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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of )

PACIFIC GAS AND ELECTRIC )  
COMPANY )

(Diablo Canyon Nuclear Power )  
Plant, Units 1 and 2) )

Docket Nos. 50-275  
50-323

(Construction Quality Assurance)

AFFIDAVIT OF J. ARNOLD, D.R. CADY, R.G. FINK, H.W. KARNER, R.A. TORSTROM

STATE OF CALIFORNIA )

COUNTY OF SAN LUIS OBISPO )

ss.

The above, being duly sworn, depose and say:

I, J. Arnold, am Resident Mechanical Engineer for Pacific Gas and Electric Company.

I, D. R. Cady, am Engineering Supervisor - NDE Level III for Bechtel Group, Inc.

I, R. G. Fink, was employed as jobsite QA/QC Manager at Diablo Canyon Nuclear Power Plant for M. W. Kellogg (now Pullman Power Products) from 1971 to early 1974.

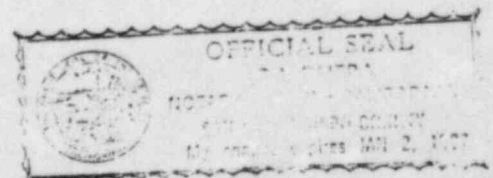
I, H. W. Karner, am Quality Assurance/Quality Control Manager for the Pullman Power Products Corporation.

I, R. A. Torstrom, am Technical Administrative Assistant to the Resident Mechanical Engineer for the Pacific Gas and Electric Company.

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1. The issues raised in Joint Intervenors Allegations Nos. 59, 60, 61, 62, 63, 74, 75, 76, 77, 78, 85, and 89 stem from Mr. Hudson's misunderstanding of code requirements related to the development of Procedure Qualification Records (PQR) and Procedure Qualification Tests (PQT) for Nondestructive Examination (NDE) and the requirements which were applicable to the valve thickness verification program ordered by the AEC.
2. Mr. Hudson assumes that the QA/QC records maintained for NDE should be the same as those for welding. This is not required.
3. In the case of welding, the code establishes standards for the process that must be met. It does not establish the method that must be used to perform the process. In order to assure that the process used results in a product that meets the standard, the welding process utilized must be qualified with a PQT and PQR. In contrast, for NDE, the code itself establishes and qualifies the method which must be used, and except for special circumstances not applicable to the allegations below, PQRs and/or PQTs are not required due to the prequalification of the NDE methods utilized.
4. 10 CFR 50 Appendix B for special processes requires only that qualified personnel using qualified procedures be used.
5. All NDE procedures referenced in Mr. Hudson's allegations were implemented using qualified and appropriately certified personnel.
6. All NDE procedures referenced by Mr. Hudson were developed from code (ASME V, ASTM) established methods and were verified for compliance by documented review and approval by a NDE Level III.



7. A minimum wall thickness verification requirement was imposed on the industry by the AEC in 1972 (see Exhibit 1, attached). Several of Mr. Hudson's allegations on the lack of PQRs and PQTs stem from an additional misunderstanding of the AEC requirements for the valve thickness measurement program. The valve thickness measurement program was a special program developed for an AEC identified problem. Nowhere in the AEC directive were the requirements of PQRs or PQTs made mandatory. It should also be noted, that where practical, each set of measurements on each valve used a micrometer reading to check UT system calibration. The result was documented on a data report which in itself is the equivalent of a PQR and PQT.

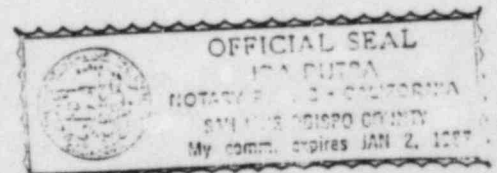
JI #59, Motion at 21.

It is alleged that:

There is no evidence that the ultrasonic thickness measurement procedure for reactor coolant pressure boundary valves was qualified through tests to demonstrate the 98 percent level of accuracy required in 1972 by the AEC. Since the measurements were conducted with an uncontrolled procedure, they cannot be accepted as the basis for conclusions about the quality of the valves. Pullman's internal auditor could neither find evidence of a Procedure Qualification Record (PQR), nor a Procedure Qualification Test (PQT). (citing Hudson Aff. at 15-16.)

8. The allegation is erroneous. The valve measurement program conducted by PGandE was accepted by the NRC as fully satisfying its requirements in 1975. By letter dated May 12, 1975, the NRC stated:

The inspector examined the final records for the ultrasonic and physical measurement of valve wall thickness. All on-site valves had been measured and



disposed in a satisfactory manner. Records were complete and provided evidence that the licensee and his contractor had satisfactorily implemented the program. The inspector stated that he considered the item closed for both Diablo Units (see Exhibit 2 at 4, attached.)

9. Demonstration of the procedure qualification was evidenced each and every time calibration was accomplished and documented on data sheets. The procedure in question (ESD 236) was controlled by date and revision number. Pullman's auditor (Hudson) could not find evidence of PQRs or PQTs since there was neither a requirement for either of these documents nor were they prepared.
10. Mr. Hudson was informed of the NRC approval by Mr. Karner at the time he raised his alleged discrepancy.

JI #60, Motion at 21.

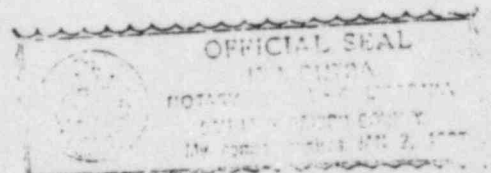
It is alleged that:

Pullman's auditor could find no evidence of "procedure verification tests" required by engineering specifications for the transducers. As a result, the ability of the procedure to take into account the curves, ridges and irregularities that exist on every valve and significantly affect the measurements remains indeterminate. (citing Hudson Aff. at 16.)

11. The Pullman engineering specification referred to by Mr. Hudson is ESD 236. ESD 236.6.7 states:

Transducers will be of suitable size and adapted with shoes, wedges or saddles as each valve measurement requires, as determined from procedure verification test.

12. The suitability of the procedure and accuracy of the transducer were verified against a known standard of like material with each application. This verification was documented on each data report. All





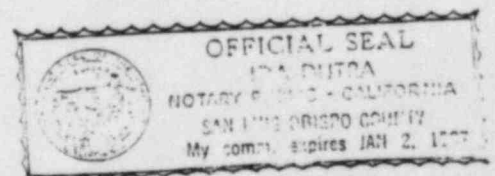
records reflecting this information are currently available. Thickness measurements were conducted at a frequency capable of resolving the thickness range to be measured, as evidenced on the data reports. The transducers utilized were of adequate size so as not to require the use of shoes, wedges, or saddles to adapt the transducers to surface contour. Therefore, PQTs for the transducers were not required.

JI #61, Motion at 21.

It is alleged that:

In 1982, Pullman's internal auditor could not find any evidence that management conducted the measurements with any qualification test, despite prior warning in 1973 that the procedure was too flawed to provide meaningful results. (citing Hudson Aff. at 16.)

13. Contrary to the allegation, the April 17, 1973, Pullman interoffice correspondence from R. G. Fink to W. R. Fox was not a "warning" that the procedure was too flawed to provide meaningful results. The correspondence was written by the QA/QC manager in response to a field change order (FCO) from PGandE requiring Pullman to UT test 177 valves. It identified questions which the QA/QC Manager felt needed to be resolved before testing could begin, but did not condemn any testing procedure.
14. At the time of the correspondence, Pullman did not have an ultrasonic testing (UT) procedure in place for wall thickness measurement. The Pullman procedure, ESD 236, was in the process of being developed and was adopted on April 26, 1973. Pullman began the UT measurements on May 8, 1973, almost three weeks after the FCO was received from PGandE.



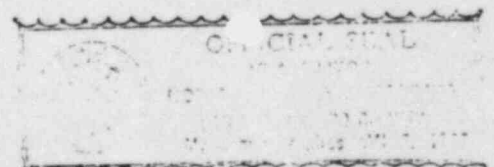
15. In the time between the receipt of the FCO and the first measurements, the questions raised by Mr. Fink were resolved and a reliable thickness measurement procedure (ESD 236) was developed by Pullman.

JI #62, Motion at 22.

It is alleged that:

Pullman QA manager Harold Karner improperly refused to take corrective action in January 1982, when the auditor disclosed the lack of procedure qualification records or tests for ESD 236 and ESD 244, the UT Thickness Gauge Procedure. The problem remains uncorrected. His excuse was that nondestructive measurements are not tests, and therefore do not represent "special processes" that must be controlled. (citing Hudson Aff. at 4.) The semantic excuse is irrelevant. The results had to be accurate in order to comply with a 1972 AEC directive. (Id. at 17.)

16. Mr. Karner did not improperly refuse to take corrective action when Mr. Hudson discussed the lack of PQRs for ESD 236 and ESD 244. A discussion was held with various knowledgeable individuals in this area, and the determination was made that the applicable codes for this Project did not require a PQR for thickness measurements by UT. The procedures themselves require a calibration and demonstration of accuracy prior to each use and are adequately controlled.
17. The UT system calibration was performed using calibration blocks traceable to National Bureau of Standards. Verification measurements were within the 2% accuracy requirement of the AEC which is verifiable on the data reports prepared for each valve.
18. This audit was closed by Mr. Hudson on March 22, 1983, with no further comments pertaining to the need for PQRs (see Exhibit 3, attached). At no time was Mr. Hudson threatened or coerced in any way to accept this



determination, and it was assumed that Mr. Hudson, by his actions, accepted the resolution.

JI #63, Motion at 22.

It is alleged that:

Pullman's linguistic distinction improperly excludes nondestructive measurements from the scope of 10 CFR 50, Appendix B, Criterion IX, despite their critical significance to plant safety in this case. As Mr. Hudson explained, "They are special process (sic) because they are uniquely created to perform a specific quality-related function." (Id.) The QA boundary created by Pullman is not specified in 10 CFR 50. Mr. Karner added the limitation, which is inconsistent with the safety goals of the Atomic Energy Act. (citing Hudson Aff. at 17.)

19. This allegation is also incorrect. Thickness measurements are not considered to be either nondestructive testing or destructive testing; rather, they are quantitative measurements, not examinations of material quality. Thickness measurement procedures used for checking the reactor coolant pressure boundary valves were not uniquely created procedures but are procedures based upon industry accepted standards including ASTM E114 and ASME V. The inherent repeatability of the thickness measurement process provides assurance that the process will yield accurate measurements.

JI #74, Motion at 24.

It is alleged that:

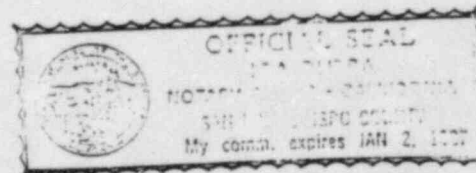
The QA breakdown for UT thickness measurement procedures was not unique. Nondestructive test procedures also lacked documentation of Procedure Qualification Records or Tests. On January 18, 1982, in Internal Audit (IA)



#101, Mr. Hudson found this flaw in seven procedures out of 21 examined, including the two UT thickness procedures. This leaves the quality of work examined under those procedures indeterminate for items such as groove welds on pipe rupture restraints prior to 1979; safety yoke rods on safety valves; and welds in the (sic) crack repair program on Unit #1 Steam Generator Feedwater Nozzles. (citing Hudson Aff. at 19-20.)

