selected by the NRC for in-depth examination and the NRC findings are detailed in the following paragraphs.

5. Criterion I, NSC Audit Finding No. 3:

"The field Quality Assurance Organization has performed functions other than those described in KFP-1 and KFPS-1; and some functions were outside the quality responsibility, i.e., writing and approving Engineering Specifications, performing welding engineering functions, approving engineering changes. These activities raise the question of the qualification of Quality Assurance personnel to perform these functions and the problem of requiring the Field Quality Assurance Organization to audit its own performance."

NRC Finding:

To resolve this issue the inspector's approach was to establish who in the Pullman organization was allowed to write procedures or procedure changes, perform the review and approval process for such documents and whether sufficient control was exercised by Pullman in the writing, review and approval process. In addition, the validity of the Pullman response was assessed.

The quality assurance program prescribed by the Pullman ASME Quality Assurance Manual procedure KFP-1, and as implemented in part by procedure ESD 259, apparently allows anyone to be assigned the task of writing procedures. However, the point of control in this procedure writing process is that the cognizant discipline management is required to review and approve the procedure prior to issuance for use. For example, the Pullman Chief Field Engineer is required to review and approve engineering and construction procedures to assure compliance with code, specification and contract requirements and the Quality Assurance Manager is required to review and approve quality assurance implementing procedures. In addition, engineering specifications covering quality assurance functions are required to be reviewed and approved by the contractor's Quality Assurance Manager and the licensee. Engineering specifications may provide instructions to field Quality Assurance inspectors, field engineers and foremen. One exception to this is that welding procedures to be used onsite were, and are, required to be qualified by the Welding Engineer at the Pullman home office, approved and issued by that office, and approved by the licensee's engineering. Engineering Specifications must also be approved by the licensee.

While the inspector concludes that adequate controls were applied in the procedure review and approval process to assure procedure adequacy, a stated concern was whether QA would be involved in auditing for adequacy a procedure which QA authored, thus potentially auditing their own performance. Quality Assurance normally audits to assure that the QA program requirements are properly implemented by quality affecting procedures and to assure that contract specification and code requirements are adequately implemented in the field. The inspector further concludes that while QA and QC may audit or inspect for implementation of these procedures such action is not considered to be an auditing of their own performance because program implementation is the responsibility of production oriented organizations.

The inspector concludes that there is no regulatory or procedural requirements which provide limits as to whom may write procedures. The inspector further concludes that Pullman has provided adequate controls to assure procedures are reviewed and approved by appropriate discipline and managerial authority prior to issuance and use of a new procedure.

No items of noncompliance or deviations were identified.

6. Criterion II, NSC Audit Finding No. 4

"There is no evidence that upper management has performed scheduled reviews of nonconformance reports, personnel qualifications, and corrective actions."

NRC Finding:

The inspector examined the historical records of nine corporate management audits conducted between September 1972 and June 1977. This examination verified that nonconformances, personnel qualifications, and corrective action were consistently among those activities audited by corporate management.

In addition, Pullman Power Products has since provided programmatic improvements and incorporated an on-site management review system requiring that the Quality Assurance/Quality Control Manager submit monthly reports "Summarizing all significant Quality Assurance events, audits, nonconformances including trends noted, and may offer suggestions for Q. A. program improvement."

The inspector concludes the historical records of corporate management audits do provide evidence that reviews of nonconformance reports, personnel qualifications and corrective actions were performed.

No items of noncompliance or deviations were identified.

7. Criterion V, NSC Audit Finding No. 1:

"There is no requirement that activities affecting quality shall be prescribed by documented instructions, procedures, and drawings."

NRC Finding:

The inspector determined that Section KFP-8 (revision dated August 22, 1972) of the Pullman Quality Assurance Manual contains procedures to be used to establish "Process Planning and Control" for on-site work. Specifically KFP-8, in paragraph 8.1, requires that "The field process sheet (Figure No. 11) serves as a traveler to identify, in sequence, the field work to be done. It is used both for the field fabrication of piping assemblies and for the erection of pipe in the plant." A field process sheet will list in sequence all significant operations and inspections associated with a particular field activity. Specific written procedures are required to be referenced, for each operation and inspection listed, to identify those detailed instructions necessary to actually perform the work assignments. Applicable isometric or detailed drawings and code requirements are also indicated on the field process sheet. Procedure KFPS-7 (issued December 3, 1973), of the Quality Assurance Procedures for Pipe Supports, establishes a similar "Process Planning and Control" system using the Field Support Process Sheet.

The inspector concludes the program elements of KFP-8 and KFPS-7 did establish that documented instructions and procedures were required to be prescribed for control of Pullman's quality related construction activities.

No items of noncompliance or deviations were identified.

8. Criterion V, NSC Audit Finding No. 2:

"Many activities affecting quality are not described in procedures. Among those activities are: hanger package review, pre-heating for welding, use of Note-O-Grams, use of Rejection Notices, and maintenance of Field Quality Inspector Daily Logs."

NRC Finding:

The inspector examined the procedures and program instructions that were available for the specific activities identified.

The inspector determined that hanger package review is described in KFPS-12 (dated December 3, 1973), which is concerned with the final documentation of pipe supports. KFPS-12 requires that "all field fabricated and field installed supports have been inspected, and accepted drawings are compiled and indexed as outlined" by the inclusive program instructions. Supplementary requirements were subsequently incorporated into ESD-234 (dated December 30, 1977) in the form of a document review checklist to establish a "Guide for assembly and review of hanger documentation packages."

Preheating for welding is prescribed in the applicable Pullman "code weld procedure specifications," which are specifically referenced by the field process sheet. Later revisions of the field process sheet and ESD-218 (dated October 1977) included amplification of preheat temperature range requirements.

The inspector does not consider it necessary that documents such as Note-O-Grams, Rejection Notices, and Inspector Logs be controlled and prescribed by written procedures. These documents are implemented internally as an aid to the quality assurance program management and provide administrative tools for status reporting and recording. The inspector determined that these documents do not establish requirements, procedural instructions, or final acceptance documentation for quality related activities. Pullman's Quality Assurance Program delineates those procedures required to be used for the inspection and documentation of quality related activities.

In conclusion, the inspector found the Q.A. program elements describing hanger package review and weld preheat were adequate and met the applicable code requirements. Note-O-Grams, Rejection Notices and Inspector Logs are not required, by applicable codes, to be prescribed in procedures. The Pullman and PG&E responses were consistent with these conclusions.

No items of noncompliance or deviations were identified.

9. Criterion V, NSC Audit Finding No. 3:

"Many activities affecting quality are insufficiently described in procedures. Among these activities are isometric package review, post welding heat treatment, non-conformance reporting, ninety-day welder's log and weekly qualified welder's list, and auditing."

NRC Finding:

The inspector examined Pullman's Quality Assurance Program to determine if the specific activities identified in the NSC Audit Finding were adequately and sufficiently described. The inspector's findings are as follows:

- ° Field procedure ESD-254 (dated May 6, 1975) appears to provide an adequate outline guide for review of isometric drawing packages. May 6, 1975 was the earliest date that could be found for ESD-254. While most piping installations had been completed prior to May 1975, the inspector found that the final complete document review of isometric drawing packages were performed after ESD-254 was in effect.
- ° Appropriate post weld heat treatment requirements were always prescribed by weld procedure specifications. These were further amplified in ESD-218 (October 1977), as a program improvement subsequent to the NSC audit.
- ° Nonconformance reporting requirements prescribed by the Pullman ASME certified Quality Assurance Program Manual Section KFP-10 (dated January 4, 1973) and procedure ESD-240 (dated December 6, 1973) were consistent with Appendix B criteria. A significant rewrite of ESD-240 in 1978, and subsequent revisions, established additional detailed instructions to clarify nonconformance reporting aspects such as documentation, specific personnel responsibilities, the functional use, closing-out, and 10 CFR 21 applicability. Pullman Power Products calls their nonconformance reports Discrepancy Reports, the terms are synonymous.
- ° Ninety-Day Welder's Log and Weekly Qualified Welder Lists are only referenced, by KFP-15 (dated August 22, 1972) and ESD-216 (dated June 17, 1976), to figures appended in the procedures. Although desirable, there were ~~no amplifying descriptions on these forms to~~ specify personnel responsibility, functional use, implementation, scope, etc., until significant revisions were incorporated into ESD-216 (dated July 10, 1979). These documents were used to maintain welder qualification status and were maintained by experienced personnel under the cognizance of the Quality Assurance/Quality Control Manager. A review of the application of 90-day welder logs and weekly qualified welder lists did not identify any evidence of inconsistencies that would have adversely affected quality control activities. The Code merely requires that a contractor assure that welders are qualified but doesn't prescribe methods effecting administrative control of this activity. Thus, the inspector finds that Pullman did adequately track welder qualification to assure Code compliance. This subject is further examined in paragraph 21 of this report.
- ° Internal and Corporate Management audits of the Pullman onsite Q.A. program were described by Q.A. manual section KFP-18 (revision 8/22/72). The program elements prescribed by KFP-18 were not complete and very general in nature. Those areas which appeared particularly deficient were audit personnel qualifications, audit scope, audit scheduling and disposition of audit records.

A corporate procedure (no. XVIII-1) prescribed further instructions for corporate management audits, directed and conducted by Williamsport headquarters management personnel. Corporate audit procedure No. XVIII-1, provided the detailed instructions for

conducting the management audits required by KFP-18. A review of corporate management audits, performed in accordance with Procedure XVIII-1, reveals a history of Quality Assurance Program audits based upon checklists following 10 CFR 50 Appendix B criteria. This established a comprehensive corporate audit system which appeared to review all field Q.A. program facets. Thus, for performing corporate management audits, Procedure XVIII-1 did provide effective amplifying instructions to implement the general elements of KFP-18.

There did not exist any comparable detailed procedure to implement "internal" audits required to be performed by on-site Quality Assurance personnel. A staff review of internal audit records prior to the NSC audit indicates that all aspects of the Pullman field Quality Assurance program were not being addressed. This deficiency was also clearly identified by a licensee audit of Pullman and subsequently documented on nonconformance report No. DCO-78-RM-004 (dated October 1978). Pullman's resolution included a rewrite of KFP-18 and development of an internal audit procedure, issued as ESD-263, dated June 26, 1978. To further provide for audit program consistency, the corporate audit procedure XVIII-1 was incorporated into field procedure ESD-274, dated February 19, 1980. Adequate corrective action was implemented to assure that all Q. A. field program elements were scheduled for internal auditing (as of June 1978). Records of subsequent internal and corporate audits verify that no major breakdown of the Quality Assurance program had occurred, nor had any significant problems gone undetected, due to the deficiencies identified with the internal auditing program.

In conclusion, the inspector determined there were adequate controls which prescribed requirements for isometric package review, post welding heat treatment and nonconformance reporting. Further, the practices used by Pullman in implementing the ninety-day welders log and weekly qualified welders list effectively accomplished the intent of these activities even though specifics regarding how these activities were to be performed were not prescribed in detail by procedures until July 10, 1979. Even though the internal audit program, implemented by on-site personnel, (prior to 1978) was determined to be of a marginal quality, a redundant program of comprehensive corporate audits was performed concurrently. Based upon an examination of the findings identified in corporate and internal audits, there did not appear to be any adverse impact on quality related activities as a result of the inadequate description of the internal auditing program. The inspector concludes that, with both programs operating simultaneously, sufficient records are available to assure the necessary criteria of Appendix B were being audited periodically. This conclusion is based, in part, on the absence of recurring significant audit findings.

No items of noncompliance or deviations were identified.

10. Criterion VI, NSC Audit Finding No. 9a:

"For Isometric 2-14-77: The Process Sheet was changed to show the completion of FW-192 on April 10 and April 11, 1974, approximately 19 months after the work was done."

