UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

August 13, 1984

MEMORANDUM FOR: R. H. Vollmer, Director
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: J. C. McKinley, Chief
Project Review Branch #1

SUBJECT: REVISED SUMMARY OF ACRS SUBCOMMITTEE MEETING TO REVIEW THE DRAFT REPORT OF THE DIABLO CANYON PEER REVIEW GROUP, JULY 11, 1984

Attached for your information is a copy of the revised summary of the subject meeting. This revision considers the comments received from the NRC Staff (R. J. Bosnak, M. Hartzman, and E. J. Sullivan).

Attachment:
As stated

cc: R. J. Bosnak
M. Hartzman
E. J. Sullivan
I. T. Yin, Region III

I/39

AUG 17 1984

C-46

REVISED: August 13,1984

MEETING SUMMARY
ACRS SUBCOMMITTEE ON DIABLO CANYON
REVIEW OF THE DRAFT REPORT OF THE DIABLO CANYON PEER REVIEW GROUP

WASHINGTON, D.C.
JULY 11, 1984

When a low power license was issued to Diablo Canyon, certain conditions pertaining to piping and pipe supports were imposed. The Diablo Canyon Peer Review Group was charged with determining if the licensing conditions were met. The Group also examined portions of the Independent Design Verification Program (IDVP) that related to piping and supports. In addition, licensee actions to rectify deficiencies in onsite design controls (programmatic issues) were reviewed.

The purpose of the subject ACRS Subcommittee meeting was to review the July 6th, Draft Report by the Peer Review Group. That report provided the findings of the Group on the issues discussed above. Presentations were made by members of the Group and by NRC inspector I. T. Yin.

Principal Attendees:

ACRS

C. P. Siess, Subcommittee Chairman
J. C. Ebersole, Member
H. Etherington, Member Emeritus
H. W. Lewis, Member
C. Michelson, Member
M. Bender, Consultant
E. D. Mysinger, Consultant
J. C. McKinley, DFE (part-time)
E. G. Igne, DFE (part-time)
C. A. McClain, Staff

NRC Staff and Consultants

R. H. Vollmer, NRR/DE
R. J. Bosnak, NRR/DE
J. P. Knight, NRR/DE
I. T. Yin, Reg. III
K. A. Manoly, Reg.I/DETP
B. F. Saffell, Battelle Columbus
E. J. Sullivan, NRR/DE
M. Hartzman, NRR/MEB

Others

L. E. Shipley, Bechtel
M. R. Tresler, PG&E
J. B. Hoch, PG&E
R. L. Cloud, Cloud Assoc./IDVP

Meeting Highlights

1. Richard H. Vollmer, NRR, made a brief introduction in which he noted that the Diablo Canyon Peer Review Group was initially formed to address concerns raised by Isa T. Yin, Region III inspector. Subsequently the Group recommended that the low power license for Diablo be conditioned on the licensee addressing seven issues related to the adequacy of piping and pipe supports. The Group has now produced a report in which they document their evaluation of the actions taken by PG&E to meet the license conditions, and they provide the results of a review of the IDVP and programmatic issues in response to additional concerns raised by Mr. Yin. The bottom line of the report was that the Group found nothing that should prevent the issuance of a full-power license to Diablo.

2. Due to the fact that the Group employed considerable engineering judgement in its reviews, Dr. Siess requested that the qualifications of each member be put in the record.

3. Mr. Ebersole asked whether the issues being examined were peculiar to Diablo or whether they were generic in nature. He wondered if other plants could withstand the scrutiny being given to Diablo.

4. Mr. Michelson and Robert Bosnak discussed the type of pipe break analysis used for designing Diablo. The leak-before-break concept was not used there, and has not yet been approved for use on any plant.

5. The Staff or one of its consultants gave a presentation on each of the seven license conditions. After each presentation, Mr. Yin was allowed to state any remaining concerns he had about the licensee's actions or how the Group's review was performed. In addition, he was allowed to question the Staff and licensee. A brief summary of each presentation is below.