20. The seven NDE procedures referenced in this allegation are:
- a) ESD 246 and ESD 247, magnetic particle (MT) procedures
  - b) ESD 236 and ESD 244, ultrasonic (UT) procedures developed specifically for thickness measurements
  - c) ESD 270, a liquid penetrant (PT) procedure which at the time of IA #101 had not been used at the Diablo Canyon Power Plant
  - d) ESD 211, an ultrasonic (UT) procedure for inspection of safety valve yoke rods
  - e) ESD ~~239~~ 239, an ultrasonic (UT) procedure for inspection of groove welds on rupture restraints.
21. Procedures ESD 246 and ESD 247 are magnetic particle procedures that were qualified by Mike MacCrae, Pullman NDE Level III. These procedures were qualified using equipment equivalent to that used during the original examination of the welds in question. The MT exams using ESD 247 were performed on only two welds, FW 197 and FW 244, as an aid in eliminating a discontinuity on or near the welds. These tests were not code required but used as an aid in construction. Since this was the only place procedure ESD 247 was used, and it was not a code-required test, there was no code violation in using the procedure without a PQR. ESD 246 was never used for any examination at Diablo Canyon.

22. ESD 236 and ESD 244 are UT thickness measurement procedures and are not required by any code to have PQRs.
23. NDE procedures are developed encompassing three main elements: scope/application, technique requirements, and acceptance criteria. When required by a referenced code, qualification of a NDE procedure is accomplished for verification of technique only. Once the technique element has been verified as being capable of producing interpretable indications, any specified acceptance criteria may be utilized in conjunction with the established technique. Since AWS has different accept/reject criteria than ASME, separate procedures were generated. ESD 270 was written for AWS work, and ESD 210 was written for ANSI and ASME Section III work. The technique and penetrant materials are identical for both, hence the PQR prepared for ESD 210 supports both.
24. ESD 241 is a procedure for ultrasonic inspection of safety yoke rods. This procedure was produced using the Dresser Instruction SP-52-166 as a guideline. The inspection of the Unit 1 safety valve yoke rods, although not a code requirement, was performed at PGandE's direction. Pullman was directed to use Dresser's Instruction for the inspection guidelines, which was done, while using a more restrictive sensitivity for the acceptance level than called for by Dresser's Instruction. There was no requirement for a formal PQR for this inspection and one was not prepared. The qualification of this procedure is the ability to repeatedly calibrate to a known standard. The calibration results recorded on the data reports provide adequate documentation of the procedure qualification.





25. ESD 234 is a procedure for UT inspection for groove welds on rupture restraints. Although neither the AWS code nor PG&E specification 8833XR required a PQR for this procedure, Paul Dawson, Pullman's UT Level III, produced a PQR for this procedure at H. Karner's directive on October 1, 1982 in response to Mr. Hudson's audit (see Exhibit 4, attached.)

JI #85, Motion at 25.

It is alleged that:

Pullman violated NRC reporting requirements and PG&E (sic) contract specifications by only reporting the deficiencies for two out of the seven nondestructive procedures identified in IA #101 to PG&E (sic) on Discrepancy Reports. (citing Hudson Aff. at 21-22.)

26. Although a PQR was not required by Code or PG&E specification 8711, a Discrepancy Report (DR) identifying the lack of PQRs for procedures ESD 246 and ESD 247 was initiated. DR 4662 was initiated to resolve Mr. Hudson's audit findings and was dispositioned by PG&E to "accept as is."
27. The five procedures, ESD 236, 244, 270, 241 and 234, were listed in IA #101 for lacking a PQR. Since there were no code or PG&E specification requirements to have PQRs for these procedures, there was no need to submit a DR for any of the seven.

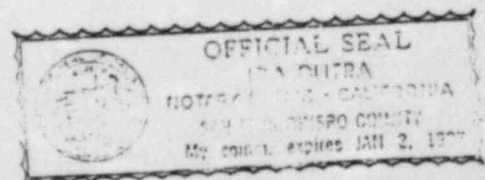
JI #89, Motion at 26.

It is alleged that:

The corrective action for ESD 246 and 247 involved procedure qualifications after-the-fact, which are the least reliable means available and should not excuse PG&E

(sic) from accountability under NRC rules. Further, the PQT's were conducted with different equipment than had been used originally. No documentation was supplied to support the asserted Corrective Action Response that the new equipment made the results more conservative. (citing Hudson Aff. at 22-23.)

28. PQRs developed after the fact though not required still verify the techniques delineated in the procedure. As stated earlier, the PQRs were developed to resolve Mr. Hudson's audit. Only two welds were inspected using procedure ESD 247 and these two welds, FW #197 and FW #244, were identified on DR 4662 as being inspected without a PQR. PGandE dispositioned the DR to "accept as is." The MT inspection of the referenced welds using ESD 247 was only an aid in verifying defect removal, and no code required this examination. Hence, a code violation did not exist by the use of the procedure ESD 247. ESD 246 was never used at Diablo Canyon, so no code violation existed with this procedure.
29. As stated in paragraph 21 above, the equipment capabilities used for the procedure qualifications discussed here was equivalent to that used for the original weld examinations.
30. Contrary to the allegation, no assertion was made that the new equipment made the results more conservative. Adequate documentation was supplied to support a PQR, if one were needed (see Exhibit 2 to Exhibit 4, attached). Qualification would result when a procedure would indicate a known flaw in a test specimen. In this case, the specifications of the procedure were followed, and acceptable and repeatable results were obtained. Because the amperage specified by the procedure was employed, the fact that a different piece of equipment was used in the qualification is not relevant. The result of the qualifying test was the same and not more or less conservative.



JI #75, Motion at 24.

It is alleged that:

The corrective action for procedure ESD 234, UT inspection of pipe rupture restraint welds, consisted of unreliable, "after-the-fact" Procedure Qualification Tests, whose use was not controlled and accomplished using qualified procedures. (citing Hudson Aff. at 19-20.)

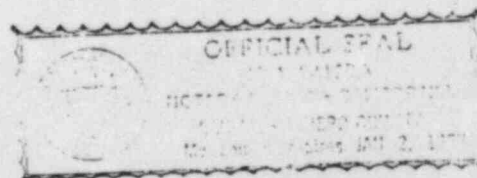
31. Since a PQT was never required, the allegation is false. ESD 234, the UT procedure for inspection of rupture restraint welds, was developed for use with AWS. The AWS Code does not require a procedure qualification record for UT procedures. The UT unit and the procedure are verified each time calibration is performed on the required calibration blocks.
32. Despite all of the above, the procedure qualification was demonstrated on October 1, 1982, by Paul Dawson, NDE Level III at Harold Karner's request in response to Mr. Hudson's concern (see Exhibit 4, attached). This was accomplished by performing ESD 234, as written, using all of the control elements of the procedure.

JI #76, Motion at 24.

It is alleged that:

IA #101 did not find evidence that management reviewed and approved the procedures for the PQT. (citing Hudson Aff. at 19-20.)

32. The allegation is false. The AWS Code, which ESD 234 is written to, does not require a procedure qualification record for ultrasonic examination procedures. Contrary to the motion, Mr. Hudson's affidavit states there is no evidence that management reviewed and approved the



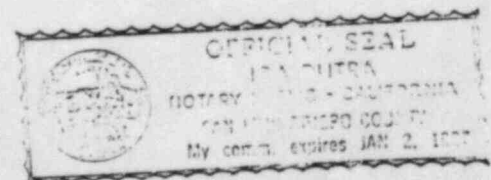
procedures for the PQT. The procedure ESD 234 was, in fact, approved by Pullman (R. Fink) and PGandE (J. Holly) as evidenced by their signature at the bottom of the procedure (see Exhibit 5, attached).

JI #77, Motion at 24.

It is alleged that:

QA Manager Harold Karner improperly prevented any corrective action for the lack of procedure qualification records on ESD 270 for Liquid Penetrant Tests. Instead, he directed that the Procedure Qualification Records for a different procedure, ESD 210, should be used for ESD 270. "The unique features of ESD 270 inherently will not have a proven demonstration of their ability to identify defects. This QA violation remains ignored." (citing Hudson Aff. at 19-20.)

34. The allegation is false. ESD 270, was written to comply with the AWS Code. The AWS does not require a PQR.
35. When temperature is outside code limits, a liquid penetrant PQR is required by ASME Code to demonstrate the ability of the technique and materials to detect surface discontinuities. A liquid penetrant procedure and supporting PQR, when required, are developed independently from the accept/reject criteria of the procedure. When two procedures use the same step-by-step technique and the same penetrant materials, the qualification of one logically qualifies the other. As ESD 210 and ESD 270 use the same technique and materials, even though their accept/reject criteria may differ, Mr. Karner's decision to apply the PQR from ESD 210 to ESD 270 was correct. No corrective action was necessary.



JI #78, Motion at 24.

It is alleged that:

No investigation identified where ESD 270 was used. The QA manager told the internal auditor to just write up what he had learned already as an audit finding. (citing Hudson Aff. at 19-20.)

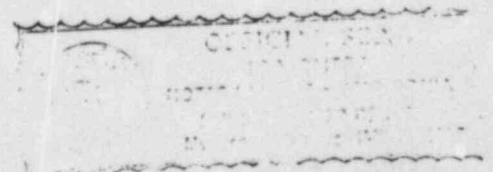
36. As discussed above, ESD 270 does not need a PQR. Therefore, no audit finding was necessary and there was no need to find out where ESD 270 was used.
37. ESD 270 was written only as a contingency procedure for liquid penetrant of rupture restraint welds where MT would be impractical.
38. Regardless of the above, Mike MacCrae and Paul Dawson reviewed the liquid penetrant inspection daily log sheets from the date ESD 270 was approved until the date of the review and no area was found where ESD 270 had been used (see Exhibit 4, attached).

JI #50 and 51, Motion at 19.

It is alleged that:

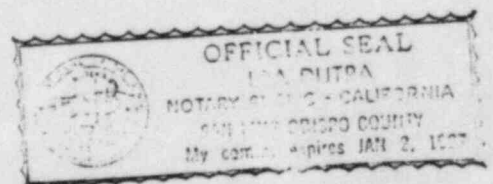
Since July 1979 full penetration welds less than 9/16 inch thick have not been ultrasonically tested (UT). All such welds in the pipe rupture restraint program were left with indeterminate quality status, including those in the weld crack repair program which already had been judged deficient. (citing Hudson Aff. at 9.)

PG&E (sic) engineers accepted the UT loophole informally, without the required review and without revising the relevant contract specification that was being ignored. The loophole also violated specific corrective action commitments on nonconformance reports, and procedures for the weld crack repair program. (citing Hudson Aff. at 9.)



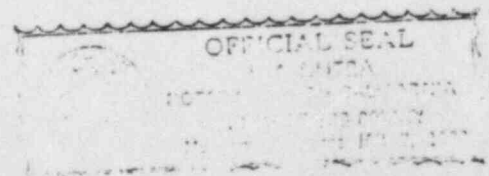


39. In contrast to the Motion, Mr. Hudson's affidavit does not allege that rupture restraint welds are of indeterminate quality status or that any welds had already been judged to be deficient in the weld crack repair program. Hudson actually alleges that PGandE engineers accepted "loopholes" in Pullman's (rupture restraint) program in July 1979, and that full penetration welds less than 9/16" thick were not ultrasonically examined in violation of contract specifications.
40. This allegation is false. Beginning in late 1978, when PGandE identified a weld cracking problem in Pullman full penetration field welds on rupture restraints, PGandE conducted an extensive program to determine the cause and to formulate corrective action. This program was first documented on nonconformance report DC1-RM-78-008 dated October 3, 1978, and reported to the NRC.
41. In mid-1979, PGandE's Department of Engineering Research (DER) conducted a thorough investigation and metallographic study of the welds as part of the rupture restraint field weld repair program. DER and PGandE Engineering Department made specific changes in welding and inspection procedures to assure weld quality. The single most important change was to add the requirement for magnetic particle examination (MT) after completing full penetration welds on all thicknesses. This change was included in Revision 13 to construction specification 8833XR on August 24, 1979 (see Exhibit 6, attached.) In conjunction with this change, the minimum thickness requirement for UT examination of full penetration welds was raised from 5/16" to 9/16" by issuance on May 31, 1979, of



PGandE UT Procedure DER 3523, "Manual Ultrasonic Examination of Welds and Plate in Pipe Rupture Restraints." Pullman was provided with, and instructed to use, Procedure DER 3523.