NRC Finding:

The inspector found that even though the NSC audit finding identifies the incorrect isometric package, presumably due to typographical error, the Pullman response correctly addresses the intended isometric package, i.e., Isometric Package No. 2-14-47. Examination of isometric package no. 2-14-47 indicated that FW-192 was completed on April 11, 1974, as indicated by the signing and dating of the line item by the Pullman welding inspector. The signature and date were in ink and the inspector could not find any evidence to indicate that the completion date or signature had been altered or that any attempt had been made to alter the signature and date. The weld was liquid penetrant examined on December 2, 1975, found acceptable, and the line item for the non-destructive examination on the process sheet was then signed and dated. Examination of the Liquid Penetrant Examination record indicated that both the signatures and dates on the process sheet and the Liquid Penetrant Examination Record were in ink and no evidence could be found to indicate that there had been an attempt to alter the dates or signatures on either or both of these documents.

Therefore, the inspector could not corroborate the NSC auditor's finding that the date for completion of FW-192 had been changed or backdated.

No items of noncompliance or deviations were identified.

11. Criterion VI, NSC Audit Finding No. 9b:

"Isometric 2-14-8: FW-1673 was performed to Revision 2 of the isometric, which did not show FW-1673. Revision 3 of the isometric, which included the FW-1673, was generated approximately one week after completion of the weld. It is therefore concluded that FW-1673 was performed without the normal controls of a Process Sheet, a weld procedure call out and a call-out of NDE requirements."

NRC Finding:

The inspector examined the various contractor procedures and documents that existed during the time frame in question to determine whether the design change control system was circumvented by the Pullman Quality Assurance Inspector which allowed or directed the welding of a valve to a capped pipe. The inspector examined Isometric No. 2-14-8 which in Revision 2, dated December 11, 1972, shows a capped pipe (termed a nipple) and in Revision 3, dated May 29, 1974, the required valve and vent (actually a capped pipe) are depicted. Revision 2 of the isometric drawing did not show FW-1673. A review of the weld process sheet indicated that the weld (FW-1673) was completed on May 24, 1974, five days before the issuance of revision 3 to the isometric drawing. Thus, the inspector concludes that FW-1673 was made prior to the issuance of revision 3 to the isometric drawing. However, it appears that the installation of FW-1673 was accomplished in a controlled manner as described below.

The inspector examined Pullman Quality Assurance Instruction No. 52, dated December 13, 1973 which states that, "Due to a shortage of valves

used for vents and drains at this complex, it has become necessary to install twelve inch nipples, capped on end, to facilitate flushing." Subsequent to instruction no. 52, on March 8, 1974 an apparently generic discrepancy report (Discrepancy Report No. DR 2100) was written in an effort to expedite the installation of vents and drains in erected pipe. Item No. 3 of the approved disposition of the discrepancy report states that, "All welds added for this change will be recorded on the process sheet and isometric. All added weld number selection will be coordinated between drafting, Quality Assurance Inspector, and Engineering." Item No. 4 states that, "Engineering is to notify the area Quality Assurance Inspector prior to starting installation of standard vents and drains." Therefore, it appears that the Quality Assurance Inspector was in contact with Engineering for the installation of vents and drains and welds were required to be recorded on process sheets. Thus, the inspector concludes that the licensee and Pullman adequately controlled and documented the installation of nipples, in place of the required vents and drains. Furthermore, the inspector concludes that the licensee and Pullman adequately controlled the restoration of the system to design configuration by adding the required vents and drains when valves became available.

A process sheet for field weld, FW-1673 is contained in Isometric No. 2-14-8, as required. Therefore, the inspector concludes that FW-1673 was performed using the normal controls of a process sheet.

Further, Pullman procedure ESD-239, dated April 2, 1974, states in paragraph 2.1 that "Piping systems shall be closed out by Quality Assurance Inspectors. Piping shall be checked when necessary against PG&E area drawings, Section 3 of Specification 8711 and the PG&E flow diagrams. All missing or incorrect items shall be recorded on a punch list and D.R. (discrepancy report) written if required." ESD-239 further states in paragraph 3.1 that "The following is a guide for Quality Assurance Inspectors when closing out piping systems" and proceeds to state in paragraph 3.1.2 to "Check field run pipe and fittings for correct materials, rating and specifications when so identified," and in paragraph 3.1.15 to, "Check that instrument connections, vents, drains and plugs are installed per the Isometric and Flow Sheets." Therefore, it appears that Quality Assurance Inspectors were required to verify conformance to PG&E design drawing (Flow Sheets), and to record any discrepancies. The field QC inspector, in conjunction with Pullman Engineering, had apparently accepted the installation of FW-1673 knowing that the next isometric revision would be updated to correspond to Flow Sheet requirements.

A comparison of the contractor operated Isometric No. 2-14-8 to the PG&E Flow Sheet (PG&E Drawing No. 108014) indicated that the required valve and vent were depicted on the line referenced on Isometric No. 2-14-8. Therefore, the weld (FW-1673) attaching the valve and vent was, at least implicitly, required on the PG&E Flow Sheet (No. 108014). It appears that the valve and vent were not installed on the line due to the shortage of valves, as stated in the aforementioned Quality Assurance Instruction No. 52. However, adequate provisions had been made for the subsequent installation of the valve, as shown by the installation of the nipple and cap depicted in Revision 2 of the isometric. A check of one

other line with a similar configuration (there are four similar lines with valves and vents in the same area) confirmed that a similar situation had occurred for Isometric No. 2-14-6, Line No. 1759-6 (i.e., the weld had been made and completed before the revision to the isometric depicted the weld).

Additionally, the inspector verified that, in the time frame in question, a method existed to assure that the proper welding procedure was used for the pipe to valve weld in question. The inspector found that ESD-227, dated December 20, 1973 provided a chart indicating the proper weld procedure for different materials and configurations required. For this case, a socket weld was required and weld procedure no. 92/93 was the weld procedure needed and used. A review of the process sheet for FW-1673 confirmed that weld procedure 92/93 was used.

Finally, the inspector verified that contractor originated drawings (for example, isometric drawings) are reviewed by the Engineer (PG&E) for conformance with the PG&E design drawings. The PG&E Drawing Control Procedure, dated September 11, 1972, paragraph 3.11 (Contractor's Field Drawings and Procedures) states that "Drawings that are drawn by the contractors onsite (Lift drawings, piping isometric, hanger drawing, etc.) are submitted to PG&E onsite office for approval. These drawings are checked by PG&E drawings. They are returned to the contractor with the stamp (no. 6) below noting the appropriate condition of the drawing." Isometric No. 2-14-8 was stamped as approved, therefore indicating review and acceptance by the licensee.

In conclusion, it appears that under certain conditions welds could be added (through coordination with the Quality Assurance Inspector and the Engineer) which did not circumvent the then existing design change control system. Furthermore, these additions were accomplished in a controlled, orderly and proper manner.

FW-1673 was completed using a weld process sheet, a welding procedure was specified, including identification of necessary nondestructive examinations. Further, while FW-1673 was not depicted on the contractor generated isometric drawing, revision 2, the weld was implied to be necessary by the PG&E generated and approved Flow Sheet (Drawing No. 108014) and the inclusion of FW-1673 was accomplished and documented in a controlled manner.

No items of noncompliance or deviations were identified.

12. Criterion VI, NSC Audit Finding No. 9c:

"Isometric 2-14-53: FW-247 was completed on February 20, 1975. Approximately December 1, 1975, the visual acceptance was signed off and backdated; the Weld Rod Requisition was changed to show that more than the original quantity of one had been burned."

NRC Finding:

The inspector examined the daily work log of the Pullman inspector who performed the inspection on FW-247. The daily work log records indicate

that the inspector did perform the final inspection of FW-247 on February 20, 1975, as stated in the Pullman response. Therefore, the inspector does not consider this to be an unauthorized, or improper, backdating because the signature reflects the actual conduct of inspections.

Examination of the Weld Rod Requisition records indicated that the quantity of weld rod was changed on one weld rod slip as stated by the NSC auditor, however the change was initialed by a Pullman inspector. The change to the Weld Rod Requisition slip was apparently made because the Pullman inspector entered the number of weld rod returned on the wrong line item and subsequently changed the line item to reflect the correct conditions. It appears that the condition was caused by an error, which was later caught by the Pullman inspectors. The inspector considers this acceptable in that the record was apparently modified to reflect the actual conditions existing. NRC examination of approximately one hundred weld rod requisition records contained in isometric packages Nos. 2-14-77, 2-14-47, 2-14-8, 2-14-53, 2-14-59, and 2-26-417, did not identify any similar conditions.

The inspector concludes that this item does not represent an instance of unauthorized changing of quality related documents and that the changes made had been made with adequate basis and reason.

As a side issue, it was reported (in Pullman's response to this audit finding) that this problem had been found as a result of an internal Pullman audit. The inspector reviewed Pullman's internal audits and could not verify the Pullman audit response. It appears that the discrepancy was found by Pullman as a result of the documentation review of the isometric package. This minor inconsistency in the Pullman response is not considered to be significant.

No items of noncompliance or deviations were identified.

13. Criterion VI, NSC Audit Finding No. 9d:

"Isometric 2-14-59: FW-268 was completed February 5, 1975. On December 2, 1975, the entry on the Process Sheet for removal of dams was signed off and backdated. There is no proof that the dams had been removed."

NRC Finding:

The inspector found that FW-268 is a Code Class 3 weld which the records indicate was made with the use of a backing ring, thus, no dams were to be used. The signing on the line entry for dam removal, by the Pullman inspector, appeared to be an oversight on the part of the Pullman inspector. Examination of Isometric Package No. 2-14-59 indicated that a Warehouse Requisition Record specifying a backing ring for FW-268 was contained in the package. The inspector could not verify the December 2, 1975 date, when supposedly the backdating occurred.

The inspector did find that, apparently in response to the NSC finding, the Pullman inspector did cross out the "Remove Dam" entry, wrote "not applicable", dated and signed this line entry on December 7, 1977. This same Pullman inspector also found that he had performed the same error on

FW-269, which is contained on the same isometric package. The Pullman inspector then crossed out, wrote "not applicable", and dated and signed this line entry on December 7, 1977.

Examination of five isometric packages, by the NRC inspector, identified three other similar cases wherein a different Pullman inspector had signed the "Remove Dam" line entry, when in fact a backing ring had been used. Isometric package no. 2-14-53 contains FW-246 and FW-247 and Isometric package no. 2-14-47 contains FW-196, which have similar discrepancies.

The inspector concludes that no safety significance can be attributed to this NSC finding and no purpose would be served by reviewing and correcting any other similar record discrepancies. The NSC finding appears to be the result of errors by Pullman inspectors, who subsequently corrected these errors to indicate the actual state of activities. The inspector does not consider this to be a QA program deficiency; rather, these appear to be instances where inspection personnel were trying to show that no dam was installed as opposed to actually removing a dam.

No items of noncompliance or deviations were identified.

14. Criterion VI, NSC Audit Finding No. 9e:

"Isometric 2-26-417: FW-144, 145, 196, and 197 were completed on May 14, 1976. The Weld Rod Requisition had been altered to add FW-197. However, the Weld Rod Requisition shows that 14 rods had been burned, which seems improbable for the four welds that were supposedly welded."

NRC Finding:

The inspector verified that the M.W. Kellogg (Pullman) Field Warehouse Requisition record indicated that four 3/4" sockets were issued on May 13, 1976 and welded on May 14, 1976. It is the inspector's opinion that 14 weld rods provide sufficient weld rod to weld the four 3/4" socket welds referred to by the NSC finding. The inspector examined Pullman procedure ESD-202, dated April 28, 1975, which states in part, in paragraph 3.2, that "For socket welds, up to four welds may be put on one requisition (weld rod requisition slip)." The inspector did find that all four socket welds were documented on one weld rod requisition slip.