6. License Condition 2.C(11) Item 1, Review of Small Bore Computer Calculation - Kamal Manoly, Region I, presented the Group's findings on this issue. Deficiencies due to lack of proper documentation and related to some calculational errors were found to have insignificant effects on the adequacy of the small bore piping (2 in. or less in diameter) supports. All small bore, computer analyzed supports were reanalyzed by the licensee. Three out of 357 failed to meet the licensing criteria because the length/thickness ratio for angle sections were exceeded. In those cases the supports were modified. Finally, the licensee's consideration of self weight excitation caused by seismic loading acting locally on a support is to be completed by October 1, 1984.

The licensee and Peer Review Group then addressed Mr. Yin's remaining concerns regarding this license condition. PG&E explained that if a support was initially analyzed as being overstressed, a closer look was taken at the assumptions made in the computer model. A more realistic model was developed and the support was subsequently qualified. It was noted that the as-built dimensions, as opposed to design dimensions, were used in the reanalysis of all 357 of the supports.

Mr. Manoly said that only a small percentage of the engineering judgements used in designing the supports were undocumented, and that those judgements had little effect on the adequacy of support design. The practice that allowed any judgement calls to go undocumented was remedied by the licensee prior to the reanalysis required by the license condition. Lastly, Mr. Manoly stated that no support inadequacies resulted from erroneous computer inputs of material properties or support geometries.

7. License Conditions 2.C (11) Items 2 and 3, Load Sharing by Closely Spaced Supports and Snubbers Located in Close Proximity to Rigid Supports and Anchors - Bernard Saffell, Battelle Columbus, presented the findings on these two items. Because the seismic design basis for Diablo was changed after discovery of the Hosgri fault, rigid supports and snubbers were in some cases placed in close proximity (less than 10D for an anchor, 5D for other supports) to other rigid supports, anchors, or equipment nozzles. If the gaps between piping and support were significantly different for close proximity supports, the result could be overloading of the support with the smaller gap before the adjacent support took up its share of the load. Design basis for the gaps was 1/16" on each side of the pipe, with a combined tolerance of +1/16". This would result in, at most, a 3/16" clearance on one side with zero clearance on the other side. If the gap between piping and a support, adjacent to a snubber, did not allow enough movement for the snubber to lock-up, i.e, function as a rigid support, the snubber would not support its share of the load. The licensee was required to inspect the gaps between piping and supports and add shims where necessary or reanalyze the loadings to ensure no supports or snubbers would be overstressed. The Group concluded that the licensee's program adequately addressed these concerns.

Regarding Mr. Yin's concerns, the Staff and licensee appeared to adequately address them. ACRS consultants, Mr. Mysinger and Mr. Bender, both noted that the ductility of piping and supports should be adequate to prevent any problems from arising. James Knight, NRR, pointed out that the decision to shim rather than reanalyze the loadings was one of expediency on the part of the licensee.

8. License Condition 2.C (11) Items 4 and 5, Thermal Gaps and Piping System Hot Walkdowns - Edmund J. Sullivan, NRR, discussed the Group's findings on these two issues. Regarding Item 4, the license condition required the licensee to monitor the gaps that were specifically included in the piping thermal analyses. There were 37 of these cases, all involving piping that was 2" or smaller. The licensee initially proposed to monitor the gaps in the cold condition; however, this was unacceptable to the Staff. A final licensee proposal, accepted by the Staff, involves reanalysis of the piping assuming no gaps. Any piping, supports, or nozzles will then be requalified if necessary. This is to be completed by the end of the first refueling outage. Mr. Yin expressed no concerns with this resolution.

Item 5 required the licensee to conduct walkdowns of the main steam piping with NRC participation and to document the results in a report to the NRC. The Group reviewed the licensee's procedures for the walkdowns

and did its own walkdowns of the RHR and main steam systems. No discrepancies were found on the RHR system. On the main steam system, two deflections were greater than the licensee's acceptance criterion. The licensee reanalyzed the loadings using the as-measured deflections and found no overstresses. One unintended restraint was discovered that was analyzed and found to be no problem. The licensee plans to remove this unintended restraint and monitor this area in the course of the power ascention testing.