42. PGandE engineering revised specification 8833XR to make the important addition of MT examination to the weld inspection requirements but inadvertently overlooked revising the specification to exclude a requirement of UT examination on all full penetration welds thinner than 9/16". The language of the specification appeared to require that welds less than 9/16" continue to be examined by UT as well as the newly added MT procedure. This created the quarter inch paper "loophole" about which Mr. Hudson complains.
43. At the time of the revision to specification 8833XR, Pullman modified its weld examination procedures to require MT for all full penetration welds and UT procedures for full penetration welds 9/16" and greater. This revision was approved by PGandE in 1979, reflecting the clear intent of the specification change (see Exhibit 7, attached).
44. Contrary to the allegation, the corrective action commitment in the NCRs and weld crack program was not to examine full penetration field welds less than 9/16" with UT but rather to use MT.
45. Since 1979, consistent with the specification, procedures, and the commitment in the NCRs and weld crack program, the quality of all new full penetration welds on rupture restraints has been assured by the application of MT procedures.



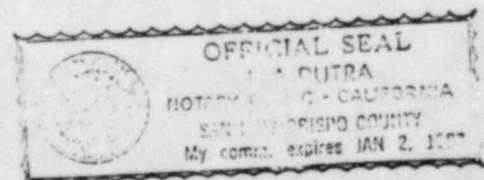
JI #58 and 29, Motion at 20-21 and 15, respectively.

It is alleged that:

In some instances, the unreliability of nondestructive examinations is due to manipulation of the test results in order to mask deficiencies. This allegedly occurred in 1982, with respect to tests involving around 230 Unit I (sic) full penetration welds -- some in the containment -- where UT examinations revealed large numbers of rejectable conditions, including voids, slag, and lack of fusion in the roots of the welds. These deficiencies raise questions about weld bonding. Bechtel and PG&E (sic) management responded by manipulating the UT procedure in a manner that would lower the number of rejected indications. The welds were then "accept(ed) as is" on the basis of relaxed acceptance criteria. (citing 1/12/84, Anon. Aff. at 8; 1/16/84, Anon. Aff. at 2-3.)

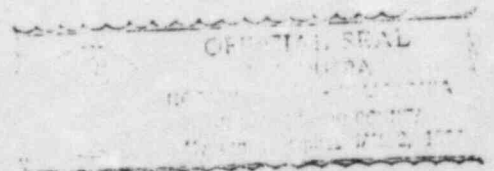
The failure to comply with weld procedure requirements led to "truly pathetic" welds for the pipe rupture restraints. In one case a backing bar for the weld was permanently held by tack welds designed to provide temporary support. The fusion was so weak that a light tap with a hammer knocked it off completely. (citing 1/16/84, Anon. Aff. at 2.)

46. These allegations combine the allegations from two anonymous affidavits dated January 12, 1984, and January 16, 1984. However, the first sentence, namely that test results were manipulated, is not supported by either of the affidavits cited as authority. One underlying affidavit spoke only to "change of 'acceptance criteria,'" which is substantially different than "manipulation of test results." (1/12/84, Anon. Aff. at 8.)
47. In August 1982, field welds on rupture restraints in Unit 2 were observed by a PGandE inspector to have incomplete fusion to backing bars. In order to visually inspect the field welds, the backing bars were removed by chiselling and grinding. To identify and track the problem, two NCRs (DC1-82-RM-N001 and DC2-82-RM-N002) and an



investigation procedure (8833XR-001) for the full penetration welds in Unit 1 were written.

48. As originally written, the investigation procedure required the welds to be re-examined both by the UT procedure in existence at the time the weld was made and by the 1982 UT procedure. Most of the welds examined with the 1982 procedure showed indications which may or may not have required rejection under the original acceptance criteria.
49. Independent of the investigation program, an analysis of the UT procedures being utilized by the program was performed by Bechtel Materials and Quality Services, the equivalent of PGandE's DER. The analysis determined that examinations using the original procedure were not repeatable. This conclusion corresponded to a determination made by PGandE in 1979, when use of the original procedure was discontinued and all welds examined under this procedure were addressed by PGandE engineering. The analysis also determined that the procedure developed by PGandE in 1979, and still in use in 1982, was more stringent than the applicable requirements of AWS.
50. As a result, a third procedure (PGandE Procedure 3523-M), the one challenged by Mr. Hudson, was developed and utilized, which reflected the current AWS requirements. This UT procedure was not manipulated in any way. As direct proof, under the new procedure, 40% of the welds did not meet AWS acceptance criteria.
51. Characteristics and location of each individual weld included in the 40% were submitted to engineering for a detailed analysis to determine each weld's fitness for use under its intended design purpose.



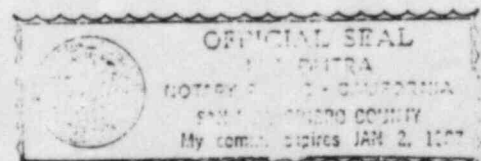
52. The weld's fitness for intended design purpose was demonstrated by engineering analysis or the weld was replaced or repaired. As a result of this program thirteen welds of the same joint configuration were repaired..
53. Under the program, there was no manipulation of test results. Procedures utilized adopted code requirements, and individual welds were analyzed to determine fitness for intended design purpose consistent with proper engineering standards.
54. From the initial discovery of the problem through its resolution, a well thought out and well controlled program was conducted in accordance with established quality assurance requirements.

JI #64, Motion at 22.

It is alleged that:

Mr. Hudson's January 1962 Unscheduled Internal Audit (UIA) #34 of 254 Valve Wall Thickness Data Reports demonstrated that the Data Reports are incomplete and not traceable, as required. For example, none listed the size, shape, or manufacturer's designation of the transducers that performed the wall thickness. The ESD 236 Documentation Packages at most included the serial numbers for the testing equipment, and not in all cases. (citing Hudson Aff. at 17-18.)

55. The allegation is in error. When performing thickness measurements, transducer size, shape, or type is not required as an entry on the data report by procedure or any referenced code. For example, Section V of ASME requires only that thickness measurements be conducted at a frequency capable of resolving the thickness range to be measured. While the concern referenced in the allegation might be applicable for ultrasonic flaw detection, it is simply not an issue as applied to thickness measurements.





56. The basic requirement is that measurement instruments be routinely calibrated. Traceability of transducers is not required and such a requirement would make no sense since it is only a part of the calibrated system. If a transducer fails, it is thrown away. Another transducer is then used and the system is recalibrated. Retaining a "paper trail" on the transducer would serve no QA or QC purpose and there is no such requirement.
57. As previously discussed, the apparent origin of Mr. Hudson's allegation is a basic misunderstanding of NDE QA/QC requirements.

Jl #65, Motion at 22.

It is alleged that:

The Data Reports offered unreliable, inconsistent information, such as 19 reports crediting two different UT machines for measuring the same valve. Valves checked physically had serial numbers different from those listed in the Data Reports. Original information in the reports was whited-out and altered without signature or explanation. (citing Hudson Aff. at 18.)

58. The preprinted Data Report used during this time period identified two UT machines (a Nortec and a Branson Unit). The record keeping technique was to either line through the unit not used or circle the unit which had been used on the data sheet. Neither a line nor a circle appears on 19 data reports, thereby failing to indicate which unit was used. However, the Nortec unit was only used during procedure development, not to collect actual wall thickness data. Therefore, the Branson unit was applied in all cases identified by Mr. Hudson.

59. The minor documentation discrepancy is of no substance, since only one machine was actually used. Even this discrepancy which has no technical significance was caught and resolved satisfactorily, thereby demonstrating a fully functioning QA program.
60. The second aspect of this allegation relates to questionable serial numbers on valves. The two valves Mr. Hudson identified have been physically checked by PGandE, and the serial numbers do indeed match the Data Report serial numbers and are traceable.
61. Mr. Hudson was correct regarding use of white-out on the reports. White-out was commonly used for correcting clerical or transcription errors on paperwork by Pullman Power Products prior to 1974 and it did not seem to pose any credibility problems at the time. This practice was prohibited in the mid-1970's.

JI #66, Motion at 22-23.

It is alleged that:

Necessary records were not consistently available to demonstrate calibration of the measuring equipment. To demonstrate the potential, lack of calibration skewed results from 2.6% - 48%. The maximum error permitted by the AEC was 2 percent. (citing Hudson Aff. at 18.)

62. Contrary to the allegation, the records of UT equipment calibration are maintained in Pullman's quality assurance documentation vault and are available for review. PGandE has confirmed the thickness accuracy of the ultrasonic calibration blocks by the use of micrometers calibrated to steel reference blocks traceable to the National Bureau of Standards. The ultrasonic machine had been calibrated using calibration

blocks that were checked against actual micrometer points on the valve body being measured. Any variance was then corrected on the ultrasonic unit. All wall measurements taken after this comparison reflected the variance.

63. For example, one calibration report noted that the mechanical (micrometer) point on the valve body being measured was .260". The subsequent UT measurement showed .280". The UT machine was then adjusted to .260" and the wall measurement taken.
64. According to Unscheduled Internal Audit (UIA) #34, Mr. Hudson compared the mechanical reading and the UT reading, identified the difference and assumed the test was conducted without accounting for this difference. Mr. Hudson's concern with this alleged failure to account for the difference in measurements once again points to his lack of understanding of the technical aspects of ultrasonic equipment operation. It is standard for an ultrasonic technician to make this type of adjustment to compensate for acoustic variations when needed even though the technician records the actual mechanical and UT reading (see Exhibits 8 and 9, attached).

JI #67, Motion at 23.

It is alleged that:

Valve measurements from equipment that failed minimum reliability standards improperly were used to accept the valves as sufficiently thick. (citing Hudson Aff. at 18.)

65. Contrary to the allegation, the ultrasonic equipment did not fail. The equipment was calibrated using calibration blocks and calibration points

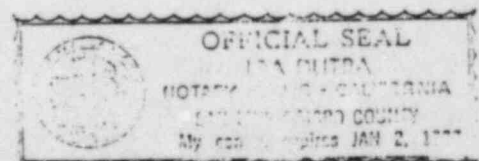
were recorded on data sheets to verify accuracy within the 2% requirement. The machine then was checked against micrometer points to account for any accoustical difference between the blocks and the valve body. Had the machines failed, they could not have been calibrated. The machines and procedure met the accuracy requirements and showed all valve body measurements within the 2% accuracy required (see Exhibit 2, attached).

JI #68, Motion at 23.

It is alleged that:

Valves that should have failed may still remain uncorrected. Although forty-two Data Reports disclosed that the valves were below the minimum thickness, on the paperwork they were marked as "accepted" without explanation. (citing Hudson Aff. at 18.)

66. This allegation is false. No valves that failed the AEC requirements were installed.
67. The Motion, as worded, is somewhat different than the allegation as described in the referenced Hudson affidavit. The first sentence, "Valves that should have failed may still remain uncorrected," does not appear in Mr. Hudson's affidavit. UIA #34 referenced in the affidavit does mention a concern that rejected valves might possibly be installed in the plant but does not address valves that should have failed being uncorrected.
68. The signoff on Line 7 of the data report, "Valve Identified," was to verify the valve was tagged with a white identification (ID) tag. These ID tags were applied to all valves. As required by Pullman's QA manual,



all valves measured were tagged either "accept" with a green tag or "reject" with a red tag as appropriate. Reject valves were red tagged and stored in a hold area. PGandE has reviewed all associated data sheets and confirmed that all valves identified as under minimum wall thickness were either replaced, repaired, or accepted through engineering evaluation, and all are adequately documented.