The inspector concluded that this NSC finding has no safety significance and was in accordance with existing procedures.

No items of noncompliance or deviations were identified.

15. Criterion VI, NSC Audit Finding No. 10:

"No procedure or requirement prohibits the changing or alteration of the records and documents that are necessary to track the work. Field Process Sheets, Weld Rod Requisitions, inspection records, etc., should not be changed or should be changed only by Quality Assurance supervisory personnel and then signed and dated."

NRC Finding:

A review, by the inspector, of historical procedures indicates the NSC audit finding is substantiated in part. Prior to 1977, insufficient requirements existed to control the changing or alteration of quality records and documents specified in the NSC finding. The ASME certified PPP Q.A. manual program elements describing field process sheets, weld rod requisitions, and inspection records did specify the qualified personnel responsible for filling out or revising these documents; however, there was no concise administrative Q.A. program instructions written to control how changes to Q.A. field documents would be implemented. This concern had been previously addressed by Pullman's own corporate management audits, which identified a few findings of editorial changes made to Q.A. field documents without adequate administrative controls.

In response to the NSC and Pullman corporate audits, several on-site Pullman QA procedures were revised to provide more explicit administrative controls. ESD-254, entitled "Document Review", was revised on December 30, 1977 to establish for records, process sheets, requisitions, and reports that "corrections, if made, shall be initialed and dated by the responsible individual". The scope of change requirements in KFP-17 (dated August 31, 1977), the QA Manual chapter on revisions and deletions, was broadened to also include all field procedures (ESDs). Corrections and/or changes of field process sheets, according to ESD-264 (dated September 15, 1978), titled "Process Planning and Control," shall be initialed and dated, and limited to specific qualified personnel.

Neither the NSC nor the Pullman corporate audit findings, nor the staff review, identified any unapproved technical changes or other substantive changes which would have adversely affected construction quality. Rather, the issue of concern merely involves editorial field changes made to Q.A. documents and records completed prior to 1977 and the NRC finds that this concern has only minimal safety significance.

Therefore, the inspector concludes that Pullman Q.A. took effective corrective action to correct the programmatic concern identified by the NSC audit and previous Pullman corporate audits.

In conclusion, the inspector determined that Pullman Q.A. took effective corrective action in addressing the programmatic concern identified by the NSC audit and previous Pullman corporate audits. Furthermore, there is no evidence in the NSC, PG&E and Pullman corporate audits to suspect that any field changes made to pre-1977 documents and records impacted adversely on the quality of field construction.

No items of noncompliance or deviations were identified.

16. Criterion VIII, NSC Audit Finding No. 12:

"Procedure ESD-223 does not give adequate instructions for the identification and control of Class I Pipe Supports."

NRC Finding:

The inspector reviewed the historical file for ESD-223, "Installation and Inspection of Pipe Supports" and, specifically, the extensive revisions that occurred on November 11, 1975 and May 25, 1976. The inspector found that the procedure revisions contained adequate Quality Assurance/Quality Control instructions for the control and identification of Class I pipe supports. Additionally, the inspector found that other existing procedures, contained in the Pullman Quality Program, provided additional or amplifying instructions for the identification and control of Class I pipe supports.

No items of noncompliance or deviations were identified.

17. Criterion IX, NSC Audit Finding No. 3:

"The qualification and certification program for NDE and inspection personnel has been inadequate. The records of the following personnel were examined: D. R. Geske, T. L. Koch, J. E. Cawelti, G. P. Keeler, K. E. Beck, L. Glass, W. R. Johnson, E. Stanton, C. B. Athay, R. G. Sears, D. S. Tutko, J. N. Shiromizu, V. J. Casey, J. A. Brasher, L. F. Myrick, S. R. Stanley, H. Guest, D. E. Bentley, R. D. Kincaide, K. D. Guy, J. R. Bowlby, E. R. Jennings, A. L. Newton, C. C. Lenzi, J. J. Sisk, L. K. Thomas, A. A. Conques, and R. L. Marks. In virtually all cases, the individuals began performing their duties without fulfilling the specified requirements. The most prevalent discrepancies are: not completing the required training, not having proof of previous experience, insufficient time as Level I, unsigned tests, and insufficient background and experience."

NRC Finding:

The inspector examined the procedures for qualification and certification of non-destructive examination and inspection personnel that existed in Pullman's program before September 1977. These are Engineering Standard-Diablo (ESD) No. 235, "Nondestructive Examination Personnel Qualification and Certification Procedure," dated September 25, 1973, and ESD No. 237, "Quality Assurance Inspector Training Program," dated February 26, 1974.

The requirements for qualification of Pullman inspectors must have been revised or amplified on or after September 25, 1973. This is based on the Pullman response, to the above NSC audit finding, which states in part, that "All current inspectors have been qualified by test as outlined in ESD-237. Requirements for qualification and certification of field inspectors were added in ESD-237 on September 25, 1973 to reflect the requirements of ANSI N45.2.6, just published. Persons hired before this time were not necessarily tested at time of hire. Subsequent to 1973, the records indicate that all inspection personnel received required training and examination." A review of the ESD-237 historical file indicated that a prior revision had occurred on May 1, 1969, however, no procedure revision could be found which was specifically dated September 25, 1973.

ESD-237, dated February 26, 1974, states in paragraph 2.3 that, "All personnel engaged as Field QA Inspectors involved in the inspection of weldments, interpretation of Engineering Specifications and Welding Procedures, and documentation work, shall be required to complete an indoctrination period as described in Section 4 of this specification." Paragraph 4.1 states that, "The indoctrination period for the Field Q.A. Inspectors described in Section 2.3 shall contain as a minimum, but not necessarily limited to, the following courses:

Visual Inspection	Welding Procedures
Welding Inspection	Welding Processes
Basic Q.A.	

Other courses offered as optional are:

Welding	Steam Power Plant Fundamentals
Basic Power Plant Instruc.	Welding & Piping Eng. Technology
Introducing Nuclear Power	(I.C.S.)

The Visual Inspection and Welding Inspection tests shall be administered and controlled by the N.D.E. Training Officer. All N.D.T. training, qualifications and certifications will be covered by ESD-235." The terms NDE and NDT are synonymous and refer to nondestructive examination.

Paragraph 4.2 states that tests used for the indoctrination courses for Field Q. A. Inspectors shall be:

1. For Basic Q.A. Test-ESD's.
2. For Weld Procedure Test-Approved Welding Procedures.
3. For the Weld Process Test, Welder Qualification Card and Pipefitter's Manual.
4. For Welding Inspection Qualifications, General Welding Information.
5. Visual Inspection Qualifications-General Dynamics NDT Introduction.

Examination of ESD-235 indicated that although this procedure is a nondestructive personnel qualification and certification procedure, the procedure also describes levels of qualification for visual inspection personnel, the type of examination, the number of questions, and the acceptable grade for the examination. Additionally, a welding test requirement is contained in paragraph 11.2.14 which states that, "A combination of General, Specific, and Practical examinations will be given using the Diablo Canyon Welding Seminar Test Paper, containing 65 questions."

Therefore, it is apparent that Field QA Inspectors were required to be indoctrinated through a program of courses related to their job function, including visual and welding inspection tests administered and controlled by the NDE Training Officer. Discussions with contractor personnel indicated that, in the pre-1977 time frame, the training officer controlled all personnel certifications, with no distinction being made between NDE and welding inspection personnel.

The inspector examined the personnel files of 20 of the 28 individuals named in the NSC audit, comparing the date when each individual started

employment with Pullman Power Products versus the date each individual started accepting work. This examination confirmed the NSC audit finding that in virtually all cases, welding Quality Assurance Inspectors began performing their duties without fulfilling the specified requirements and without completing the required training. Two examples are as follows:

- ° V. J. Casey began employment with Pullman Power Products on November 19, 1973 and began accepting weldments in November, 1973. He was not certified as a welding inspector until February 27, 1974.
- ° E. R. Jennings began employment with Pullman Power Products on January 16, 1974 and began accepting weldments on January 22, 1974. He was not certified as a welding inspector until April 21, 1974.

Additionally, two other inspectors were found to have questionable backgrounds which, in the inspector's opinion, would not warrant their immediate certification as welding inspectors. K. D. Guy had essentially no background in quality control/quality assurance, yet within two months was a fully certified inspector accepting weldments. A. L. Newton had some background in the aircraft industry, but a lapse of several years had occurred between the time he had terminated his employment in the aircraft industry and the time he began employment with Pullman. Yet within two months Newton was accepting weldments. Both of these individuals had taken several, but not all, of the required welding examination tests specified in ESD-237. Therefore, both of these individuals also began performing their duties without fulfilling the specified requirements and without completing the required training.

The failure to assure that Quality Assurance Inspectors were qualified and certified in accordance with the contractor quality procedures is considered an apparent item of noncompliance (50-275/323/83-37/01).

It should be noted that for all personnel files examined, with the exception of Messrs. Guy and Newton, all individuals appeared to be experienced, with adequate backgrounds either in welding or in the area of quality control inspection.

The inspectors review of personnel files further concluded that Pullman NDE personnel were properly certified and had not accepted or performed work prior to being certified in accordance with Pullman procedures or codes.

The inspector concurs with the NSC audit finding that welding inspection personnel performed inspections prior to being certified. The inspector does not concur with the NSC finding that NDE personnel performed nondestructive examinations prior to being certified.

18. Criterion IX, NSC Audit Finding No. 10b:

"The Ninety-Day Welders' Log was not maintained from August, 1972 to December, 1972. There is no Weekly Qualified-Welders List for that time period to substantiate that the welders were actually qualified."

NRC Finding:

The inspectors approach to resolving this issue was to examine the 90 day welders logs to determine whether the alleged gap in the log exists, to determine the basis for establishing the weekly qualified welders list, to determine whether the weekly list is available for the above time period and, if not, the reasons for the unavailability.

The inspector examined the 90 day welder's log and found that no void existed between 8/72 and 12/72. While it is true that no weekly qualified welders list exists for that time period, the basis for establishing the weekly list is the 90 day qualified welder's log. However, the inspector notes that the weekly qualified welder's list is not a document requiring retention by the Pullman Quality Assurance program. The 90 day welder's log provides documentary evidence of welder performance during a specific period, to assure qualification within code requirements. This log is based upon weld filler metal withdrawal sheets and the welder qualification records. Therefore, the inspector concludes that, based upon the records available, no code or procedural violation can be determined because the 90 day welders log existed for the time period referenced by the NSC audit and the weekly qualified welders list is not required to be retained. The NRC considers this practice acceptable.

No items of noncompliance or deviations were identified.

19. Criterion IX, NSC Audit Finding 10c:

"The Ninety-Day Welders' Log is not sufficiently detailed to determine if the welder is qualified to perform certain procedures. The Ninety-Day Welders' Log has been revised a number of times, and the detail has improved with each revision. Previous to the latest revision (November, 1974), the log was very poor in giving precise information relative to procedure and thickness ranges to which the welder was qualified."

NRC Finding:

The inspector's approach to resolving this issue was to examine a representative sample of the early 90 day qualified welder's logs and determine if the information contained was sufficient to conclude that a welder was qualified to perform certain welding procedures.

The 90 day qualified welder's logs for the period from 1972 through 1978 were examined. The log identifies the welder, weld stamp identifier, the procedures which the welder was qualified to perform, and the welding process (i.e., metal-arc, insert, Gas Tungsten Arc for both carbon and stainless steel, and Gas Metal Arc for carbon steel) qualified to perform. Process use in the 90 day log was, and still is, determined from a review of weld filler metal withdrawal sheets.

The inspector discussed the Pullman method of tracking welder qualifications with the Code Authorized Inspector who was onsite during the early construction years. The former Authorized Inspector stated that he reviewed the Pullman methodology for documenting welder

qualifications and was satisfied that the Pullman method had been acceptably implemented.