Mr. Yin was concerned that the clearances available would not be adequate for seismic and thermal movements since only the thermal clearances were the focus of this activity. Licensee representatives and Mr. Sullivan argued that the seismic movements, on the order of 3/16", on the average, would not significantly affect the available clearances. Mr. Yin also suggested that "stress" walkdowns, done with piping systems in a cold condition, had overlooked potential interferences. He referred the Subcommittee to his draft inspection report of March 29, 1984, in which he enumerated instances of this, that he felt he had uncovered during his own walkdowns. The licensee argued that they had properly accounted for these situations through the combination of the "stress walkdowns" and the "hot piping walkdowns".

9. License Condition 2.C. (11) Item 6, Quick Fix Program - Robert Bosnak, NRR, presented the Group's findings on this item. This item addresses two onsite programs, the Pipe Support Design Tolerance Clarification (TC or PSDTC) Program and the Diablo Problem (DP) System, that provided the means for resolving problems encountered during construction. The licensee was required to identify: support changes that deviated from the defined scope of the TC program; significant deviations between as-built and design configurations that stemmed from TC or DP activities; and unresolved matters identified by the DP system.

The Group concluded that, because the TC program initially used a guide rather than approved procedures, problems arose that Mr. Yin initially identified. Some activities did not comply with the intent of the program; however, no significant deviations exist between as-built structures and current approved design configurations. The program was terminated in June 1984 and replaced by a field change system.

It was concluded with regard to the DP system that, although design information was transmitted to a degree greater than intended, the information was included in QA controlled as-builts and design calculations. Additionally, no unresolved DPs were discovered.

Mr. Yin had concerns only with the TC review. He thought the TC program had caused a breakdown in the QA program; however, he admitted that the design changes were eventually reviewed by the right people to ensure quality. He was concerned that some changes were not included in the as-built packages; but, the licensee representatives at the meeting insisted that they had been. In response to Mr. Yin's concern regarding the qualifications of the Group members who performed the review of support installations, Mr. Bosnak said that the four members had extensive engineering experience, including hands-on in various types of facilities.

10. License Condition 2.C (11) Item 7, Small Bore and Large Bore Technical Issues - These were discussed by Mark Hartzman, NRR. The licensee was required to show that several technical issues had been adequately addressed in the design of piping supports. These issues related to the inclusion of warping normal and shear stresses; consideration of lateral and torsional buckling; consideration of load eccentricities; correct use of Rayleigh's method to calculate fundamental frequencies; resolution of differences between the AISC code and Bechtel criteria for unbraced lengths of angle; and consideration of effective weld throat thickness on structural steel tubing. All but three small bore supports and one large bore support were found to meet licensing criteria. The licensee has modified the four unqualified supports.

11. Mr. Bosnak discussed the review of the IDVP. Because of several allegations regarding the portion of the IDVP that addressed piping and supports, the NRC established a special task force that reviewed the work done by R. L. Cloud Associates. The concerns dealt with the distribution of samples selected from the firms doing piping and support work, qualification of 15,000 feet of span rule analyzed piping by the use of a smaller sample of computer analyzed piping, and the large number of "deficiencies" identified in interim technical reports (ITRs) that did not result in expansion of the scope of the IDVP. The task force determined that the sample size distribution and the small bore piping acceptance were indeed adequate. Review of the backup review packages confirmed the fact that the "deficiencies" reported were not significant and that someone reading only the interim report would get the wrong impression of the severity of the problems.

Mr. Yin stated that his attempts to review the IDVP and the QA program was hampered by NRC management. He said that he has resigned from further involvement in the Diablo Canyon licensing activities.

12. A brief executive session followed the presentations. It was determined that the Subcommittee members agreed with the Staff's finding that the license conditions have been met. It was decided that an attempt should be made to have Mr. Yin present when the ACRS considers the Group's report. Mr. Mysinger stated that it was reassuring that the NRC had the time to thoroughly investigate the concerns raised by Mr. Yin. He added that he thought he understood all the concerns but felt there was no substance in them.