JI #69, Motion at 23.

It is alleged that:

In 11 cases, the measurements were incomplete, with missing data for required areas of the valve, such as the flat pad at the bottom. (citing Hudson Aff. at 18.)

69. This allegation is incorrect. Mr. Hudson was unaware of other data for the valves collected by Westinghouse. The eleven valves in question were new valves that Westinghouse had shipped to replace originals that had been returned for unacceptable wall thickness. Westinghouse performed full UT thickness measurements on the new valves prior to shipment to the site. Therefore, no measurements were required by Pullman. However, upon receipt of these valves at the site, it was noted that certain areas on the valves were identified in the supplier's documentation as being close to minimum.
70. PGandE elected to perform certain additional thickness measurements on the valve areas in question. Pullman performed these tests and found the valve wall thickness to be acceptable. Pullman was not requested to, nor did they, examine all areas of the valves. This testing was an



added precautionary measure. The actions taken above are documented in a PGandE memo to file from H.E. Petersen, "Wall Thickness of 10C482 Check Valves documented in Westinghouse letter PGE-2479," dated December 5, 1973. Mr. Hudson apparently did not gather this information in his audit.

JI #70, Motion at 23.

It is alleged that:

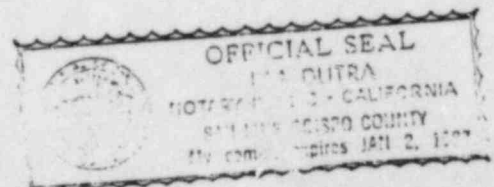
UIA #34 could not find evidence that all required welds were measured. In 14 valve locations, there was no documented evidence of an examination. (citing Hudson Aff. at 19.)

71. This allegation is factually correct, but has no technical or QA significance and the implied conclusion is incorrect. Mr. Hudson did not have access to information discussed below demonstrating that these valves were acceptable.
72. The fourteen valves identified were excluded from valve wall thickness requirements either as a result of the valve body not being the pressure containing item, or they were deleted at a later date by an amendment to the original list by Westinghouse, because evaluation showed these valves were not part of the primary pressure boundary. These valves are:

1-8010 A, B, & C

2-8010 A, B, & C

Valve wall measurement was not required in accordance with the exception described in Westinghouse Letter PGE-2080.



1-8368 A, B, C, & D

2-8368 A, B, C, & D

These were not primary pressure boundary valves and were deleted from the measurement program by Engineering per modification of the original list by Westinghouse. Valve identities were changed by an amendment issued March 14, 1973 (Westinghouse Letter PGE-2273).

JI #71, Motion at 23.

It is alleged that:

UIA #34 reported the lack of documentation indicating that weld repairs on the valves were controlled. To illustrate, the Data Reports do not have a requirement to list whether valves were weld-repaired, or the weld procedure used. (citing Hudson Aff. at 19.)

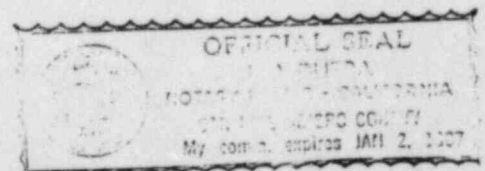
73. This allegation is incorrect. Although documented elsewhere, no requirements exist in ESD 236 for UT thickness data reports to include documentation on valve weld repairs.
74. Valves that were found to have unacceptable wall dimensions were returned to the vendor for repair or replacement. These valves, when returned to the site, were remeasured, as described in paragraph 69 above and UT data reports for these repaired or replacement valves are included in the documentation packages for ESD 236.
75. Weld repair procedures used by the valve vendor were controlled by the vendor and submitted to the AEC July 23, 1974. Since repairs were not performed on site, there was no requirement or reason to submit these weld repair procedures to the site contractors.

JI #72, Motion at 23.

It is alleged that:

None of the valves meet AEC and PG&E (sic) design requirements. Westinghouse, the manufacturer, had explicitly declared that they "were not designed to meet the minimum wall thickness requirements of ANSI B16.5" -- one of the relevant professional codes listed by the AEC in 1972. Based on a comparison of Westinghouse's communication with PG&E (sic) contract specifications, the valves also do not meet the design requirements in the contract. (citing Hudson Aff. at 19.)

76. The allegation is in error in that the AEC did not establish valve design requirements. Additionally, ANSI B16.5 was one of numerous codes referenced by the AEC in 1972. Mr. Hudson erroneously compared the valves to Pullman's contract specification 8711, not as he should have done, to Westinghouse's contract specification 8700.
77. As a component of the Nuclear Steam Supply System supplied by Westinghouse in accordance with Specification 8700, the subject valves were actually designed and fabricated to the requirements of USAS B16.5, properly using the stress criteria of ASME BPVC, Section III, as the basis for establishing stress levels. ASME Section III, Article 9, was properly used for operational design requirements.
78. The requirements of USAS B31.1.0 were met. The requirements defined in subsection 50.55(a) of 10 CFR 50 specify the use of USAS B31.1 or USAS B31.1.0. USAS B31.1.0, Chapter IV, "Dimensional Requirements," paragraph 126, directs the use of USAS B16.5 for design and fabrication of valves and is the basis for its being used as the criteria for the pressurizer safety valves. As defined by Westinghouse in letter



PGE-2080, the bodies of the valves in question are not the pressure containing items and, therefore, were not designed to meet the minimum wall thickness requirements of USAS B16.5.

79. In summary, Mr. Hudson was erroneously attempting to audit valves supplied by Westinghouse to Pullman's contract requirements, a classic "apples and oranges" comparison.

JI #73, Motion at 23.

It is alleged that:

Management did not work with the originator of UIA #34 to develop corrective action. As a result, the quality of the welds may be as indeterminate now as in 1972, again because of a deliberate management decision not to find out. (citing Hudson Aff. at 19.)

80. Again Mr. Hudson has cited a single correct fact from which he draws a completely erroneous conclusion. In accordance with established procedures, receipt of UIA #34 was acknowledged in writing by Mr. Paul Dawson, NDE supervisor, on February 15, 1983. This acknowledgement signifies Mr. Dawson's responsibility for preparation of the appropriate corrective action. As Mr. Hudson was not certified as an NDE technician and, therefore, could not be expected to provide detailed technical input, Mr. Dawson investigated the matter and verified that NDE procedures were properly utilized without requesting additional assistance from Mr. Hudson.
81. Mr. Hudson left his job with Pullman QA/QC on May 19, 1983. The development of an acceptable corrective action for UIA #34 required an extended period of time. The audit was, however, closed out on

August 9, 1983. Since Mr. Hudson was no longer part of Pullman QA/QC, he was not made aware of the proposed corrective action, nor was he made aware of the audit closure. Corrective action taken as a result of UIA #34 demonstrated that, in fact, the UT examination of boundary valve wall thicknesses was performed in an acceptable manner.

82. The motion also alleges that "the quality of the welds may be indeterminate." As UIA #34 did not deal with welding, but rather with ultrasonic measurement of boundary valve wall thickness, the allegation as contained in the motion has no basis even in theory, let alone in fact.

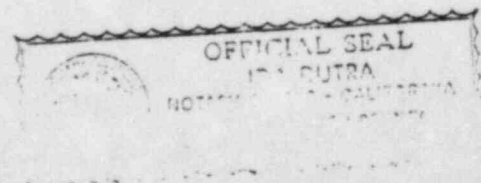
JI #80, 81, Motion at 24-25.

It is alleged that:

ESD 241 was used for tests from December 17-20, 1973, before the UT procedure itself was even issued on December 26, 1973, and prior to PG&E's (sic) February 12, 1974 approval. The testing was totally uncontrolled for the yoke rods on these valves, which control the release of radiation from the containment. (citing Hudson Aff. at 20-21.)

ESD 241 violated instructions from Dresser, the vendor for bolts and studs, that required examination of the rods before threading. In ESD 241, the UT's (sic) were conducted after the threading. ESD 241 also ignored the Dresser instruction to determine the reference point for sensitivity, and the reporting criteria for questionable items. (citing Hudson Aff. at 20-21.)

83. The yoke rods in question are part of the Unit 1 Steam Generator Safety Relief (SGSR) valves. Contrary to the allegation of Mr. Hudson, the purpose of the valves is to prevent over-pressurization of the non-radioactive secondary side of the steam generators, not "to control





the release of radiation from the containment." The valves were ordered from Dresser Industries in 1969 under PGandE Purchase Specification 8730. The purchase specification required that the valves be manufactured to meet the requirements of ASME, Section III, Article 9. This article of the code does not require any type of nondestructive examination of the valve yoke rods. At the time of the manufacture of the rods, Dresser had no requirement for nondestructive examination. Consequently, nondestructive examinations were not performed on the yoke valve rods by the manufacturer before shipment of the Unit 1 valves to Diablo Canyon in May 1972.

84. During the later manufacture of the valves for Unit 2, Dresser revised their manufacturing process to include ultrasonic examination of the bar stock to be used for valve yoke rods. This requirement was implemented using Dresser Engineering Instruction SP-52-166.
85. UT examinations on the Unit 2 rods being manufactured disclosed anomalies in the rods causing their rejection.
86. In response to the examination results, PGandE directed Pullman to perform UT inspections of the Unit 1 rods, utilizing the applicable portions of Dresser Instruction SP-52-166. However, the Dresser Instruction was designed for testing during the manufacturing process prior to threading of the rods. Since the Unit 1 rods were already manufactured and installed, the Dresser Instruction could only be used as a starting point to develop a procedure for UT of the already installed valve yoke rods.

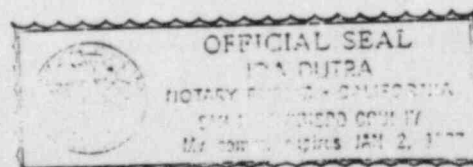
87. To supplement the Dresser Instruction, Pullman calibrated the test equipment to a more sensitive reference level and incorporated a shear wave inspection, neither of which were included in Dresser Instruction SP-52-166.
88. At PGandE's direction the Level III from Pullman documented the UT procedure he developed and utilized to examine the rods in Unit 1. The UT method developed by the Level III resulted in a conclusive and repeatable examination which was formalized in Procedure ESD 241.
89. While Mr. Hudson is procedurally correct in his allegation that ESD 241 was referred to as the applicable procedure prior to its approval date, assigning a numeric designation prior to procedure approval is a common industry practice, especially when, as here, a modified method is developed for use to meet a specific condition.

JI #79, Motion at 24.

It is alleged that:

ESD 241 for UT of the safety valve yoke rods also was performed without evidence of Procedure Qualification Records, according to IA #101. (citing Hudson Aff. at 24.)

90. As has been noted throughout this affidavit, a PQR was not required for ESD 241. The procedure was developed and approved by a NDE Level III and qualified each time calibration was accomplished in accordance with the procedure.



JI #82, Motion at 25.

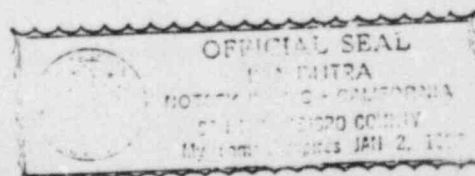
It is alleged that:

The existing test documentation fails to comply with either the ESD 241 or the Dresser Instructions. IA #101 concluded that required information on the testing surface and instrument calibration was missing. (citing Hudson Aff. at 21.)