The inspector observed that the 90 day qualified welders log form had been frequently revised to provide more information; including qualification coupon wall thickness, and specific (versus general) identification of procedure and process as the number of welding procedure specifications in use expanded. In the early days of construction the number of specific welding procedures was small with these procedures being refined and narrowed in applicability as construction progressed and experience dictated.

The inspector finds that the 90 day qualified welder's log was sufficiently detailed to determine whether a welder was qualified to perform certain procedures and complied with applicable code requirements. Weldment thickness a welder was qualified to perform was added to the 90 day log as a result of an NRC concern during the later phases of construction, in order to clarify welder's qualification to make welds on limited or unlimited thickness sections. This was not a critical addition since other means existed to establish each welder's thickness qualification (ie: the original qualification record).

No items of noncompliance or deviations were identified.

20. Criterion IX, NSC Audit Finding 10d:

"No procedure states what the Field Quality Assurance Inspector uses as the primary means to determine welder qualification, the Ninety-Day Welders' Log, the Weekly Qualified Welders List, or the Welder's Qualification Card."

NRC Finding:

The inspector's approach to resolving this issue was to evaluate the validity of the NSC finding and Pullman response.

The ASME QA Manual, procedure KFP-15 (Welding Qualifications, dated August 22, 1972) generally describes the responsibility and methodology used by Pullman in assuring that welders are tested, qualified and issued a stamp. ESD-216 (Welding Performance Qualification) is the implementing procedure for the welder qualification process. Neither procedure describes precisely what the assigned Quality Assurance Inspector uses to determine whether a welder has used a specific process and is thus qualified; however, discussions with the former Authorized Inspector and Pullman personnel who have been onsite since the early 1970, indicate that weld filler metal withdrawal sheets had always been used to determine whether a particular welder had used the specific process during the previous 90 days or whether he had used another process during the extended 6 month period, specified by the ASME Code, immediately prior to the point in time under consideration.

The inspector finds that no Pullman procedure identifies what the field Quality Assurance inspector uses as a primary means to determine welder qualification, however, the practice utilized by Pullman was generally

well known by both personnel and management assigned primary responsibility for tracking welder qualification. Furthermore, the inspector considers that the method historically used by Pullman (i.e., weld filler metal withdrawal sheets and welder qualification records) was sufficient and adequate to document and verify welder qualification, as required by the ASME B&PV Code, Section IX.

No items of noncompliance or deviations were identified.

21. Criterion IX, NSC Audit Finding 10e:

"No procedure specifies who is responsible for the Ninety-Day Welders' Log, the Weekly Qualified Welder's List, or the Welder's Qualification Card; how the information is obtained; how the logs are used; to whom they are distributed; etc."

NRC Finding:

The inspector's approach to resolving this issue was to assess the validity of the NSC finding and Pullman response, examine the applicable procedural requirements and practices employed and assess the adequacy of the findings for compliance with code requirements.

As described in finding 10.d, above, the inspector examined (1) procedures KFP-15 and ESD-216, and (2) the 90 day qualified welder's logs from 1972 through 1978. The inspector found that the 90 day log was continuously maintained, except for the strike during June-November, 1974. All welders who returned following the strike were requalified by performance of test welds to reestablish a basis for the 90 day log. Both procedures (KFP-15 and ESD-216) imply that the assigned QA inspector is to keep and maintain the 90 day qualified welder's log, the weekly qualified welder's list, and the welder's qualification records. This was apparently the understanding of both the Quality Assurance inspectors and Quality Assurance management and appeared to be consistently implemented. That the procedures do not specifically assign such responsibility for the maintenance of the above documents is of minimal significance. The inspector finds that the Pullman practice and procedures for documenting and maintaining welder qualification status was and is adequate.

No items of noncompliance or deviations were identified.

22. Criterion IX, NSC Audit Finding 10f:

"Procedure KFPS-13 differs from KFP-15 in that it does not permit a six-month extension of welder qualifications if the welder has been actively welding on some other welding process. Procedure KFPS-13 requires the welder to use the specific welding process within a three-month period or be requalified. There is no evidence of adherence to this requirement for pipe support welding."

NRC Finding:

The inspector's approach to resolving this issue was to examine the NSC referenced procedures, assess the validity of the NSC finding and Pullman response, and evaluate the findings for compliance with the ASME Code.

The 1971 edition of the ASME Boiler and Pressure Vessel Code, Section IX provided, in paragraph Q-26, that "Renewal of qualification of a performance specification is required...when a welder...has not used the specific process...to weld either ferrous or nonferrous materials for a period of three months or more...." This paragraph was revised in the Winter 1971 Addenda to read "Renewal of qualification of a performance specification is required...when a welder...has not used the specific process...to weld either ferrous or nonferrous material for a period of three months or more except when employed on some other welding process the period may be extended to six months...." The inspector found that Pullman had not revised procedure KFPS-13 to reflect the revised requirements of the Winter 1971 Addenda and that, up to November 30, 1977, KFPS-13 reflected the original, more conservative, requirement of the 1971 Edition, Section IX, paragraph Q-26. The inspector also found that Pullman's welder qualification program implemented the appropriate Code requirements regarding renewal of qualification in compliance with the code preamble requiring that "Any requalifications or new qualifications shall be made in accordance with the test requirements of the current edition." Thus, the inspector finds that Pullman complied with the revised welder requalification provisions of the ASME B&PV Code, after the revision, although Pullman was slow in revising KFPS-13 to reflect the revised code requirements.

The inspector reviewed procedure KFPS-13 (Pipe Support Field Procedure - Welding Qualifications - dated December 3, 1973) and notes that paragraph 13.2.3 was revised on November 30, 1977 to reflect the applicable provision of the ASME Code, Section IX regarding renewal of qualification.

The ASME Code prescribes that the most current edition of Section IX be implemented at all times. Discussion with the Pullman Quality Assurance Manager, the Welding Qualification Quality Assurance Inspector, and the Authorized Inspector during the early construction phase, indicated that the current revision of Section IX was consistently implemented and that the apparent omission of the time extension provision of the Code in KFPS-13 was an omission of the relaxed requirements provided in Section IX. Examination of the 90 day Welder Qualification Logs for the years of 1972 through 1979 indicate that adequate welder qualification documentation was maintained. Further, discussions with the above individuals indicates that verification of a welders use of another process, as provided by Section IX, was accomplished by review of the weld filler metal withdrawal sheets which issued weld filler metal to the welder. These sheets document the procedure to be employed by the welder in performance of welding with the filler metal issued. The ASME Quality Assurance manual for code piping (KFP procedures) provided for use of the referenced ASME Section IX option; however, the Pipe Support Quality Assurance manual (KFPS procedures) were subordinate to the ASME Quality Assurance manual and, therefore, welder qualifications were accomplished using the option provided by the ASME Quality Assurance manual and

Section IX. The inspector finds that the Pullman practice for welder qualification tracking was consistent with the ASME B&PV Code.

No items of noncompliance or deviations were identified.

23. Criterion IX, NSC Audit Finding 10h:

"Procedure ESD-219 requires random sampling of in-process welding, with the sampling to be noted on the Field Process Sheets. In examining Field Process Sheets, it is obvious that the sampling by the area inspectors was not performed."

NRC Finding:

The inspector's approach to resolving this issue, was to assess the validity of the NSC finding and Pullman response and evaluate the NRC findings for safety significance and/or compliance with the Pullman program.

ESD-219 required that welder audits were to be performed on each welder every six weeks and recorded on the welder audit sheet. The procedure ESD-219 did not require that welder audits be recorded on the Field Process Sheets. The audits are a Pullman program requirement in excess of the ASME Code requirements and were performed on a sampling basis and recorded on the welder audit sheets. The welder audit sheet format was upgraded on 12/10/73, 2/4/74, 12/6/74, 6/27/74 and 6/17/76 as experience in the use of the audit sheets identified an upgrading need. The inspector examined welder audit sheets and observed that activities monitored were recorded on these welder audit sheets. The inspector considers that the performance of welder audits of each welder every six weeks was an appropriate method for recording in process welding observations. The fact that the procedure did not require that such observations be recorded on the process sheet is viewed as a finding of no safety significance since this activity is over and above the ASME Code requirements.

The inspector examined the revision/change records of procedure ESD-219 (Weld Procedure Monitoring) and observed that paragraph 4.4 was revised on December 30, 1977, apparently in response to the NSC audit finding, to prescribe that sampling checks of in process welding may be noted on the process sheet or inspectors daily work sheet.

No items of noncompliance or deviations were identified.

24. Criterion IX, NSC Audit Finding 10i:

"Procedure ESD-219 requires periodic auditing by the Welding Auditor. These audits were not performed until November 5, 1973; and Pullman Power Products was not in compliance with this procedure for approximately 23 months."

NRC Finding:

The inspector's approach to resolving this issue was to assess the validity of the NSC finding and Pullman response, and evaluate the NRC findings for conformance with the specified Pullman program.

The inspector examined the records of change/revision to ESD-219. The records show that the procedure was written in draft form on February 14, 1973. The November 1973 revision apparently was issued and implemented beginning in November 1973. Examination of the 1973, 1974 and 1975 welder audit sheets indicate that the required welder audits were performed beginning November 1, 1973. Discrepant findings appear to have been adequately dealt with and resolved.

The ASME Code does not contain any requirements for performance of welding audits. The Pullman program for conducting welder audits appears to be in excess of ASME Code or AWS D1.1 requirements and the NRC finds no irregularities in the Pullman implementation of this welder audit program.

The inspector concurs with the NSC finding that these audits were not performed until early November 1973, and concurs with the Pullman response that ESD-219 was not written until February, 1973. The procedure implementation appears to have begun in November 1973.

Based on the above, the inspector was not able to corroborate the NSC statement that Pullman was in noncompliance with the procedure for about 23 months.

The inspector concludes that Pullman did implement a program of periodic welder audits in 1973 shortly after procedure ESD-219 was issued. Pullman apparently exceeded the requirements of the ASME Code and AWS D1.1 in the area of welder auditing and had implemented a program consistent with industry practice of the time in the area of welder auditing.

No items of noncompliance or deviations were identified.

25. Criterion IX, NSC Audit Finding 10j:

Procedure ESD-219 requires monitoring stainless steel welds for ferrite control. However, the Severin Gauges were not on site until the beginning of 1973; and Pullman Power Products was not in compliance with this procedure for approximately 12 months.

NRC Finding:

The inspector's approach to resolving this issue was to examine the Pullman response to the NSC finding, establish the degree of response validity and have Parameter, Inc., an NRC consultant, independently examine a sample of stainless steel welds in Unit 1 for delta-ferrite and establish the degree of conformance with regulatory requirements.

Based on discussions with PG&E personnel it appears that stainless steel welding on site began in early 1973. Indications are that the early stainless steel on-site welding was performed on radioactive waste

systems, a non-safety related activity. Prior to this time stainless steel welding was performed on prefabricated pipe spools at the Kellogg-Pullman shop in Paramount, California. Procedure ESD-219 was issued for implementation in November 1973, shortly after the beginning of site stainless steel welding. The first Severin gauge was received on-site about December 20, 1972 and the second was received about January 30, 1973. Thus, the inspector was not able to corroborate that Pullman was in noncompliance with this procedure requirement for 12 months.

As an additional check the inspector chose a random sample of 25 stainless steel welds in Unit 1 and had these welds examined for delta-ferrite by Parameter, Inc. personnel. The results of this examination are listed in Attachment 1 of this report and indicate that all welds examined complied with delta-ferrite acceptance criteria.

No items of noncompliance or deviations were identified.

26. Criterion IX, NSC Audit Finding No. 10k:

"Hangers are not welded in accordance with Pacific Gas and Electric Company requirement. Hangers 2023-IV and 2039-2V are two examples of a number of hangers observed that are welded to the structural steel on the wrong side of the bracket."