Danny - I gave this to Tom to add to the large answer package submittal to us!
SDR

January 16, 1984

DER Welding Engineering has reviewed Pullman Power Products Procedures 15/16, 128, and 140. In a few instances, these procedures have been interchanged for the welding of attachments to stainless steel containment spray piping. In every case the procedure used was acceptable or compatible with the procedure specified on the process sheet. For these weldments any of the three welding procedures could have been used to achieve acceptable welds.

R.S. Blackman for
R. D. Kerr
Pacific Gas & Electric
Corporate Welding Engineer

H167
351

Response to NRC Questions
Regarding Allegations Dated 11/14/83

FOR INFORMATION ONLY

1. Charpy test requirements for heat affected zones: Paragraph 3-6, Section 2 of Specification 8833XR, Revision 15 specifies that "Included in the procedures shall be provisions for testing the heat affected zone of welds for notch impact strength in conformity with provisions of Paragraph 2-1" Revision 9 of the Specification added a statement at the end of this paragraph to read "If required on the drawing." This statement is valid for all subsequent revisions including the current revision.

   For rupture restraints inside containment, design drawings never specified requirements for Charpy testing. For rupture restraints outside containment, drawing number 504950 note #16 specifies that "Charpy notch test for heat affected zones of welds is not required."

2. Welding of tubular steel section with a 3/16" round bar backing strip:

   Restraints number 21/9&10RR included a detail weld where a round bar backing strip was used. In 1974, when NSC (presently Quadrex) revised the rupture restraints design for DCPP, it was decided that these rupture restraints are inactive and were identified as abandoned restraints. DCPP verification program verified this conclusion and issued a DCN #DC-O-EC-5485 transmittal #5 to abandon these restraints.

   In addition, an engineering avaluation was performed and proved that even if the restraint is an active restraint, the weld as is will be able to transmit the loads used in the 1972 design file.

Myron Lopez

1-18-84

(805) 595-7066

FOR INFORMATION ONLY

H168/ 352

[MISC9026]

FOR INFORMATION ONLY

January 14, 1984

Response to NRC questions resulting from H. Hudson allegations.

1. Welding code requirements for pipe supports?
   A. Design of pipe supports is by Engineering Department using Design Criteria Memo M-9. AISC (and therefore AWS) is referenced as a basis for design.
   B. Welding procedures and welder performance qualifications for pipe supports are in accordance with PG&E specification 8711 section 3, paragraph 4.12 (i.e. ASME Section IX).

2. Fit up of flare bevel welds? Open butt welds?
   A. Flare bevel welds are not used in design as full penetrant welds.
   B. Where tube steel of the same size is welded using "T" joints or corner joints the possibility of root gaps exists and therefore fit up inspection is required and is a hold point on the process sheet. Ref. ESD 223 paragraph 6.8.2.6.E. [1]
   C. Tube steel which is welded across another tube or against a plate forming a flare bevel weld creates a "natural" weld joint. These joints are easily prepared and as with fillet welds no fit up inspection is required. If, however, a gap should form between the faying surfaces more weld than required would be deposited. It is understood that the first pass would be similar to an open root butt weld and is not considered in design. The remaining weld would exceed drawing requirements. In addition, excessive misalignment and gaps is part of the criteria during inspection, ESD-223 paragraph 6.8.2.4.A. [2]
   Also, asbuilting is required, ESD-223 paragraph 6.8.2.6.H. [3]

3. Frequency of ultrasonic re-examination and procedure change?
   A. The frequency of ultrasonic re-examination was reduced from two tests per weld to one test because the number of tests originally planned for each weld was not achieving the purpose of the re-examination program (spec. 8833XR-001), to identify the cause of NCR DC1-83-RM-N001 and DC2-83-RM-N002. However the scope of the re-examination program was not decreased. The explanation for the reduction in tests is contained in Bechtel M&QS Report DOH-013-01. [4]
   B. The ultrasonic procedure for re-examining the welds in the sample was changed. Originally each weld in the sample was to be tested twice, once using Pullman's ESD-234 and once using PG&E procedure 3523. After a portion of the sample had been re-examined it was determined that Pullman's procedure could not reliably be repeated and that PG&E's procedure exceeded the requirements of AWS D1.0-69. Therefore the re-examination

FOR INFORMATION ONLY

3. B continued:

procedure was modified as a control to determine which welds were acceptable per minimum AWS acceptance criteria. See Bechtel Memorandum DOH-112-03. [5]

C. Once the cause of NCR DC1-83-RM-N001 was identified the entire program became moot since the problem had been previously identified on NCR DC1-79-RM-010 and corrective action taken three years earlier.