91. Mr. Hudson alleges that the test reports failed to document the surface or surfaces from which the yoke rod examination was to be performed as required by ESD 241 and Dresser SP-52-166.
92. Contrary to the allegation, there is adequate information on the data reports to satisfy the requirements of the procedure. The reports specify that the material examined were rods from bar stock. Only two surfaces of the rod can be measured: the length, which is the curved outer face, and the flat portion of each end. Since the data reports also state that transducers with curved shoes were used to perform the examination, it is obvious that the examination was conducted from the curved outer face of the rod. Mr. Hudson concedes this fact on page 2 of Exhibit 3 to Attachment 2 of JI Motion which page was conveniently omitted from that exhibit (see Exhibit 10 at 1-2, attached).
93. Mr. Hudson alleges that the test reports failed to include a description of the calibration block (size, material, basic calibration reflectors), as required by ESD 241 and Dresser SP-52-166. This is correct, but not significant. A description of the test block is contained in ESD 241 Sections 11.4 and 13.1. The basic calibration reflectors are described in ESD 241 Sections 11.4.1 and 13.2. The calibration method is described in ESD 241 Sections 10, 11, and 12. The purpose of describing

the test block is to assure the test itself is reproduceable. In this case, while the block actually used in the tests is still available, the procedure itself has sufficient data to reproduce the block if it were not. A comparison of the test block used in the 1973 tests, and one of the yoke rods examined in the 1973 tests, was made on February 29, 1984, by both a Level II and Level III UT Technician. This comparison confirmed that the yoke rods and the test block are acoustically similar. The results of this comparison have been added to the yoke rod data packages.

94. Mr. Hudson alleges that the required calibration intervals described in Dresser SP-52-166 and ESD 241 were not adhered to. The procedure did not require documentation of all specified calibration intervals. Despite not being required to document calibration intervals, the NDE technician recorded sufficient information on the data reports to assure that any differences between the actual calibration interval and the frequency interval required by the procedure can be determined. ESD 241 required the identical calibration intervals as Dresser SP-52-166. The checks were to be made before and after each production run, each 1/2 hour, and each time the machine was believed to be malfunctioning. The summary report from the 1973 tests shows that calibration checks were made before and after each yoke rod was examined, approximately 15 minutes prior to each technique, and whenever a discontinuity was suspected (see Exhibit 11, attached).



95. While the summary report does not specifically indicate calibration each 1/2 hour as discussed above, the information on the report is more than adequate to determine the accuracy of the equipment, and the lack of this entry is of no significance. Even Mr. Hudson concedes that the calibration intervals were "most adequate," although this information was also omitted from the exhibit attached to Joint Intervenors Motion (see Exhibit 10 at 2, attached).

JI #83, Motion at 25.

It is alleged that:

Neither ESD 241 nor the UT test documents demonstrated compliance with a PG&E-imposed (sic) requirement for backup inspection of the yoke rod ends for indications of cracking that might extend into the threaded area. . ."  
(citing Hudson Aff. at 20-21.)

96. At the time the UT procedure was directed to be performed on the valve yoke rods of Unit 1, PGandE's responsible Design Engineer indicated that "In addition to the UT inspection, a back-up inspection should be performed with the dye penetrant technique to check the yoke rod ends for indication of cracking that might extend into the threaded area of the yoke rods." On February 5, 1974, approval to eliminate liquid penetrant examination through an engineering release was sought and received from the responsible engineer who had suggested the additional test (see Exhibit 12, attached).
97. The threaded portion of each rod is approximately 25% of the overall rod length and is inaccessible for the PT examination without disassembly of the valve. However, the manufacturing process and the materials used do



not normally produce isolated discontinuities. This information, together with the fact that there were no rejectable indications in the remaining 75% of each rod, provides reasonable assurance that each rod is acceptable without examining the threaded portion.

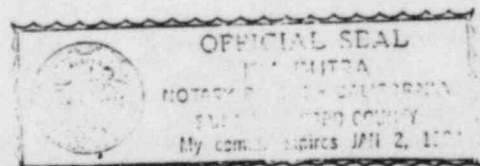
98. Mr. Hudson's concern that PGandE review elimination of the PT requirement was satisfied in February 1974 (see Exhibit 10 at 3, attached).

JI #84, Motion at 25.

It is alleged that:

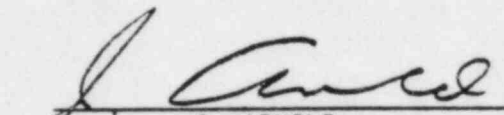
Mr. Karner improperly reneged on corrective action commitments on the basis of a memorandum from John Guyler, Mr. Hudson's successor as internal auditor. Mr. Guyler dismissed the detailed, documented DR which Mr. Hudson had proposed with an inaccurate assertion: "PPP has accomplished this per instruction from PG&E (sic). It is evident that a nonconformance does not exist and a DR is not necessary. (citing Hudson Aff. at 21.)

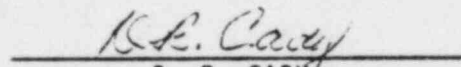
99. As opposed to reneging on the corrective action commitments agreed to during a September 14, 1982, meeting (i.e., to prepare and submit a DR to PGandE), Mr. Karner instructed Mr. Hudson to prepare a draft DR which was submitted for appropriate review on November 3, 1982. In the course of reviewing this draft DR, it was determined that the work in question was performed in accordance with an appropriate procedure. Mr. Guyler, the Pullman Internal Auditor, reported this investigation and conclusion in his memo of January 16, 1983, which stated that a nonconformance did not exist and that a DR was not necessary.

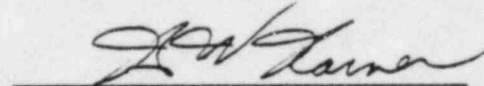


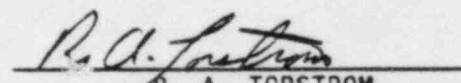
100. Mr. Hudson fails to state that he was involved with the final closure and approval of the action that was taken. He reviewed the responses, signed off and closed Audit Action Request (AAR) #1 of Audit 101 on March 22, 1983. At the time of closure, Mr. Hudson did not indicate that he was dissatisfied with the response and manner of closing AAR #1 (see Exhibit 3, attached).

Dated: March 19, 1984

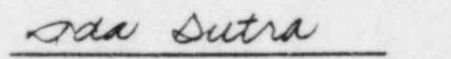
  
J. ARNOLD

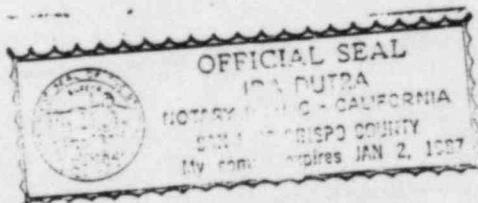
  
D. R. CADY

  
H. W. KARNER

  
R. A. TORSTROM

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



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of )

PACIFIC GAS AND ELECTRIC )  
COMPANY )

(Diablo Canyon Nuclear Power )  
Plant, Units 1 and 2) )

Docket Nos. 50-275  
50-323

(Construction Quality Assurance)

AFFIDAVIT OF RONALD G. FINK

STATE OF CALIFORNIA )

COUNTY OF )  
SAN LUIS OBISPO )


ss.

I, Ronald G. Fink, being duly sworn, depose and say:

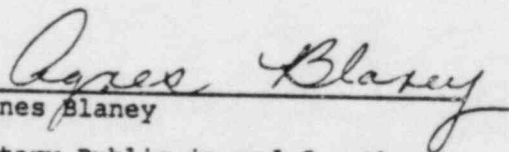
1. I am Vice President of Reactor Controls, Inc.

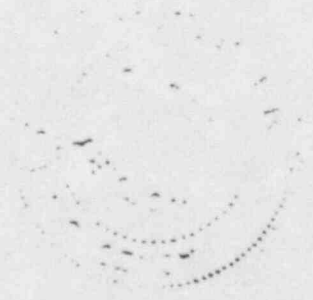
I have reviewed the Joint Intervenor's Motion to Reopen the Record on Construction Quality Assurance and Licensee's Character and Competence dated February 22, 1984. I have assisted in the preparation of responses to allegations, #61, 65, 68 and 76 in the Motion. The responses to these issues are true and correct to the best of my knowledge.

DATED: March 19, 1984

  
Mr. Ronald G. Fink

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

  
Agnes Blaney  
Notary Public in and for the  
State of Florida  
My Commission expires  
Notary Public, State of Florida  
Date My Commission Expires Dec. 6, 1986  
Supersedes Form 1709 (1-1-81) 10/10/83, 1984



### Exhibits

1. Atomic Energy Commission letter to PGandE dated June 20, 1972.
2. Nuclear Regulatory Commission letter to PGandE dated May 12, 1975.
3. Audit Action Request No. 1 to Internal Audit #101.
4. Affidavit of P. Dawson dated March 18, 1984.
5. ESO 234, page 1.
6. Revision 13 to Specification No. 8833XR, dated August 23, 1979.
7. QA Instructions 143, dated July 6, 1979.
8. Affidavit of G. Larson and D. R. Cady dated March 16 and 17, 1984, respectively.
9. Affidavit of D. Geske dated March 17, 1984.
10. Interoffice Correspondence of H. Hudson to QA/QC Manager, dated November 22, 1982.
11. Report of Ultrasonic Examination dated December 17, 1983.
12. PGandE Memorandum from C. K. Maxfield/M. R. Tressler to M. H. Chandler/R. S. Bain, dated February 5, 1974.



EXHIBIT NO. 1

UNITED STATES  
ATOMIC ENERGY COMMISSIONREGION V  
3115 DANCROFT WAY  
BERKELEY, CALIFORNIA 94704TELEPHONE 841-5141  
EXT. 661

June 20, 1972

Pacific Gas and Electric Company  
77 Beale Street  
San Francisco, California 94106Docket No. 050-0133  
Docket No. 050-0275  
Docket No. 050-0321Attention: Mr. Frederick T. Searls  
Vice President and General Counsel

Gentlemen:

Information obtained during inspections conducted by the Directorate of Regulatory Operations has disclosed that a number of facilities have been equipped with valves with wall thicknesses below the minimum requirements specified by the applicable codes, standards and procurement specifications. In other instances, licensees have not been able to document whether or not their valves met minimum wall thickness requirements. Our survey of this subject has disclosed that the matter is not limited to any class of licensee or valve supplier.

In light of the above information, you are requested to verify, through manufacturing records or other suitable means, that valves important to nuclear safety installed or to be installed at your facility(ies) meet the minimum wall thickness requirements of the specified codes or standards. To the extent that verification records are currently available, you are requested to promptly accumulate those records at the plant site, and to advise this office within thirty (30) days of the date of this letter of what records are available and when our inspector may examine them at the plant site.

In the event that records are not currently available, you are requested to advise this office within thirty (30) days of your plans and schedules for demonstrating by suitable alternate means that valves important to nuclear safety installed or to be installed at your facility(ies) are acceptable with respect to wall thickness. Records of conformance shall be maintained current with inspections performed.

00242-0851

Pacific Gas and Electric Co.

2

June 20, 1972

The valves which require demonstration of acceptable wall thickness are the following:

Each valve within the reactor coolant pressure boundary, as defined in subsection 50.55(e) (Codes and Standards) of 10 CFR 30, where the valve is:

- (a) Over 1-inch nominal pipe size for pressurized water reactors;
- (b) Over 1 1/4-inch nominal pipe size in water lines for boiling water reactors;
- (c) Over 2 1/2-inch nominal pipe size in steam lines for boiling water reactors.

The following techniques are considered to be a sufficient demonstration of acceptable wall thickness. Alternate techniques may be offered, but there is no assurance that they will be found acceptable:

- (1) Documented direct physical measurement of actual wall thickness with comparison to specified minimum wall thickness.
- (2) Documented results of ultrasonic measurement of wall thickness with comparison to specified minimum wall thickness, and documentation that the ultrasonic measurement technique is demonstrated to have a maximum error in repeatability and accuracy of not more than 2% of the wall thickness.
- (3) Wall thicknesses, verified by either of the above techniques, to be not less than 90% of specified minimum wall thickness will be acceptable, provided that the documented mechanical characteristics of the material exceed the specification minimum by an amount sufficient to compensate for the measured reduction in wall thickness.
- (4) "Specified Minimum Wall Thickness," as used above, means the wall thickness required by the relevant codes and standards (e.g., ASA B31.1 (1955); USAS B31.1.0 (1967); USAS B16.5; MSS-SP-66) in effect on the date of the purchase order.