NRC Finding:

The inspector examined Hanger No. 2039-2V, the related hanger drawing, and determined that the hanger is Class II/E hanger which received no quality control inspection hence no field weld process sheets were generated or available for review nor were they required. Class II/E components are not safety related and, hence, not included in the quality assurance/control program. NRC examination of the hanger drawing established that the drawing called out a 1/4" fillet weld on the front and back of the beam attachment. The beam attachment is the only component specified on the drawing as requiring welding. The inspector found the beam attachment to be welded as specified on the drawing. NRC examination of Hanger No. 2023-1V (a Class I hanger) and the related hanger drawing established that the beam attachment was welded as specified on the hanger drawing. Both of these hangers are located in Unit No. 2.

The inspector concludes that the Pullman response to the NSC finding is accurate and that the NSC finding was in error.

During the field examination of the above noted hangers the inspector selected eight additional hangers from the same general area with similar configurations. The inspector noted that all hangers chosen were similar to Hanger Nos. 2039-2V and 2023-1V; that is, a welded beam attachment supporting a spring hanger. All of these hangers are located at approximately the 130' elevation in the general area where the main steam lines exit Containment No. 2. The following hangers and their related hanger drawings were examined and found to conform to the specified drawing requirements.

<u>Ranger No.</u>	<u>Class Designation</u>
2040-1V	Class II/E
2023-7V	Class II/E
2023-6V	Class II/E
2021-4V	Class I
2023-5V	Class II/E
2021-3V	Class I
2037-1V	Class I
2021-1V	Class II/E

No items of noncompliance or deviations were identified.

27. Criterion IX, NSC Audit Finding 101:

"The interface of welding to other suppliers' parts and components is not clear. Welding is done to join Westinghouse and Paramount parts and components. The necessity for addressing impact property requirements for those weldments is not clear; in addition, the requirements for addressing impact property requirements for Pullman Power Products field welds are not clear. If impact properties are necessary, the acceptability of each weld that has been repaired and subjected to more than one stress relief is indeterminate because of the time at temperature limitations within the qualified weld procedure."

NRC Finding:

The NRC approach to resolving this issue was to examine the requirements of the Code in the area of impact testing and evaluate the NSC finding and Pullman response in this area.

The 1971 addenda to ASA B31.7 states, in paragraph 1-723.2.3, that "When the design specification requires impact testing of ferritic steel materials, the tests and acceptance standards shall be in accordance with the requirements of Appendix I." The 1970 edition of B31.7, same paragraph, requires evaluation of toughness properties if service is expected to be less than 30°F.

PG&E specification number 8711, imposed on Pullman, doesn't require impact testing of qualification welds for procedure qualification; thus, impact testing of procedure qualification weldments was not performed. The inspector further observes that impact testing is not unilaterally required for such weldments by the B31.7 Code. Specification 8711, Change 12, requires compliance to the 1970 Addenda of ASA B31.7.

The inspector finds that Pullman procedures for impact testing of qualification weldments and specification 8711 are consistent with B31.7 Code requirements.

No items of noncompliance or deviations were identified.

28. Criterion IX, NSC Audit Finding 10m:

"Some welders do not receive sufficient training. Welders, fabricating the pipe rupture restraints within the containment, are welding heavy plate. While these welders are qualified by virtue of welding heavy wall pipe, the techniques are different. The welders who were already qualified to heavy wall pipe were not given additional training on plate."

NRC Finding:

The inspector's approach to resolving this issue was to examine the code requirements in this area and evaluate the validity of the NSC and Pullman response.

The 1974 Edition of the ASME B&PV Code, Section IX, paragraph QW 303.5 states "...qualification on pipe shall qualify for plate, but not vice-versa except that qualification on plate shall qualify for pipe over 24 inches in diameter." Therefore, it appears that the Code recognizes pipe as more difficult to weld than plate. The Code does not require additional training on plate for welders originally qualified on pipe. These Code requirements are also reflected in the current edition of Section IX, table QW-461.9.

Qualification on heavy wall pipe (wall thickness greater than about 0.75") requires additional qualification by performance of welds on thicker members; so also does qualification to weld heavy plate.

The inspector found that Pullman welder qualification procedures comply with Code Section IX requirements. The NSC audit finding appears to apply an interpretation which is not supported by Code requirements.

No items of noncompliance or deviations were identified.

29. Criterion IX, NSC Audit Finding 10n:

"There is no procedure for preheating weld joints."

NRC Finding:

The inspector evaluated the validity of the NSC finding and Pullman response and evaluated the Pullman preheat program for conformance with specified requirements.

Specification 8711 prescribes that preheating may be performed using either the electrical resistance heating method or localized torch method in conjunction with appropriate tempil sticks.

The inspector examined the following welding procedure code numbers and welding procedure specifications and found that each contained an adequate definition of preheat, postweld heat treatment and interpass temperature requirements: Code Nos. 4/5, 7/8, 15/16, 79/80, 86/87, 88/89, 92/93, 105/106, 129, 134, 149, 150, 200, 201, 202, 203 and 208; Welding Procedure Specification Nos. 88-I-4/5-K-12, 90-I-8/4-K-12, 100-III-8/45-OB-1, 408-III-CARP20-OB-1, 409-III-34-OB-1, and 507-I-42-OB-1.

ESD-218 (Postweld Heat and Preheat Treatment Procedure) was revised and improved December 30, 1977 to prescribe preheat requirements and indicate preheat applicability, in addition to the information prescribed on the Welding Procedure Specifications.

ESD-264 (Process Planning and Control-Field Process Sheet) was reviewed by the inspector. The Field Process Sheets were revised in early 1978 to indicate preheat requirements. Prior to early 1978, compliance with the preheat requirement was dependent on the welder's knowledge of and compliance with the welding procedure specification and was indicated on the process sheet by the craftsman and QC signature in the welding block, which specified the welding procedure to be used. The philosophy used was that when each signed a block, the signature meant that all applicable procedure requirements had been accomplished.

The inspector concludes that, while no separate and specific procedure for preheating of weld joints existed prior to December 30, 1977, preheating requirements were adequately prescribed by the welding procedure specifications and documented by signature on the welding block of the process sheet, which specified the applicable welding procedure.

No items of noncompliance or deviations were identified.

30. Criterion IX, NSC Audit Finding 10c:

"The initial results of the welding auditing (from November 5, 1973 to February, 1974) indicate that the following problems existed:

- (1) The welders did not understand shielding and purging.
- (2) Tempil sticks were not used.
- (3) Amperages were not within procedure limits (mainly root welds and tack welds).
- (4) Weld procedures were not available, and many welders did not know where to obtain them.
- (5) The oxygen analyzer was not available or not operative. Also, the time vs. flow rate alternate technique was not used.
- (6) Oven rod temperature control was not monitored by the welders.
- (7) Many welders did not understand their duties and responsibilities.

Based on a review of the Pullman Power Products welding audit reports and the frequency of the above-noted problem areas, there is no confidence that welding done prior to early 1974 was performed in accordance with welding specification requirements."

NRC Finding:

The inspector's approach was to examine the records of welder audits conducted during the above time period and assess the validity of the NSC

finding and Pullman response. The welder audit program is an example of extra effort, not required by the Code, to provide assurance of a quality welding program implementation and effect prompt corrective action for identified discrepancies.

The inspector critically examined the records of welder audits performed between November 1, 1973 and April 1, 1974. A total of 183 welder audit records were examined. Each of the above NSC audit statements are addressed below.

The NSC audit statement was that "The welders did not understand shielding and purging." The inspector observed that 23 of the reviewed audits identified problems regarding compliance with the 20 psi and 20 cfm requirements for gas pressure and flow. Weld quality problems could occur if the gas flow rates are excessively high or low. The vast majority of safety-related stainless steel welds were radiographically examined and the film was reviewed and accepted by a qualified interpreter for code compliance. The audit findings did not indicate that welders did not understand shielding and purging, rather the findings point out the difficulties which can be experienced when more than one purge/shield line is connected to a single gas source and regulator. In all cases, corrective action was taken to return the pressure and flow rate to the required values.

The NSC audit identified that tempil sticks were not used. The purpose of Tempil sticks is to verify proper preheat and assure that the interpass temperature was low enough to begin welding the next weld pass. Of the 183 audits examined, fourteen of the audits identified that the welders did not have tempil sticks in their possession. In each case action was taken to provide the welder with Tempil sticks. Several of the welders apparently told the auditors that prior to resuming welding they wait until they can touch the weld; thus providing assurance that interpass temperature requirements are not exceeded. This is an acceptable practice.

The NSC audit identified that amperages were not within procedure limits. Of the 183 audits reviewed, four instances were identified wherein amperages were not within welding procedure specification limits. In each case the welder corrected his amperage setting. A lower than acceptable amperage would result in lack of adequate root penetration or lack of acceptable heat affected zone fusion, which would be seen in a radiograph and may be detectable by surface examination methods, such as the liquid penetrant or magnetic particle techniques. High amperage would result in excessive spatter, a condition which qualified welders would not weld under because welding is quite difficult under high amperage conditions. Further, amperage is not an essential variable specified by the ASME Code, Section IX and is only a supplementary essential variable for material with notch toughness requirements.

The NSC audit identified that weld procedures were not available and many welders did not know where to obtain them. Welders are required to have a copy of the welding procedure at the job location. Of the 183 audits examined, five audits identified cases where the welder did not have a welding procedure. Three of the five cases identified that the welder

did not know where to obtain them. In each case the corrective action was to have the welder obtain a copy of the welding procedure along with an explanation of the location from where they could be obtained. The inspector concludes that the vast majority of welders used welding procedures and knew where to obtain them and that this NSC finding has only minor technical significance.

The NSC audit indicates that the oxygen analyzer was not available or operational. Although this was not a required checkpoint, only one finding of the 183 audits reviewed indicated a problem with the oxygen analyzer. This problem was corrected. Thus, the inspector considers that the welder audit records do not support the NSC conclusion.

The NSC audit indicates that oven rod temperature control was not monitored by the welders. Of the 183 welder audit records reviewed, fourteen of these audits identified instances where the welders rod oven temperatures were lower than the 225°F required by Pullman procedure, and did not meet the 225°F requirement. Most instances observed by the auditors identified deviations up to 35°F, however, two audits observed temperatures as low as 150°F. In all cases the welder was required to return the defective oven to the rod room and obtain another. The audits further indicate that a large number of the apparently discrepant findings were due to the thermometer being out of calibration and reading low, thus indicating that the actual temperature of the oven was higher than that indicated on the thermometers. The primary reason that rod ovens are maintained hot is to preclude moisture entry into the welding electrode coating and, thus, minimize the potential for inducing underbead cracking. Recent industry findings indicate that when the temperature of the weld rod is maintained significantly in excess of the atmospheric temperature, thus above the dew point, the entry of moisture into the coating is effectively precluded. The NSC finding that rod oven temperature was not monitored by the welders is not supported by the inspector's review of the audits, although isolated instances of ovens being below temperature were identified by the audits. In addition, this should not be a technical problem because rod is removed from a hermetically sealed shipping container and immediately put into an oven with temperatures of sufficient value to preclude moisture intrusion.

The NSC audit indicated that many welders did not understand their duties and responsibilities. The NRC considers that the reason these welder audits were done was to identify such instances and provide corrective action. Of the 183 audits reviewed, five welder audits indicated that the welder in question did not understand their duties and responsibilities. In each case the welder was reinstructed by the Quality Assurance inspector auditing the welding activities, including notification and reinstruction of the welder's foreman, as applicable.

It is important to recognize that none of these were NSC findings, but were instead findings of the Pullman welder audit program, which was designed to detect program weaknesses and provide prompt corrective action during the early phases of site welding activity.

In summary, the inspector notes that isolated instances of problem areas were identified and corrected by the Pullman welding inspectors.