4. Welding Technique Specification AWS 1-1 not referenced on Rupture Restraint process sheets?

A. AWS 1-1 is not specified on restraint process sheets and is not required. According to Pullman's ESD-243 all welding on restraints is per AWS. Process sheets for restraints are only used for welding restraints per Pullman's ESD-264. ESD-243 is called out on process sheets for welding parameters except weld complete and ESD-243 specifies the Welding Technique Specification AWS 1-1 parameters in greater detail than AWS 1-1. These requirements are often in excess of AWS 1-1 and AWS D1.1.

FOR INFORMATION
ONLY

Pullman Power Products Corporation

Diablo Canyon Nuclear Project
Post Office Box 367
Avila Beach California 93424
Telephone (805) 595-2356

December 8, 1983

RESULTS OF FLARE BEVEL PENETRATION TEST

On December 8, 1983, Pullman Power Products conducted tests to determine the typical penetrations which will be achieved for flare bevel joints. The material used was 3" square tube steel to 1/4" thick plate. All welding was performed in the flat position with 3/32" and 1/8" E7018 electrodes. Results are as follows:

Minimum Required Throat (5/16 R)	Actual Throat	
	3/32" Electrode	1/8" Electrode
5/32"	- 3/32" 15/64", 17/64" 7/32"	7/32" 15/64"

C M Neary

C.M. Neary
QEG Welding Engineer

cc: H. Karner
File

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 15 1984

MEMORANDUM FOR: Thomas M. Novak, Assistant Director for Licensing
Division of Licensing

FROM: R. Wayne Houston, Assistant Director for Reactor Safety
Division of Systems Integration

SUBJECT: DIABLO CANYON NUCLEAR POWER PLANT, UNITS 1 AND 2 -
STAFF AFFIDAVITS IN RESPONSE TO THE AFFIDAVIT OF
JOHN H. COOPER DATED 1/19/84 AND TO ALLEGATION NO. 177

An affidavit and a response to Allegation No. 177 prepared by C. Y. Liang, and another affidavit prepared by F. Rosa, of my staff are enclosed. These documents have been prepared in response to the subject affidavit and allegation; they are intended to provide input to the staff response to the Joint Intervenor's Motion to Augment or Reopen The Record dated February 14, 1984.

By copy of this memorandum, the originals of the enclosures are being transmitted to J. Rutberg (OELD).

R. Wayne Houston, Assistant Director
for Reactor Safety
Division of Systems Integration

Enclosures:
As stated

cc: R. Mattson
D. Eisenhut
T. Speis
G. Knighton
K. Kniel
R. Capra
J. Rutberg (OELD)
L. Chandler (OELD)
H. Schierling
RSB Section Leaders
A. Marchese
O. Parr
V. Benaroya
W. Jenson
R. Kendall
ICSB Section Leader

Contact:
C. Liang, RSB
X24754

~~8404050267XA~~

Filed in 3845

4p. A 307

H162

00784-37

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

Dennis - Official Copy to follow

MEMORANDUM FOR: Dennis F. Kirsch, Chief, Reactor Projects Branch #2, Division of Resident, Reactor Project and Engineering Programs, Region V

THRU: Stewart D. Ebneter, Chief, Engineering Programs Branch, Division of Engineering and Technical Programs, Region I

Jacque P. Durr, Chief, Materials and Processes Section, EPB, DETP, Region I

FROM: Samuel D. Reynolds, Jr., Lead Reactor Engineer, M&PS, EPB, DETP, Region I

SUBJECT: DIABLO CANYON SPECIAL INSPECTION - 11/30 THROUGH 12/9/84 (LICENSEE SUBMITTALS)

Attached you will find a copy of significant licensee transmittals associated with Allegation [redacted] (Hudson Allegation) obtained during the inspection.