Pacific Gas and Electric Co.

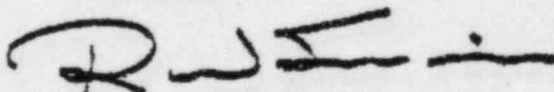
3

June 20, 1972

- (5) Certain of your valves may have, for procurement convenience, been ordered to ratings higher than actually required by service conditions. In such instances, you may, if you wish, provide for our review an engineering justification for accepting valves which do not conform to procurement specifications, but do, in your opinion, satisfy service requirements. Such justification should be promptly transmitted to this office in ten (10) copies.
- (6) In certain instances, you may wish to repair valves found to have wall thickness below the specified minimum. In such instances, you are requested to provide to this office for our review the proposed repair procedure, including a description of techniques to be used to verify the acceptability of the repaired components. Such a proposed procedure should also be submitted in ten (10) copies.

Acceptable documentation of conformance with the above requirements must be completed within three (3) years of the date of this letter.

Sincerely,



R. W. Smith  
Director, Region V.  
Directorate of  
Regulatory Operations

cc: Warren Raymond, Humboldt Bay Nuclear Power Station  
J. D. Worthington, PG&E  
G. Richards, PG&E

Docket Nos. 50-275 - 50-323 - Diablo Canyon Units 1 and 2

bcc: SLSibley RHGerdes JFBonner RJPeterson JDWorthington HPSBraun  
PFMautz FWMielke PTSearls CHSelam BWSnackelford JFTaylor JCMorrissey  
WRAllen RVBettinger MHThandler JACrockwell NHDaines RBDewey EKHall  
WRJohnson DVKelly PMatthew AJMcCollum HRPerry GVRichards ARTodd  
RWWhite JOSchuyler WJLindblad JGPoster VHLind WLMurray VCNovarino  
FRDraeger JGMeyer GCulwell AGSmith (J. W. Dorrycott)

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION V  
SUITE 202, WALNUT CREEK PLAZA  
1990 N. CALIFORNIA BOULEVARD  
WALNUT CREEK, CALIFORNIA 94596

MHC  
RSB  
DEH  
WRH  
REM

RECEIVED  
MANAGER'S  
OFFICE

MAY 16 1975  
STATION CONST.  
DEPARTMENT

BJL  
HJC  
CJK  
CFP  
JWW

EXHIBIT NO. 2

MAY 12 1975  
COPY  
FILE

Pacific Gas & Electric Company  
77 Beale Street  
San Francisco, California 94106

Docket No. 50-275  
Diablo Canyon Unit 1

Attention: Philip A. Crane, Jr.  
Assistant General Counsel

Gentlemen:

This refers to the inspection conducted by Mr. W. G. Albert of this office on April 28-30, 1975 of activities authorized by NRC Construction Permit No. CPPR-39, and to the discussion of our findings held by Mr. Albert with Mr. C. K. Maxfield 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.

No items of noncompliance with NRC requirements were identified within the scope of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you believe to be proprietary, it is necessary that you submit a written application to this office, within 20 days of the date of this letter, requesting that such information be withheld from public disclosure. The application must include a full statement of the reasons why it is claimed that the information is proprietary. The application should be prepared so that any proprietary information identified is contained in an enclosure to the application, since the application without the enclosure will also be placed in the Public Document Room. If we do not hear from you in this regard within the specified period, the report will be placed in the Public Document Room.





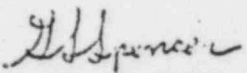
Pacific Gas & Electric  
Company

- 2 -

MAY 12 1975

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

Sincerely,

  
for R. H. Engelken  
Director

Enclosure:  
IE Inspection Report  
No. 50-275/75-06

cc w/o enclosure:  
G. V. Richards, PG&E  
J. D. Worthington, PG&E

bcc: CPUC Application No. 49051

bccc: JFBonner JDWorthington HPBraun FFMautz FWMielke  
CHSedam BWS Shackelford JFTaylor GABlanc WBallen  
TABettersworth RVBettinger RFCayot ~~ME~~Chandler  
JACrockwell NHDaines EEHall WRJohnson DVKelly  
PMatthew AJMcCollum HRPerry GVRichards JOSchuyler  
WJLindblad ARTodd RWWhite JGFoster WLMurray  
GFClifton SLCulwell ACSmith JCCarroll HReynolds  
(NUS) (JWDorrrycott)



U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

IE Inspection Report No. 50-275/75-06

Licensee Pacific Gas & Electric Company

Docket No. 50-275

77 Beale Street

License No. CPPR-39

San Francisco, California 94106

Priority                     

Facility Diablo Canyon Unit 1

Category A

Location San Luis Obispo County, California

Type of Facility PWR, 3411 MWt Westinghouse

Type of Inspection Routine, Unannounced

Dates of Inspection April 28-30, 1975

Dates of Previous Inspection Feb. 10-12, 1975 (Construction)

Principal Inspector W. G. Albert, Reactor Inspector

May 9 1975  
Date

Accompanying Inspectors None

                      
Date

                      
Date

Other Accompanying Personnel: None

Reviewed by G. S. Spencer

G. S. Spencer, Chief, Reactor Testing & Operations Br.

May 9 1975  
Date

## SUMMARY

### Enforcement Action

None

### Action on Previously Identified Enforcement Matters

Not applicable

### Design Changes

Not examined

### Unusual Occurrences

The inspector discussed repairs to the Unit 2 containment liner as a result of a fire on March 6, 1975. No new information of significance was noted, therefore further reporting will be deferred until the next routine inspection of the Unit 2 facility.

### Other Significant Findings

- A. Construction is 92.3% complete. (Paragraph 2 in Details)
- B. The NSSS supplier has completed implanting sample tubes for corrosion testing in a steam generator. (Paragraph 3 of Details)
- C. The NSSS Supplier has completed the tube expansion program in the steam generators in preparation for the use of volatile chemistry treatment for the secondary system. (Paragraph 3 of Details)

### Management Interview

At the conclusion of the inspection the inspector met with C. K. Maxfield and other members of his staff to review the findings from the inspection. The following significant items were discussed:

#### A. Valve Wall Thickness Measurement Program

The inspector stated that he had examined the final data packages for the measurement of valve wall thickness and considered the item closed for both units. (Paragraph 4 of Details)

B. Housekeeping

The inspector noted that cleanliness controls observed in the area of the reactor pit seemed to be ineffective. The licensee stated that the situation would be examined to see what improvements could be reasonably made. (No reference in Details).

C. Electrical Insulation Repairs 4 & 12 KV Switchgear

This item was re-opened after noting a difference in the method of repair for Unit 1 versus Unit 2. After examining the repairs the difference in repair methods appeared to be warranted. (Paragraph 5 of Details)

D. Close Out Records

The inspector found that some contractors still had minor procedural kinks to work out before putting together final data packages on their work. These were noted to the licensee. The inspector also informed the licensee that examination of these packages would be an item continuing through several future NRC inspections. (Paragraph 8 of Details)

## DETAILS

### 1. Individuals Contacted

#### a. Pacific Gas & Electric Co. (PG&E)

C. K. Maxfield, Project Superintendent  
W. J. Tomei, QA Engineer  
R. D. Etzler, Field Engineer  
D. W. Day, QC Engineer  
R. C. Lorenz, Coordinating QC Engineer  
C. T. Tallon, Project Scheduler  
C. A. Hemstock, Project Coordinator  
P. D. Newell, Project Materials Supervisor  
E. W. Barredo, QC Engineer

#### b. Westinghouse Electric Co. (Westinghouse)

R. H. Baulig, Site Manager

#### c. Wisner & Becker

H. W. Machado, QA Manager

#### d. M. W. Kellogg Co. (Kellogg)

J. P. Runyan, QA Manager  
E. Y. Martindale, NDE Supervisor  
W. R. Johnson, Inspection Supervisor

#### e. H. P. Foley Co. (Foley)

R. V. Green, QA Manager  
Nora Grunberg, Clerical Inspector

#### f. Pittsburg DesMoines Steel Co. (PDM)

C. Bauer, QA Manager  
W. G. Morris, Documentation Supervisor

### 2. Plant Status

At the time of the inspection Unit 1 was 92.3% complete and Unit 2 54.6% complete. The current Unit 1 fuel loading date of October 1975 appears realistic.

### 3. Steam Generators

The NSSS supplier has modified the Unit 1 steam generators by expanding the tubes against the tubesheet for the full depth of the tubesheet (22 inches). This expansion was accomplished utilizing a Westinghouse process (WEXTEx) which explosively expands the tubes to eliminate any crevice between the tube and the tube sheet. Westinghouse states that when volatile chemistry treatment is used on the secondary side, impurities in the steam generator are held to a low level and free caustic formation is prevented. With these conditions, stress corrosion cracking is not expected to occur even if the tube to tubesheet crevice is not eliminated. However, it is considered conservative to eliminate the crevices on those steam generators that have not operated, thus removing a potential problem area in the remote event of free caustic formation.

QC controls consisted essentially of dye penetrant examinations of the tube-to-tubesheet shop welds on selected tubes, and instrumentation monitoring of shock and pressure loads on steam generator components during an evaluation phase to determine the maximum number of tubes which could be expanded at one time. This number was determined to be 50 tubes because one attempt with 75 tubes resulted in steam generator components reaching approximately 75% of design load. All dye penetrant examinations performed showed no indications.

Another program initiated by Westinghouse is the implanting of 16 tube sections, 30 inches long, in the hot side of steam generator No. 1 of Unit 1 in order to test the corrosion characteristics of four different tube materials. It appears to be Westinghouse's intention to test these materials in plants with sea water cooling, river cooling and tower cooling. The installations for Diablo had been completed at the time of the inspection and the implanted tube sections had been successfully vacuum tested. This program was described in a PG&E letter to DRL dated April 7, 1975.

### 4. Valve Wall Thickness Measurement Program

The inspector examined the final records for the ultrasonic and physical measurement of valve wall thickness. All on-site valves had been measured and dispositioned in a satisfactory manner. Records were complete and provided evidence that the licensee and his contractor had satisfactorily implemented the program. The inspector stated that he considered the item closed out for both Diablo Units.



On April 3, 1975 the licensee reported by letter on the status of this program and noted that all future valves would be routinely examined for wall thickness. This would include any rejected valves that need to be replaced as a result of the wall thickness measurement program.

5. 4 and 12 KV Insulation Repairs

The inspector noted that different methods had been utilized between the insulation repair on the two units. It appeared that the insulation sleeve material utilized for Unit 2 was less susceptible to cracking than the sleeve material originally utilized for Unit 1. The Unit 1 sleeves were completely replaced by taped insulation while the Unit 2 sleeves were simply tape reinforced at the ends of sleeve sections.

6. Electrical Contractor QA Program

The inspector examined recent procedure changes relating to inspection planning for equipment installation. This was an item of concern from a previous inspection. The procedural changes appeared satisfactory.

7. Primary System Installation

The inspector observed field preparation of welds (grinding) for baseline ultrasonic inspections. Nothing questionable was noted.

8. System Completion Checks

The inspector examined procedures in effect at Wismer & Becker, PDM, Kellogg and Foley for determining that systems under their responsibility were complete, that records to be turned over to the plant operator were complete, and that necessary instructions for proper filing and retrieval were available. The inspector found that procedures required some minor development at two of the contractors (Wismer & Becker and Kellogg) but that activity and controls were commensurate with the status of work in these organizations.