However, the inspector does not consider the aggregate of problem areas to be so pervasive such that support can be given the NSC conclusion that "There is no confidence that welding done prior to early 1974 was performed in accordance with welding specification requirements."

No items of noncompliance or deviations were identified.

31. Criterion X, NSC Audit Finding Nos. 5 and 6:

Finding 5: "For all inspection processes, there is no mechanism to provide the inspector the particular characteristic to be inspected; the particular acceptance criteria; the particular methods and equipment to be used; and provisions for recording results, other than acceptance for the particular inspection being made. The exceptions to this statement are radiography, where the reader sheet allows the recording of results, and those procedures that specify the use of particular equipment (such as some of the ultrasonic procedures)."

Finding 6: "The inspection process is generally not auditable. The practice of exhibiting an acceptance signature only does not permit auditing to determine if the individual characteristics were examined, the correct criteria were used for acceptance, and the correct specific measuring devices were used."

NRC Finding:

To resolve this issue the inspector examined the Pullman program procedures in this area, the validity of the NSC findings and Pullman responses and examined field process sheets to verify compliance with the prescribed Pullman program and 10 CFR 50, Appendix B, Criterion X.

The inspector examined ESD-264 (Process Planning and Control - Field Process Sheet) and observed that the field process sheets do identify, and are required to identify, the procedures necessary to perform a particular inspection. The inspector's signature is meant to verify that the required inspections were performed in accordance with the referenced procedure.

Examination of some of the procedures referenced on the process sheet indicates that each contains numerous inspection requirements and acceptance criteria. These inspection requirements and criteria are so numerous that inclusion of each on the field process sheet would excessively complicate the process sheet. The inspector considers that inclusion of each inspection requirement and acceptance criteria on the process sheet would decrease the effectiveness, and work process continuity, afforded by the field process sheet.

Examination of about 100 completed field process sheets indicates that the required procedures were consistently identified on the process sheet, thus identifying the group of inspections and examinations to be performed by field inspectors.

The NSC finding that the inspection process is generally not auditable is true if one defined auditability as the ability to verify, after the

inspection, that each inspection requirement and acceptance criteria was considered and so documented by the inspector's signature by each requirement and criteria. However, if one accepts the philosophy that the inspector's signature verifies the conduct of inspection/examination in accordance with the identified procedure, then the inspection process is auditable. The inspector considers the Pullman practice acceptable, in accordance with standard industry practice, and in compliance with ASME code requirements, which do not provide specific rules and guidance in this area.

No items of noncompliance or deviations were identified.

32. Criterion X, NSC Audit Finding No. 7:

"A large number of welds in Unit 2, System 14 (FW-110, 111, and 112 in isometric package 2-14-31 are examples) were accepted for visual examination and thereafter accepted based on surface NDE inspection (MT or PT). Visual examination of those welds indicates that the surface is not suitable for the performance of surface NDE inspection."

NRC Finding:

The NRC retained the services of a certified level II Liquid Penetrant Examiner through Parameter, Incorporated.

The certified examiner was directed to evaluate the surface condition of field welds 110, 111 and 112 on isometric 2-14-31 (Component Cooling Water System-Return Header B) and perform, and interpret the results of, liquid penetrant tests on those welds. The NRC consultant determined that the surface condition of those welds was acceptable for surface NDE inspection. All welds examined, except for an indication near FW-111, were found to be acceptable. The examiner observed an indication approximately 1½ inches long in the base metal of the pipe about 3/8" from Field Weld-111. The examiner's findings are detailed in Attachment 1 to this report.

Pullman wrote Discrepancy Report No. 5567 to remove the indication by flapper wheel grinding and conduct further liquid penetrant examinations. The inspector observed these activities. The indication was determined to be a shallow surface lap in the metal caused by the rolling operation during pipe fabrication. The indication was removed by grinding. Subsequent liquid penetrant examination verified that the indication was a surface type and not a rejectable indication, even prior to removal of the indication. The grinding operation did not violate minimum wall thickness criteria.

The inspector concludes that the NSC finding (that the surface of the welds was not acceptable for surface NDE inspection) was in error.

No items of noncompliance or deviations were identified.

33. Criterion X NSC Audit Finding No. 9:

"FW-83 (isometric package 1-10-9) was repaired in accordance with a valid Process Sheet. The radiograph of FW-83 does not exhibit the required R1 symbol, but R1 was inked onto the radiograph. There is a surface defect that is questionable for acceptance to visual standards."

NRC Finding:

The NRC retained the services of a qualified radiograph interpreter who examined 102 radiographs of various welds in several Unit 1 systems. The results of this examination are contained in the attached Parameter, Inc. report (Attachment 1). This examination included the FW-83 radiograph following repair.

The Parameter consultant examined both the original radiograph, and the radiograph following repair, of FW-83 and concluded that both radiographs were of the same weld. Further, the Parameter Consultant informed the inspector that while inking of numbers onto a film is not desirable, it is sometimes done because the lead labels may have fallen off or were positioned outside the film area. This isolated instance would not make a radiograph unusable. The code prohibits marking of radiographs in the area to be examined. Thus, the inspector finds that the fact that R1 was inked onto the repair radiograph, outside of the area to be examined, has no safety significance and is not a violation of code or regulatory requirements.

The inspector examined the surface of FW-83 in the field and found that the weld does not contain a surface defect. The inspector did observe a gradually sloped grinding line (about 1/8" wide, 2" long and less than 1/64" deep) which may be what the NSC referred to as a "defect". The depth obviously did not violate minimum wall thickness criteria. Discussions with the Parameter, Inc. radiograph interpreter indicated that the observed densities did not vary significantly on the film, thus indicating that the grinding line was not of sufficient depth to significantly decrease wall thickness in the weld area.

No items of noncompliance or deviations were identified.

34. Criterion X, NSC Audit Finding 10a:

"Records of welder qualification prior to 1972 are not available."

NRC Finding:

The inspector's approach to resolving this issue was to determine if welder qualification documentation was available prior to 1972 and to assess the validity of the Pullman response to the NSC finding.

The inspector examined welder qualification documentation, including weld coupon test results; form titled "Manufacturer's Record of Welder Performance Qualification Tests on Groove Welds." The inspector found that 20 welders (welder stamp letters A, B, C, D, E, F, G, H, I, J, K, L, N, O, Q, R, S, T, U, and V) were qualified during the period beginning August 4, 1971 and ending December 23, 1971. There are no indications

that safety related welding was performed prior to August 4, 1971. The inspector did not corroborate the NSC finding.

The 90 day qualified welders log was started at the beginning of 1972 and was continued through the present time, except for the labor dispute between June and November, 1974.

The inspector concludes that records of welder qualification prior to 1972 were available and were in acceptable order.

No items of noncompliance or deviations were identified.

35. Criterion XI, NSC Audit Finding No. 5:

"The B31.1 and B31.7 Codes required that all piping is leak-tested, where practicable. Pullman Power Products is only leak-testing Class A and B piping and that Class C piping specified by Pacific Gas & Electric Company. Classes D, E special, and E piping is not being leak-tested. A letter from Pacific Gas & Electric Company (dated January 13, 1976) does exist, which states that Pacific Gas & Electric Company will assume responsibility for the leak-testing of Class C piping. There is concern that Pullman Power Products is not discharging its contractual obligations (that specify compliance to B31.1 and B31.7) by not performing piping leak-testing to Code requirements for Classes C, D, E special, and E piping systems and, as a result, may be legally vulnerable."

NRC Finding:

The inspector examined the referenced licensee letter dated January 13, 1976 and a contractor letter dated January 8, 1976 relieving Pullman Power Products of responsibility for code compliance on Class C components. The inspector also found that the licensee did not have a piping class designated as Class D. Additionally, the inspector found that Class E and Class E special are (were) being hydrotested, though (in some cases) at less than code requirements. ANSI B31.7 allows, in paragraph 737.4, for components to be tested at less than code requirements, because of limiting components within the piping system. The inspector has no further questions on this subject.

The inspector concluded that Pullman appeared to be properly discharging their contractual requirements in this area.

No items of noncompliance or deviations were identified.

36. Criterion XII, NSC Audit Finding No. 3d:

"Severin Gauges 2947 and 2971 were received on the site in January, 1973. Initial calibration was August 29, 1973; and the next calibration was November 19, 1974 for gauge 2947 and January 23, 1975 for gauge 2971. Procedure ESD-213 requires annual calibration."

NRC Finding:

Field Procedure ESD-213, "Gauge and Instrument Control/Calibration", does require an annual calibration check of the two onsite severin gauges (2947 and 2971). There are equipment calibration record cards which document calibration status and provide a historical record of the frequency of calibration checks performed since August 1973. These records verify the NSC finding and indicate a subsequent history of consistently exceeding the required frequency of calibration checks.

Associated test equipment control records establish, since 1978 (the custody log was not maintained prior to this time), that neither gauge was ever used during any out-of-calibration period for material testing. In each case, the instrument was logged out for calibration check and unavailable for testing during the lapsed period. Documentation since 1973, which verify calibration checks performed on-site by PPP personnel or by Severin Engineering Company, provide no evidence that either gauge was discovered to be out-of-tolerance. Test equipment control implementation appears to adequately remove from service any instrument exceeding the required re-calibration date. There is no evidence to indicate that Severin gauges 2947 and 2971 were used in ferrite examinations when these gauges were outside of their calibration limits.

In conclusion, the NSC audit finding was substantiated but determined to have no safety significance. Evidence indicates test equipment control was adequately implemented since August of 1973 and was under control.

No items of noncompliance or deviations were identified.

37. Criterion XII, NSC Audit Finding No. 3f:

"There is no documentation available to verify calibration of "Tong Test" amp meters."

NRC Finding:

Tong test amp meters were contracted off-site for the required periodic calibration checks. An equipment calibration record card exists for each instrument, documenting the frequency of calibration checks performed since the particular tester was acquired. Calibration certificates are on file from the applicable lab verifying completed calibration for each tong tester. These records appear to provide adequate documentation that "Tong Test" amp meters were being calibrated.

No items of noncompliance or deviations were identified.

38. Criterion XII, NSC Audit Finding No. 3g:

"Tong Test amp meter IT2527403 was out of calibration for the period December 12, 1976 to January 31, 1977. No DR has been written against that instrument."

NRC Finding:

NRC review of the equipment calibration record cards for "Tong Test" amp meter TT2527403 (200 amp Crompton Parkinson) supports the NSC finding concerning the period out-of-calibration. Records also indicate several subsequent time periods where the calibration check frequency had exceeded the ESD-213 annual requirement for this Tong Tester and two others. It would appear the fundamental cause for these apparent lapses in calibration control were due to the transit time necessary to ship instruments back and forth from the contracted calibrating facility. Equipment control records clearly establish that, since 1978 (prior records were not kept), none of the other Tong testers examined were ever used during an out-of-calibration period. Unfortunately, for meter TT2527403 equipment control records were not retained when the instrument was broken and removed from service April 15, 1983 (although calibration records are still on file).

Based upon PPP past history of adequate test equipment control and the non-essential nature of the welding current parameter (as identified by ASME code) the inspector considers this item to have no safety significance. This activity was under control.

No items of noncompliance or deviations were identified.

39. Criterion XIII, NSC Audit Finding 5:

"Handling procedures do not exist; and the only handling instructions are contained in ESD-222 and a number of other procedures, which contain a caution against the use of carbon steel in handling stainless steel. Procedure ESD-259 has excellent detail as to the handling of Grinnell Snubbers during installation. However, Procedure ESD-259 was issued January 27, 1977; and there is not assurance that materials, parts, and components were properly handled during the period prior to January 27, 1977, when most of the installation activities were occurring."

NRC Finding:

The inspector examined those handling activities which were performed by both the licensee and Pullman to establish the validity of the NSC finding and Pullman response.