103

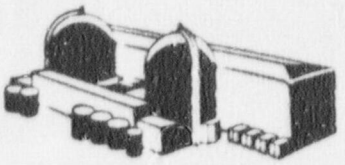
Samuel D. Reynolds, Jr.
Lead Reactor Engineer

8708190336

H164

346 [redacted]

Diablo Canyon Project



PACIFIC GAS AND ELECTRIC COMPANY
BECHTEL POWER CORPORATION

January 19, 1984

Dennis Kirsch - N.R.C.
Diablo Canyon Inspection Team
Region V
Walnut Creek, CA

Attention: Sam Reynolds (N.R.C.)

Per your request, attached is a general description of the Diablo Canyon weld design program. It includes five packages of related documents as attachments.

M. E. Leppke
Onsite Project Engineer
Diablo Canyon

8404190317
39pp.
H169 3

P.O. BOX 3965 • SAN FRANCISCO, CALIFORNIA 94119

WELD DESIGN PROGRAM

This report has been prepared to summarize the weld design and installation program at Diablo Canyon. It has been written with a view towards clarifying how each piece of the program compliments the other. Problems are identified and corrected by a process of multiple reviews. It must be recognized that no single element of the program by itself can be considered self sufficient. The issues which arise must, therefore, be used as feed back in future efforts to train personnel and improve the process. The Diablo Canyon program is no exception and there is a firm commitment by the Project to improving the communication of weld design and the general understanding of each participant in the program.

The weld symbols used at Diablo Canyon have basically been consistent with standard AWS 2.4. Some configurations are difficult to symbolize and it is understandable that construction personnel might question them. This is particularly true when modifying an As-built plant such as Diablo Canyon. In view of this concern, welding symbols were viewed as only a part of the means of conveying weld requirements. Any discussion of welding at Diablo Canyon must, therefore, recognize weld symbols within the context of other programs. To date no case has come to our attention in which the weld symbols used have resulted in the installation of unacceptable welds.

The Diablo Canyon Weld Design Program includes several elements:

1. Regular communication occurs on weld design other than weld symbols provided without comment.

2. Ambiguous welds were discounted in design calculations.

3. Weld design provides for substantial reserve margins.

4. Training classes have resulted in a steadily improving clarity.

Early work on the reverification program consisted of reviewing all available As-built information. Additional information was obtained by plant walkdowns where reviews indicate insufficient or inaccurate information. Welding was included in all reviews. Major areas address (but not limited to) were:

1. Pipe supports; designers using As-built drawings performed conservative calculations which eliminated any uncertainties in welds by taking no credit where doubts exist (i. e., square groove welds, seal welds, partical penetration welds on lug attachments) (Attachment No. 1). This was done to improve engineering efficiency and allow designers to spend time on more critical elements. Requests were made of the Onsite Engineering Feasibility Group to provide additional information where calculations indicated that these assumptions effect the acceptability of the installation in meeting revised loading (Attachment No. 2). This information was supplied by weld symbols supplemented by sketches of affected areas. Pipe support welds were found in general to not be highly stressed and seldom control acceptance.

2. Conduit supports: Designers were provided with As-built drawings obtained by field walkdowns. Welds are simple 3/16" fillet welds with designers never taking credit for weld throat produced by the small radii of struts. These welds are not highly stressed and almost never control acceptance.

3. HVAC Supports: Drawings by field walkdowns. The welding in this area is unique to the project in that the fraction shown on partial penetration welds was always the effective throat. This compares to the remainder of the project which provided depth of preparation. The welds in these supports are generally not highly stressed and seldom control acceptance.

4. Structural Steel: Designers reviewed As-built drawings and field conditions. Structural steel welds are generally very simple and seldom provoked questions as to the desired welds. Very little verification of welds was required.

5. Equipment Mounting: Designers reviewed installation As-builts. Additional field information was obtained by walkdowns where doubt of qualification arose. Few weld issue came from this area.