The inspector also examined the system in use by PG&E which provided "Exception Reports" on uncompleted systems. The PG&E "Exception Report" System appeared to be a detailed and satisfactory method of preparing and controlling open items for completion of systems.



DIABLO CANYON  
NUCLEAR POWER PLANT  
ACTION REQUEST

EXHIBIT NO. 3  
PAGE 1 OF 3

FOR INFORMATION ONLY

FILE NO.: I AUDIT NO.: 101 A.A.R. NO.: 1

OBSERVATION CODE: 1 ACTIVITY AUDITED: NDE Procedures

AUDIT DATE: 1-18-82

REFERENCE DOCUMENTS: PG&E 8711, PG&E 8833X, KEP-1, 2, 16, ESD 246, ESD 247

FINDING:

There are no formal procedure qualification records for the following NDE procedures:

Continued on Page 2.

FINDING BY: H. Hudson

DATE: 3-22-82

ACK'D BY: Shaner

DATE: 3/23/92

SUSPECTED CAUSE:

Finding #1 - Per the QA/QC Manager the requirements of ESD 234.9.1 and 9.2 establish the qualification of this procedure. Paragraph 9.1 states that "Kellogg-Standards of Configuration to represent the weld under test with known defects will be used as reference, Figure 1, 2 and 3, Continued on Page 3.

RECOMMENDED CORRECTIVE ACTION:

1. NDE procedures be qualified and these qualification records be maintained; or, delete those NDE procedures which management decides are not applicable to the Diablo jobsite.

Continued on Page 3 <sup>Not</sup> Finding #2 will not have a PQR prepared due to lack of procedure never used per D. Huske, former QA/QC Manager. <sup>will use 2nd set attached sheet. H/C 4/9/82</sup> DUE DATE: 4-5-82

CORRECTIVE ACTION TAKEN: #1 & 2 PQR's ARE BEING PREPARED. COMPLETION TO BE BY 4/9/82. #3 & 4 PROCESSES ESD 246 & 247 ARE NOT BEING USED.

NO RECORD OF THEM PREVIOUSLY BEING USED. PROCEDURES TO BE DELETED BY THE PQR'S REQUESTED FROM WILLIAMSPORT IN CASE PROCEDURES NEED TO BE REINSTATED #5 ESD-270 BEING REVISED TO INCORPORATE PQR'S OF ESD 210. TO BE TAKEN BY: COMPLETED BY 4/9/82. Shaner APPROVED BY: HOW 4-6-82

STEPS TO PREVENT RECURRENCE:

Any new NDE procedures will be closely examined to assure the PQR's are included.

TAKEN BY: Shaner 4/5/82

APPROVED BY: HOW 4-6-82

FOLLOW UP: ACTIVITY COMPLIES WITH APPROVED CORRECTIVE ACTION  
IF NO - PLEASE EXPLAIN:

DR for ESD 241 not generated. I.A.Q. Snyder reviewed discrepancies and action was performed per P&E instructions.

BY: H. Hudson

DATE: 3-22-83

A.A.R. CLOSED BY: H. Hudson

DATE: 3-22-83

APPROVED BY: Shaner

DATE: 3/22/83

→ See attached response Shaner  
of 1-17-83 by J. Boyer - HOW 3-22-83

DIABLO CANYON  
NUCLEAR POWER PLANT  
**FOR INFORMATION ONLY**  
AUDIT ACTION REQUEST

PAGE 2 OF 3

FILE NO.: I AUDIT NO.: 101 A.A.R. NO.: 1

OBSERVATION CODE: 1 ACTIVITY AUDITED: NDE Procedures

AUDIT DATE: 1-18-82

REFERENCE DOCUMENTS: PG&E 8711, PG&E 8833XR, KFP-1.2.16, ESD 246, ESD 247

FINDING: CONTINUED FROM PAGE 1

1. ESD 234 - Ultrasonic Inspection Groove Welds AWS-D1.069, ASME Section VIII and Section V. (Noncompliance to PG&E 8833XR Section 3.4.128 and 4.1211).
2. ESD 241 - Ultrasonic Examination of Safety Yoke Rods on 3707 RAX6-21 Safety Valves: (Noncompliance PG&E 8711 Section 4.3.23 and 3.29 or PG&E 8833XR Section 3.4.128 and 4.1211, KFP-1.14.5, KFP-2.3 and 2.4, KFP-16.5.T.)
3. ESD 246 - Magnetic Particle Procedure/Dry/Continuous Coil B31.7. (Noncompliance to PG&E 8711 Section 4.3.23 and 3.29, KFP-1.14.5, KFP-2.3 and 2.4, KFP-16.5.T, ESD 246.13.2).
4. ESD 247 - Magnetic Particle Procedure/Dry/Continuous Coil B31.1, (Noncompliance to PG&E 8711 Section 4.3.23 and 3.29, ESD 247.13.2.)
5. Liquid Penetrant Examination Procedure (Noncompliance to PG&E 8833XR Section 3.4.128 and 4.1211.) *ESD-270*

Finding #1 - ESD 234 and Finding #2 - ESD 241, have established in their procedures a means to demonstrate the qualification of the procedures each time the procedure is used (see Suspected Cause) but there is no formal documentation of the qualification.

Finding #5 - ESD 270 uses similar penetrant materials and examination methods as ESD 210 - Liquid Penetrant Procedure (ANSI B31.7). ESD 210 has procedure qualifications records which demonstrate the ability to detect the specified discontinuities.

*ESD 270*  
*Liquid Penetrant*

FOLLOW UP: ACTIVITY COMPLIES WITH APPROVED CORRECTIVE ACTION  
IF NO - PLEASE EXPLAIN:

YES NO

BY: DATE:

A.A.R. CLOSED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

DIABLO CANYON  
NUCLEAR POWER PLANT  
**FOR INFORMATION ONLY**

PAGE 3 OF 3

AUDIT ACTION REQUEST

FILE NO.: I AUDIT NO.: 101 A.A.R. NO.: 1

OBSERVATION CODE: 1 ACTIVITY AUDITED: NDE Procedure

AUDIT DATE: 1-18-82

REFERENCE DOCUMENTS: PG&E 8711, PG&E 8833XR, KFP-1,2,16, ESD 246 and ESD 257

SUSPECTED CAUSE CONTINUED:

Finding #1 continued - A radiograph of each standard shall be on file for proof of defects". Paragraph 9.2 states "the operator will check his test unit to this standard and show known defect".

Finding #2 - Per the QA/QC Manager the requirements of ESD 241.11.4 establishes the qualification of the procedure. Paragraph 11.4 states "the examination shall be conducted with a frequency that is capable of producing a minimum of 50 to a maximum of 75% of full scale reflection from the provided drilled hole in the reference specimen (MWK 001 Sketch #1). Paragraph 13.1 states "reference specimen shall be of same nominal diameter, thickness and composition and heat treated condition as the product being examined. The separation between standard defects placed in the same reference specimen shall not be less than twice the length of the sensing unit of the inspection equipment".

Finding #3 & 4 - ESD 246 and ESD 247 - Unknown.

Finding #5 - ESD 270 - Unknown.

RECOMMENDED CORRECTIVE ACTION:

2. Request Williamsport office to check if they have P.Q.R.'s for ESD 246 and ESD 247, if they do, to forward copies to the job site.
3. Per the QA/QC Manager a copy of ESD 210 Procedure Qualification Record be filed with ESD 270 based on the similarities of the procedures.

FOLLOW UP: ACTIVITY COMPLIES WITH APPROVED CORRECTIVE ACTION  
IF NO - PLEASE EXPLAIN:

YES

NO

BY:

DATE:

A.A.R. CLOSED BY:

DATE:

APPROVED BY:

DATE:



## FOR INFORMATION ONLY

Audit 101

AAR-1 DR 4662 involving ESD 246 and 247 dated 11-8-82 is at PG+E for disposition and approval. A written response to this portion of AAR indicating that DR 4662 is the corrective action taken will be basis for closing.

There is a pending CR involving ESD 241. This is a special procedure created to supplement PG+E and manufacturers examinations. PPP has accomplished this per instructions from PG+E. It is evident that a non-conformance does not exist and a DR is not necessary. A written response indicating this will be considered basis for closing this portion of AAR.

ESD 234 has PQR dated 10-1-82.  
ESD 246 + 247 have PQR's dated 11-9-82 and are now withdrawn

AAR-2 Closed by H Hudson 3-23-83, but not approved by QA/QC mgr.

AAR-3 Closed by H Hudson 7-12-82, but not approved by QA/QC mgr

When above items have been accomplished, this audit will be closed

J. Huyler



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

\_\_\_\_\_  
In the Matter of )

PACIFIC GAS AND ELECTRIC )  
COMPANY )

(Diablo Canyon Nuclear Power )  
Plant, Units 1 and 2) )  
\_\_\_\_\_ )

Docket Nos. 50-275  
50-323

(Construction Quality Assurance)

AFFIDAVIT OF PAUL DAWSON

STATE OF CALIFORNIA )

COUNTY OF )  
SAN LUIS OBISPO )

ss.

I, Paul Dawson, being duly sworn, depose and say:

I have been an employee of Pullman Power Products at Diablo Canyon (formerly M. W. Kellogg) since April 2, 1978. My responsibilities have mostly consisted of Quality Control involving Non-Destructive Examination (NDE) using Liquid Penetrant (LP), Ultrasonic (UT), Magnetic Particle (MT) and Radiography (RT).

1. At the time period that Pullman Internal Audit #101 was written by Harold Hudson, my responsibilities were NDE Supervisor, UT, MT, PT Level III, and RT Level II. My primary function was to coordinate NDE work and review NDE reports and daily work sheets.

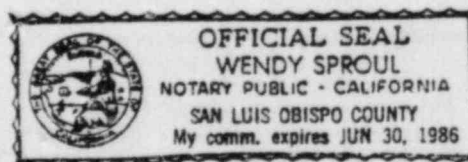
2. During the process of closing out Internal Audit #101, Mike MacCrae and I reviewed all the daily NDE reports from the date of ESD 270's original issuance, February 15, 1979. We found no evidence that ESD 270 had ever been used at Diablo Canyon Nuclear Power Plant up until March 22, 1983, the date of closeout for the audit.
3. Additionally, at the request of Mr. Harold Karner, I performed a Procedure Qualification Test demonstrating the ability of ESD 234 to detect known defects. This test was performed on October 1, 1982, and recorded as a Procedure Qualification Record (see Exhibit 1, attached). Mike MacCrae also prepared PQRs for ESD 246 and ESD 247 (see Exhibit 2, attached). These actions were done to assist Mr. Hudson and Mr. Karner in closing out the audit.

DATED: March 18, 1984

*Paul S Dawson*  
\_\_\_\_\_  
PAUL DAWSON

Subscribed and sworn to  
before me this 18th day  
of March, 1984

*Wendy Sproul*  
\_\_\_\_\_  
Wendy Sproul  
Notary Public in and for the  
County of San Luis Obispo,  
State of California.  
My commission expires  
June 30, 1986



Exhibits

1. ESD 234 Procedure Qualification Record dated October 1, 1982.
2. Response of M.S. MacCrae to Internal Audit #101, AAR #1.

ESD 234 PROCEDURE QUALIFICATION RECORD

The referenced procedure has been demonstrated using the following parameters to detect known defects as shown in Ultrasonic Standard #1 and #2.