The inspector discussed, with Pullman and licensee personnel who were working at the site since the early 1970s, the practices employed regarding receiving, storage and handling of safety related equipment, including which organizations performed such activities and under what circumstances these activities were performed.

The inspector determined that PG&E received, stored, handled, surveilled, and maintained all large class 1 components (including pipe, pipe spools, valves, snubbers, motors, etc). Contractors, such as Pullman, would requisition components when the contractor was ready and required to install the particular component in the plant. The primary reason that the licensee performed the above activities was because warehouse and laydown space was limited at the site. To obtain sufficient area for warehousing and laydown, the licensee used the larger areas available at Pismo Beach, California. Items shipped to PG&E for use at Diablo Canyon

were received and stored in the Pismo Beach areas until contractors were ready to install those particular items. The material was then loaded onto trucks, by the licensee, and off loaded at the site, by the contractor under licensee surveillance, and moved into the plant. The contractor, prior to accepting custody of the component or equipment, would perform receipt inspection activities, after which the component was moved into the plant. From the time the contractor accepted the material until such time as the system/component was turned over to the licensee, the contractor was responsible to perform necessary surveillance and maintenance activities, as appropriate.

The inspector examined the following procedures detailing the licensee's program for handling of equipment. The requirement for such a program was contained in the licensee's Quality Assurance Manual, procedure PRC-1 (Receiving Inspection, Storage and Handling). Procedures implementing the required program, for mechanical equipment, were reviewed.

MFI-0-1 (dated September 17, 1971): Mechanical Department Procedure - Receiving, Inspection, Handling and Storage of Equipment/Materials.

- * The inspector found that this procedure accomplished the following:
 - ** assigned responsibility for accomplishment
 - ** provided adequate handling instructions
 - ** provided detailed inspection requirements
 - ** provided adequate storage requirements
 - ** provided adequately for accomplishment of surveillance while in storage
 - ** provided the mechanism for processing and responding to contractor requests for transfer of the equipment to the plant
 - ** provided for keeping equipment history records from receiving through shipping and storage.

MFI-2-2 (Revisions dated 10/75, 5/72 and 8/70): Mechanical Department Procedure - Instructions to Inspectors - Power Plant Piping.

- * The inspector found that the procedure accomplished the following:
 - ** assigned responsibilities for accomplishment
 - ** adequately addressed inspector qualifications
 - ** adequately defined inspector duties
 - ** provided adequate handling instructions
 - ** provided adequate storage surveillance and installation inspection requirements.

The licensee contracted with Bigge Crane and Rigging Company for the conduct of handling activities at the Pismo Beach Yard and transfer of material to the site. The inspector examined the Bigge "Procedure for Receiving, Handling and Storing Nuclear Power Plant Equipment and Material - Pismo Beach Yard." This procedure provided (1) adequate instructions for receiving and unloading, (2) adequate instructions for storage, (3) adequate instructions for preservation, (4) adequate instructions for care and handling of Stainless Steel and Class I items, (5) adequate instructions for load-out and hauling, and (6) adequate

instructions regarding types of handling equipment necessary and inspections necessary for handling gear.

The inspector examined the following documents which provided handling instructions for Pullman personnel.

Specification 8711 (Specification for Erecting Main Systems Piping and Furnishing, Fabricating and Erecting Balance of Power Plant Piping

- ° paragraph 6.12 provides definition of responsibility for receipt inspection, including general receipt inspection criteria, and unloading of carriers.
- ° paragraph 6.13 addresses storing of material including general contractor requirements such as protecting items in storage from damage by requiring "use of dust proof, fireproof and waterproof tarpaulins, adequate spacing and temporary heaters", as necessary.
- ° paragraph 6.23 requires that all material be stored on cribbing when in laydown areas.
- ° paragraph 4.1181 and 82 contain specific requirements for welding electrode receiving, storage and control.
- ° paragraph 3.211 of Section 4 provides for Quality Assurance requirements related to handling, storage, packaging, shipping and preservation.

ASME QA Manual Procedure KFP-7 (Receiving Inspection)

- ° provides that inspections be conducted to verify that off-loaded items are to prevent damage, contamination or deterioration.

ESD-215 (dated September 23, 1971): Visual Inspection

This procedure provided requirements for handling such as (1) flame cutting of stainless steel was not allowed; (2) weld preparation dressing requirements; (3) examination for and removal of mill scale, oil, rust, slag, paint, marking materials and surface oxide and dirt prior to welding; (4) removal of arc strikes and subsequent liquid penetrant retest; (5) pipe alignment criteria; and (6) cleaning.

Quality Assurance Instruction 94 (dated July 29, 1973): Performing Maintenance Surveillance

This procedure contained criteria for capping of pipe ends, actions required when loose nuts/bolts, missing parts or equipment damage was observed. The instruction provides inspection guidance for both hangers, snubbers and piping.

ESD-217 (dated September 23, 1971): Receiving Class 1 Procedure

This procedure requires monthly maintenance surveillance reports for items in storage such as Class 1 pipe, Class 1 Pipe Supports, Class 1

valves, and Class 1 pipe, valves and supports erected and installed. Protection and maintenance requirements were provided by PG&E.

ESD-222 (dated February 23, 1972): Protection, Installation, Maintenance and Surveillance of Control Valves

This procedure specifies appropriate handling requirements and criteria for pneumatic and motor operated valves and attached devices, manual operated valves, and relief valves, from receipt through installation.

Beginning about April, 1977, PG&E installed a snubber test facility on the upper floor of the fuel handling building, between the Unit 1 and Unit 2 areas. All Grinnell hydraulic snubbers were removed, reworked, refurbished and subjected to dynamic stroke, lockup and load tests on the testing machine. Snubbers determined by test to be acceptable were reinstalled. Unacceptable snubbers were either reworked and retested or replaced with an acceptable snubber. This activity was completed in 1978 and, thus, verified the operability of Grinnell hydraulic snubbers installed prior to the issuance of ESD-259. The information gleaned from this testing program was incorporated into ESD-259 revisions in order to minimize the potential for harm or deterioration of the snubbers. Snubbers installed out of doors were also placed inside a rubber boot to prevent deterioration and corrosion of snubber shafts.

Unit 2 hydraulic snubber maintenance is performed every 6 months on each Unit 2 Grinnell snubber and this activity tracked by Pullman.

It is correct, that Pullman did not have a procedure specifically addressing handling instructions. However, viewing in the aggregate all of the Pullman procedures applicable to Pullman equipment handling and considering the limited scope of equipment handling Pullman was required to exercise, the inspector concludes that appropriate and adequate handling requirements were in place. The inspector also finds that the limited addressing of snubber handling requirements prior to the issuance of ESD-259 is of minimal safety significance given the conduct of the 1977-78 testing program and the subsequent issuance and upgrading of ESD-259.

No items of noncompliance or deviations were identified.

40. Criterion XIV, NSC Audit Finding No. 1

"The major mechanism that exhibits the status of the work is the Field Process Sheet. The Field Process Sheet provides for performance status of some important fabrication steps and for inspection status. However, many important fabrication steps are not indicated by the Field Process Sheet: erection steps; cleaning prior to installation of insulation; and some critical welding steps as preheating, checking gas flows, and checking for O₂ content in the backing gas. The Field Process Sheet, as a mechanism to exhibit status, is considered inadequate. The inadequacy of the Field Process Sheet is considered a major weakness in the Pullman Power Products System."

NRC Finding: The NRC findings relative to Field Process Sheets are contained in paragraphs 7 and 31 of this report.

Based upon the discussions contained in these paragraphs the inspector concludes that the use of the field process sheet adequately controlled and specified required work activities. Specific steps for fabrication, erection, welding, etc. are not required to be listed on the Field Process Sheet. Status of these activities can be ascertained by reviewing the actual field procedure. The Field Process sheet sequences, by procedure, the required construction events. It is not a mechanism to maintain status of specific work steps.

No items of noncompliance or deviations were identified.

41. Criterion XVI, NSC Audit Finding No. 2:

"Based on the results of this audit and the problems encountered in the past, it appears that a corrective action system has not been operative."

NRC Finding:

The inspector examined corrective actions taken as a result of items identified by licensee audits, Pullman Management audits and the NRC, and found corrective actions had been taken, as appropriate, when problems were identified. For example each of the following represent corrective actions taken in response to audit findings: the pipe support procedure was extensively rewritten in June 25, 1975; Quality Assurance Instruction No. 98 was created for the inspection of existing concrete expansion anchors; and in March 13, 1979 the pipe support quality assurance manual was superseded by ESD-223 to provide all the elements of installation, inspection, and as-builting of pipe supports in one procedure. Additionally, as a result of NRC identified discrepancies with radiographs (Reference: Inspection Report No. 50-275/77-06 dated May 6, 1977) the licensee committed to requiring that all radiographs would be reviewed by a Level III or a second Level II individual.

During this inspection, an NRC consultant reviewed 102 radiographs, to confirm the corrective action on the radiographs, and to confirm that all the radiographs were reviewed by a Level III or a second Level II radiographer. No discrepancies were identified during this review by the NRC consultant.

The discussion in paragraph 42, below, is particularly germane to this issue.

The inspector concludes that the Pullman corrective action system has been operative.

No items of noncompliance or deviations were identified.

42. Criterion XVIII, NSC Audit Finding No. 3:

"In response to KFP-18, Paragraph 18.2.1, management audits were performed approximately every six months. Check sheets were employed.

Based on the results of this audit and the results of Pacific Gas & Electric Company audits, these management audits appear to have been ineffectual."

NRC Finding:

Corporate management audits, conducted from September 1972 through February 1978, of the Pullman on-site Quality Assurance program were reviewed for content, completeness, and effectiveness. There is a file of ten management audit reports, performed during this time period, indicating that comprehensive inspections were conducted by the Pullman Corporate office on approximately a semi-annual frequency. In accordance with Q.A. program element KFP-18 (dated January 4, 1973) these audit reports specifically identified deficiencies, provided recommendations for corrective action and required on-site resolution by the responsible supervisor. As appropriate, each report followed up on the adequacy of corrective action implemented to correct and improve previously identified deficient conditions in the Quality Assurance program.

As a further significant improvement to their program Pullman revised KFP-18 on December 30, 1977 to require direct written response from the resident construction manager and the field Quality Assurance/Quality Control manager for "Schedule completion of implementation of corrective action and measures taken to preclude re-occurrence." The field Quality Assurance/Quality Control manager is responsible to monitor audit findings for trends.

In conclusion, there is every indication the on-site PPP Quality Assurance organization was responsive to corporate management audits and there is no basis to suggest these audits were ineffectual.

No items of noncompliance or deviations were identified.

43. Criterion XVIII, NSC Audit Finding No. 5:

"In response to KFP-18 and KFPS-16, internal audits were performed every six months. Check sheets were not employed."

NRC Finding:

At the time of the NSC finding, checksheets were not being used by the onsite Quality Assurance organization to perform internal audits. Corporate audits, being performed by Williamsport Headquarters personnel, did use checksheets to coordinate their inspections. This inconsistency was resolved when internal auditing became proceduralized in June 1978, by the evolution of field procedure ESD-263. The scheduling of program elements to be audited and use of checksheets is detailed in ESD-263.

The inspector concludes that, while the NSC finding is factual, the finding is of minimal safety significance, because adequate corporate audits had been performed using checklists and subsequent audits, both internal and corporate, indicate that no fundamental QA program breakdown occurred as a result of the inadequately described internal auditing

program. (The Pullman internal audit program is further discussed in paragraph no. 9 of this report).

No items of noncompliance or deviations were identified.

44. Conclusion

The NSC audit contains a total of 175 documented findings, of which 110 were findings of apparent discrepancies or program weakness by NSC.