---

MATERIAL	CARBON STEEL
EQUIPMENT	KROUTKRAMER
MODEL	USM-2
SERIAL NUMBER	804002
TRANSDUCER	KROUTKRAMER-BRANSON-GAMMA
SIZE	1/2 x 1/2
FREQUENCY	2.25 MHZ
ANGLE	45°, 60°, 70°
CALIBRATION BLOCKS	AWS-IIW PG&E S/N 4R58211 AWS-SC ATS S/N 783116 PPP REF. CAL BLOCK PPP CB - 1 & 2
COUPLANT	EXOSEN - 30 and WATER
U.T. STANDARD	FIGURE #1 "T" S/N "E" FIGURE #2 "45°" S/N "A"

---

DEMONSTRATED BY PULLMAN POWER PRODUCTS

SNT-TC-1A LEVEL III Paul S. Dawson DATE 10-1-82

## Response to Internal Audit #101, A.A.R. #1

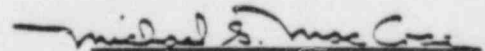
A procedure qualification was performed in order to qualify ESD-247 as well as ESD-246 (ref. Internal Audit #101, A.A.R. #1).

As both ESD-246 and 247 have been withdrawn from use and the equipment listed in both procedures is no longer available for use, the equipment used for these PQR's was the Magnaflux Model P-90 for the coil technique only. All other factors are the same as specified in the procedures.

As the Magnaflux Model P-90 puts <sup>out</sup> less amperage than the equipment listed in ESD-246 and ESD-247, and acceptable results were obtained (i.e; I.D. and O.D. surface and I.D. subsurface indications were located), the demonstration of this technique is deemed adequate to approve this method employed by the equipment listed in the above procedures.

A record of the procedure qualification demonstration is hereby submitted along with this response. The originals will be filed with the applicable procedures.

In the event that either or both procedures are re-activated in the future, they will be revised to incorporate the Magnaflux Model P-90 into the list of equipment. As both procedures are currently withdrawn from use, no revision is deemed necessary at this time.



Michael S. MacGrath  
MT Level III  
11-9-82



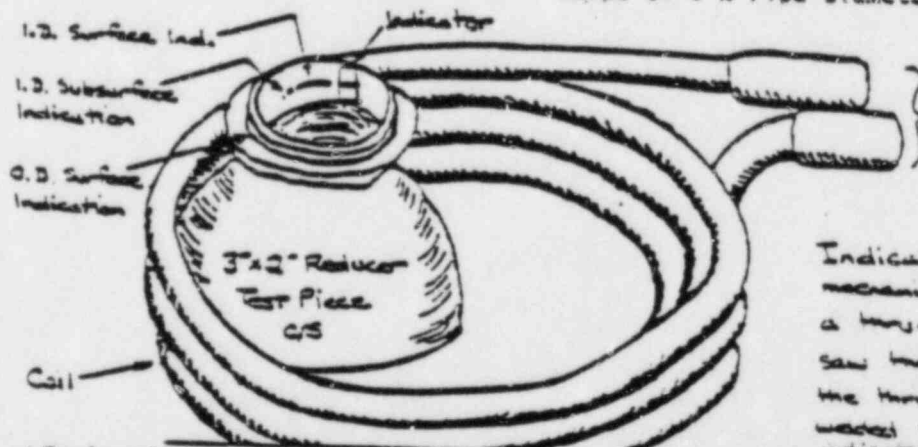
ENGINEERING

SPECIFICATION -

SPEC. NO.  
8711

ENGINEERING DEPARTMENT

ES 0-246

MAGNETIC PARTICLE  
PROCEDURE QUALIFICATION RECORDProcedure Qualification No. MT-3Method Dry Powder Continuous: Half Wave D.C., CoilEquipment Manufacture Magnaflux Corp.Brand Name MagnafluxModel Number P-50Magnetic Particles: Brand Magnaflux Type Dry Color BA-RedMagnetization Current Half Wave Rectified D.C.Out Put Amperes 1000 Amps.Test Piece Position VerticalTest Material Carbon SteelType Test Piece 3"x2" Reducer with cut fillet weld at socket endSurface Condition Bare MetalPre-Cleaning Method NoneWeather 700 DryBase Metal Color Dark Brown and Shiny MetalContrast of Particles to Base Metal GoodMethod of Particle Application Powder BulbMethod of Removing Excess Particles BlowingDemagnetization NoneProd. Spacing and Amperage: 3 Coil Loops of 5 x Pipe Diameter with 1000 Amps.Coil plugged into  
Magnaflux Model P-50  
Half-Wave Rectified  
DC Current. (10 volt)

Indications are induced  
mechanical defects made by  
a half-wall cut of a band  
saw then compressed. Part of  
the half wall cut was back-  
welded to produce no surface  
indications.

Evaluation of Procedure Good-Indicator and defect showed well.Procedures: ☒ Approved ☐ Not ApprovedTest Conducted By M. MacGree 11/6/87MT Level IIPREPARED BY M. MacGreeDATE OF ISSUE 11/6/87PAGE 07

APPROVED BY \_\_\_\_\_

DATE OF REV. \_\_\_\_\_

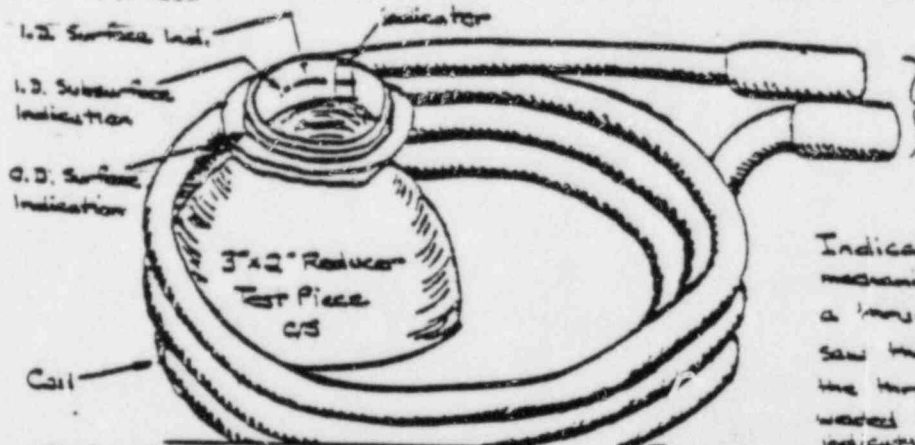
ENGINEERING

SPECIFICATION -

SPEC. NO.  
8711

ENGINEERING DEPARTMENT

ES D-247

MAGNETIC PARTICLE  
PROCEDURE QUALIFICATION RECORDProcedure Qualification No. MT-3Method Dry Powder Continuous; Half Wave D.C., CoilEquipment Manufacture Magnaflux Corp.Brand Name MagnafluxModel Number P-30Magnetic Particles: Brand Magnaflux Type Orv Color BA-redMagnetization Current Half Wave Rectified D.C.Out Put Amperes 1000 Amos.Test Piece Position VerticalTest Material Carbon SteelType Test Piece 3"x2" Reducer with cut fillet weld at socket endSurface Condition Bare MetalPre-Cleaning Method NoneWeather 700 OrvBase Metal Color Dark Brown and Shiny MetalContrast of Particles to Base Metal GoodMethod of Particle Application Powder RubMethod of Removing Excess Particles BlowingDemagnetization NoneProd. Spacing and Amperage: 3 Coil Loops of 5 x Pipe Diameter with 1000 Amos.

Coil plugged into  
Magnaflux Model P-30  
Half-wave Rectified  
DC Current. (100 Volt)

Indications are induced  
mechanical defects made by  
a thru-wall cut of a band  
saw then compressed. Part of  
the thru wall cut was back-  
welded to produce sub-surface  
indications.

Evaluation of Procedure Good-indicator and defect showed well.Procedure: ☒ Approved ☐ Not ApprovedTest Conducted By M. MacCree 11/10/87

M. S. MacCree  
MT Level 1

PREPARED BY M. MacCreeDATE OF ISSUE 11/10/87PAGE 02

APPROVED BY \_\_\_\_\_

DATE OF REV. \_\_\_\_\_

ULTRASONIC INSPECTION

Groove Welds

A.W.S. - D1.0 - 69

VOID

1. SCOPE (WELDING IN BUILDING CONSTRUCTION CODE)

- 1.1 This procedure is applicable to structural groove welds.
- 1.2 This procedure shall be employed when ultrasonic inspection is specified to comply with the A.W.S. - D1.0-69 Welding in Building Construction Code, Appendix-C, and AWS-Welding Handbook, Section I, Sixth Edition.
- 1.3 This procedure shall be used when angle beam (shear wave) for groove weld inspection is specified.
- 1.4 After the weld is completed and before the angle beam examination, the area of the base material (through which the sound will travel in angle beam examination) shall be completely scanned with a straight beam search unit to detect reflectors which might affect the interpretation of angle beam results. Consideration must be given to these reflectors during interpretation of weld examination results, but their detection is not a basis for rejection of the base material.
- 1.5 Ultrasonic inspection shall be performed only by qualified personnel certified by the M.W. Kellogg Company in accordance with ASNT-TC-1A.

2. COVERAGE

- 2.1 When possible, welds shall be examined from both sides of the weld.
- 2.2 Contact surfaces shall be free from weld spatter and any roughness that would interfere with the search unit or ultrasonic vibrations.

3. EQUIPMENT

- 3.1 Approved ultrasonic test equipment:
- (A) Branson, Krautkramer, Magnaflux, Automation Industries, Sonic, or equivalent.
  - (B) Transducers--
    - a. Angle--45°, 60°, or 70° (+ or -2°).
    - b. Straight beam.



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\* Denotes revision  
\*\* Denotes addition  
\*\*\* Denotes deletion



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\*\*7.211 All completed full penetration and partial penetration welds and all fillet welds 1/2 inch and larger shall be magnetic particle inspected. If the as-welded surface condition makes interpretation difficult, the surface shall be ground smooth and the weld retested. Acceptance criteria shall be in accordance with AWS D1.1.

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Q.A. INSTRUCTION 143

EXHIBIT NO. 7

NDE REQUIREMENTS - STRUCTURAL WELDING

- 1.0 PURPOSE: Effective immediately, the following information shall be applied to implement the requirements of PG&E Specification 8833XR. This instruction is an addenda to ESD 243 and shall be incorporated during it's next revision.
- 2.0 SCOPE: This instruction shall apply to all manners of welding governed by the AWS D1.1-79 Structural Welding Code, PG&E Spec. 8833XR, Para. 1.3. It does not apply to welding of Pipe Supports under PG&E Spec. 8711.
- 3.0 N.D.E. REQUIREMENTS:
- 3.1 Magnetic Particle Examination - PG&E 3212
- 3.1.1 All Full Penetration Welds.
- 3.1.2 All Partial Penetration Welds 1/2" and larger.
- 3.1.3 Fillet welds 1/2" leg size and greater.
- 3.2 Ultrasonic Examination - PG&E 3523
- 3.2.1 Full Penetration Welds 9/16" and greater effective throat.
- 3.2.2 Base Material repairs 9/16" and greater depth.
- 4.0 FIELD Q.C. INSPECTOR REQUIREMENTS:
- 4.1 Verify location of work, comparing issued process sheets versus physical location.
- 4.2 Verify traceability of all materials being installed.
- 4.3 Conduct Visual Examination of the weld preparation for cleanliness.
- 4.4 Conduct Dimensional Examination to assure fit-up within tolerance of the required weld procedure and technique.
- 4.5 Verify preheat prior to welding and/or thermal cutting operation. Re-verify preheat after any interruption of preheat, see Q.A. Instruction 142.
- 4.6 Monitor interpass temperatures during all welding operations, see Q.A. Instruction 142.
- 4.7 Conduct Visual Examination of root pass of all multiple pass fillet welds.

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Q.A. INSTRUCTION 143 (Cont.)

- 4.8 Conduct Final Visual Examination of all complete welds, to include preparation for N.D.E.
- 4.9 Conduct Dimensional Examination of all fillet welds for proper size. Dimensional Examination shall be conducted after all surface conditioning for N.D.E. is completed.

Donald R. Geske

Donald R. Geske  
Field Q.A./Q.C. Manager

PG&E APPROVAL: V.L. Killpack

DATE: 11 July 79

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