The NRC has completed an examination of 50 of the NSC findings identified as apparent weaknesses or discrepancies. The criteria used to select those findings for NRC examination are provided in paragraph 4 of this report. Of the 50 findings examined by the NRC, three of these were examined prior to this inspection and are documented in NRC Inspection Report No. 50-275/83-34.

Although, the NRC has identified a potential violation (paragraph 17) during this inspection, regarding the qualification of Pullman visual welding inspectors, this item is of reduced significance since all but two of the inspectors had adequate backgrounds and experience in the areas of welding or quality control inspection. It does not appear that this problem was chronic or widespread.

It is the staff's opinion that the NSC audit findings do not provide a basis for concluding that the Pullman-Kellogg Quality Assurance Program suffered a major breakdown during the time period prior to the NSC audit. Furthermore, based on this significant sample of the most important NSC findings it is concluded that examination of the remaining items is not warranted.

45. Management Meeting

On November 18, 1983, the inspectors met with licensee representatives denoted in paragraph 1. The inspection scope, observations, and findings were discussed. The licensee acknowledged the potential item of noncompliance identified in paragraph 17.

Parameter, Inc.
CONSULTING ENGINEERS
ELM GROVE, WISCONSIN

Report No. PAR(DCNP)-NDE-2
Page 1 of 3
November 22, 1983

Subject

1. Independent delta-ferrite measurements on 25 selected stainless steel welds to verify compliance with Code and Regulatory Guide 1.31 requirements.
2. Visual and liquid penetrant examination of field welds FW110-111-112 in isometric package 2-14-31.
3. Examination of radiographs of 102 weld joints for compliance with Code, verification of adequacy of reader sheets and evaluation of overall quality of radiographs.

References

1. Outline of nondestructive examination work to be performed at Diablo Canyon, November 14-18, 1983 by NRC contract personnel (Exhibit 1).
2. Contract No. NRC-05-82-249
Task Order No. 56
3. PAR: NRC/IE-82/83

Writer of Report

Kenneth A. Ristau, PARAMETER, Inc., NDT Level III, MT, PT, RT and UT

Contract Personnel Assigned

Daniel J. Hunt, Wisconsin Industrial Testing, Inc.,
Level II, MT, PT, UT

Introduction

The NRC outline of work (Exhibit 1) designates 3 welds to be liquid penetrant tested and visually examined.

The 25 stainless pipe welds to be tested for delta-ferrite measurements were designated by Mr. Dennis Kirsch, NRC Section Chief. For a list of the welds and results of the inspection, see WIT report (Exhibit 3). Also see WIT report for results of visual and penetrant inspection (Exhibit 4).

Mr. Kirsch also indicated the 102 welds of which radiographs were to be viewed (Exhibit 2).

Record of Activities

November 15 and 16 inspections were made by Dan Hunt and films were viewed by Ken Ristau.

In a short meeting with Dennis Kirsch, day end November 16, the results of our findings were conveyed verbally, as follows:

1. The delta-ferrite measurements met the NRC requirements.
2. The LPT of all three welds were approved but FW111 had one LP indication running transverse to the weld in the base material of the pipe. It was approximately 1/2" away from the weld and about 1" long.
3. The radiographs of the welds were viewed and approved as adequately meeting Code. Comments were also made by the writer concerning film quality, detail of reader sheet documentation and the excellent condition of the radiographs, nearly 10 years after x-ray date.

Conclusions

1. Having reviewed the radiographs and reader sheets of all 102 selected piping welds identified in Exhibit 2, the writer found reader sheet documentation detailed and clear. Radiographs were readily available, in good order and of very good quality. Radiographs are approved as meeting the requirements of applicable Codes.
2. All 25 welds selected for delta-ferrite measurements met the requirements of Code and Regulatory Guide 1.31 (See Exhibit 3).
3. Visual and liquid penetrant examination of FW110 and 112 were acceptable. FW111 weld was also acceptable but an liquid penetrant indication was noted in the pipe base material (See WIT Penetrant Report, Exhibit 4).

Parameter, Inc.
CONSULTING ENGINEERS
ELM GROVE, WISCONSIN

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List of Exhibits

1. Outline of Nondestructive Examination Work to be Performed at Diablo Canyon, November 14-18, 1983, by NRC Contract Personnel.
2. Field Welds Chosen for Radiograph and Reader Sheet Review.
3. Delta-Ferrite Measurements.
4. Visual and Liquid Penetrant Examinations.

Prepared by:

Kenneth A. Ristau
Kenneth A. Ristau, Level III

Reviewed by:

Walter J. Foley
Walter J. Foley, Q/A Engineer

Exhibit 1 to
Report No. PAR(DCNP)-NDE-2

November 8, 1983

OUTLINE OF NON-DESTRUCTIVE EXAMINATION WORK TO BE PERFORMED AT
DIABLO CANYON, NOVEMBER 14-18, 1983, BY NRC CONTRACT PERSONNEL

GENERAL INFORMATION:

Location: Diablo Canyon Nuclear Plant, Unit Nos. 1 and 2
San Luis Obispo, California

Licensee: Pacific Gas and Electric Company
Docket No. 50-275 and 50-323

- Purpose:
1. Perform independent delta-ferrite measurements on about 25 selected stainless steel welds to verify compliance with code and Regulatory Guide 1.31 requirements.
 2. Visually examine and perform liquid penetrant examination of field welds FW-110, 111, 112 in isometric package 2-14-31.
 3. Examine about 100 weld radiographs and verify reader sheet, radiograph and evaluation adequacy.

Site Contact: Mr. Marvin Mendonca, NRC Senior Resident Inspector
805-595-2353

RV Contact: Mr. Dennis Kirsca, NRC Section Chief, 415-943-3740

Work Hours: 0730-1630, November 14-18, 1983

REQUIREMENTS:

To be furnished at the Diablo Canyon Site by the licensee:

- Hard hats and safety glasses
- Insulation removal
- Scaffolding erection
- Escorts to locate welds in the plant
- Assistance to assemble documentation (radiographs)
- Electrical power and extension cords for portable test equipment
- Working space for one or two persons to examine radiography records
- Viewer to examine radiographs
- Use of lunchroom and sanitary facilities
- Use of Xerox machine as back-up
- Calibrated severn gauge

To be furnished at the Diablo Canyon Site by the NRC:

- Assistance as required by the Senior Resident Inspector
- Telephones in the NRC trailer
- Xerox machine for copying

To be furnished by the contractor:

Certified level II or III liquid penetrant and qualified radiograph interpreter examiner to conduct visual and liquid penetrant examinations and an examination of about 100 radiographs for adequacy. Two copies of certifications and qualifications of all contractor personnel, and documentation verifying certification and qualification of liquid penetrant cleaner, penetrant and developer used shall be given to the NRC contact upon arrival at the Diablo Canyon Site.

Measurements performed shall be in accordance with the latest editions of the ASME code. Two copies of all data sheets will be furnished to the NRC contact at the conclusion of the work.

A letter report including a description of the work performed, the data obtained or examined, and evaluation of the adequacy of licensee's documentation shall be prepared and delivered to the NRC Region V office by November 25, 1983. An exit meeting will be held with the NRC contact at the conclusion of the work to discuss the scope and findings.

Parameter, Inc.
CONSULTING ENGINEERS
ELM GROVE, WISCONSIN

Attachment 1
Exhibit 2 to
Report No. PAR(DCNP)-NDE-2

Field Welds Chosen for Radiograph
and Reader Sheet Review

<u>ISO Drawing</u>	<u>Field Weld</u>	<u>ISO Drawing</u>	<u>Field Weld</u>	<u>ISO Drawing</u>	<u>Field Weld</u>	<u>ISO Drawing</u>	<u>Field Weld</u>
1-7-21	100	1-7-6	31A	1-7-1	215	1-07-22	106
1-7-21	101	1-7-6	32	1-10-19	144	1-07-22	107
1-7-21	105	1-7-6	33	1-9-34	216	1-07-22	108
1-7-18	80	1-7-6	282	1-7-24	124	1-07-22	109
1-7-18	81	1-7-6	280	1-7-24	126	1-10-9	83 ^{K1}
1-7-14	62	1-7-6	283	1-9-42	249	1-07-22	110
1-7-14	63	1-7-9	294	1-9-42	245	1-07-22	111
1-7-14	64	1-7-9	284	1-9-42	250	1-07-22	112
1-7-10	46	1-7-9	182	1-7-8	242	1-07-22	113
1-7-2	7	1-7-9	43	1-7-8	40	1-09-9	75
1-7-5	22	1-7-9	42A	1-12-8	100	1-09-9	73
1-7-5	23	1-7-9	42	1-12-8	103	1-09-9	72
1-7-5	24	1-8-323	1084	1-12-8	99	1-09-9	74
1-7-5	25	1-7-1	1	1-12-8	104	1-09-9	71
1-7-5	26	1-7-1	2	1-7-23	117	1-09-9	77
1-7-5	27	1-7-1	3	1-09-41	242	1-09-9	78
1-7-5	295	1-7-1	4	1-09-41	243	1-07-17	76
501014	362	1-7-1	201	1-09-41	244	1-07-17	77
1-8-321	1069	1-7-1	203	1-09-17	130	1-07-17	78
1-7-28	186	1-7-1	204	1-09-17	131	1-07-17	79
1-7-28	187	1-7-1	206	1-09-17	132	1-07-16	72
1-4-153	1428	1-7-1	207	1-09-38	230	1-07-16	73
1-4-153	1060	1-7-1	209	1-09-28	231	1-07-16	74
500136	251	1-7-1	211	1-09-38	232	1-07-16	75
1-7-6	28	1-7-1	213	1-09-38	233	1-07-19	82
						1-07-19	83
						1-07-19	84

AUDIT PERFORMED BY DANIEL HUNT (PARAMETER) 11-16-83

FERRITE INDICATOR ³/_N 2947, CAL.

DATE 3-9-83

ISO NUMBER	FW NUMBER	FERRITE READING
1-8-328	1117	> 7.5% < 10%
1-8-328	1125	> 7.5% < 10%
1-8-328	1124	> 7.5% < 10%
1-8-328	1122	> 7.5% < 10%
1-8-328	1119	> 7.5% < 10%
1-8-328	1118A	> 7.5% < 10%
1-8-328	1118	> 7.5% < 10%
1-8-320	1060	> 7.5% < 10%
1-8-320	1059	> 7.5% < 10%
1-8-320	1057	> 7.5% < 10%
1-8-20	293	> 7.5% < 10%
1-8-20	293A	> 7.5% < 10%
1-8-20	293B	> 7.5% < 10%
1-8-20	150	> 10% < 15%
1-8-20	149	> 10% < 15%
1-8-20	148	> 10% < 15%
1-8-20	147	> 10% < 15%
1-8-20	145	> 7.5% < 10%
1-8-20	146	> 7.5% < 10%
1-8-2	16	> 7.5% < 10%
1-8-2	20	> 7.5% < 10%
1-8-2	21	> 7.5% < 10%
1-8-2	22	> 7.5% < 10%
1-8-2	24	> 7.5% < 10%
1-8-2	19	> 7.5% < 10%

Daniel J. Hunt
11-16-83

4750 N 126th Street • Brookfield WI 53005 • Tel: (414) 781-0106
889 Chicago • Neenah WI 54956 • Tel: (414) 722-3115
FAX Repair Station C13 29

Attachment 1

101. CONSIDER INDUSTRIAL TESTING INC. The Contractor will use reasonable effort to assist the Government in the location of appropriate facilities and to locate in these areas and organizations or persons having the information which reasonably can be obtained thereunder by these means. The Contractor hereby certifies that the facts stated have been obtained in conformity with the special above noted. This request represents the Contractor's interpretation of the reports obtained from the tests and is not to be construed as a guarantee or warranty of the condition of the materials tested. The liability of Contractor shall be its officers, agents and employees, as to any facts suspected, including any

FORM • S-11