6. Rupture Restraint: A sample of welds were field verified by NDE and checked by calculation for adequacy.

Engineering and Construction has conducted training classes and is committed to future Engineering training classes in order to improve the communication of weld symbol use and weld design (Attachment No. 3). These classes are applicable to Design Engineers, Field Engineers, Inspectors, and Contractor personnel.

The design information provided by engineering to construction was supplemented by significant amounts of other communication. Memos, letters and discrepancy reports are transmitted between construction and engineering on a regular basis (Attachment No. 4). This information is used by both design engineering and construction to revise existing procedures and instructions, where necessary, to standardize and clarify requirements and intent. This ongoing process serves to insure that the design intent is communicated to construction and that construction practices are communicated to engineering. Design engineering, has also placed engineers in the field to respond to any questions which arise (Attachment No. 5). They are present at all time that construction work is in progress. This assures that the designer's intenet is provided to construction as well as aiding in the resolution of installation difficulties.

The process involved in communicating and implementing the designer's intent has lead to many discusions. They are all identified and handled in the same general manner. Identification of most points requiring interpretation occur during pre-field construction reviews, preparation of erection drawings, assembly of work traveler packages, and during construction but prior to QC acceptance. Such items are resolved by:

1. Refering them to the Onsite Tolerance Clarification Group.

2. Refering to Onsite Engineering Group for design change or red lining.

3. Returning to SFHO Engineering for interpretation and clarification.

During QC review or after final acceptance the process identified above may be supplimented by:

1. Issue of a discrepancy report with engineering input for disposition.

2. Issue of a discrepancy report with the PTGC welding engineer input for disposition.

Weld symbols uses which require clarification on a re-occuring bases are refered to engineering for generic clarification. These are generally provided in formal letters issued by the Project Engineer. The following section illustrates a number of symbols used which are typical of those requiring clarification.

1. Typical single flare bevel symbol: No specified T_e noted on drawing implies T_e by design to be per AWS D1.1 with maximum T_e =5/16R. Any greater T_e required by design will be stated explicity.

2. Flare Bevel (See comment 1.).

3. Typical staggered fillet weld. Arrow side symbol to be same size as noted for other side symbol. Design intent is that both side symbol to be dimensioned per AWS.

4. Single bevel groove weld. Bevel and included angle the same. Angle to be as per either pre-qualified or specially qualified procedure. Any deviation outside of code essential variables if so noted to be reviewed by engineer. No included angle required to be noted unless specific requirement of design engineer.

5. Typical square groove butt weld. Future design use will specify both T_e required and root opening if weld has structural value. This symbol will be used in the future to denote a "seal weld" if weld is not structural and will be noted in the tail as such.

6. (See comment 5.).

7. Fillet weld on two sides both fillet weld sizes assumed same. Field to verify. Future per AWS both sides to be sized.

8. Single bevel groove weld with fillet cap. Interpretation and assumption requires design engineer clarification or construction As-builting.

9. Fillet weld on two sides. Intent is for fillet weld on right and left sides of shape. Future design will arrow both sides requiring weld deposit plus length of required weld. Also, wrap around requirement will be stated (See Attachment 2-1).

10. Fillet weld for size onsize tublar steel. Size on size tublar steel one weld symbol as shown not sufficient. Requires a fillet weld for 2 sides and a flare groove type weld for other two sides.

11. Fillet weld on 3 sides (See comment 1.).

12. Fillet weld on 3 sides. Symbol accepted as shown. No need to specify "3 sides."

13. Site engineer directive DCC 10263 and SFHo DCC 8039 Chron. 037390 (See Attachment No. 4) specified wrapping of corner when possible and in all cases the weld size and length to be noted on As-built drawing.

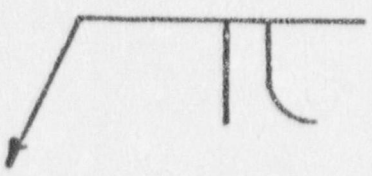
14. Fillet weld on 3 sides. Future only arrow side to be shown and only 3 sides to be welded (See comment 12.).

15. For SFHO engineer directive see DCC 7688 and DCC 7524 for explanation of joint design requirements, measurement and weld symbol.

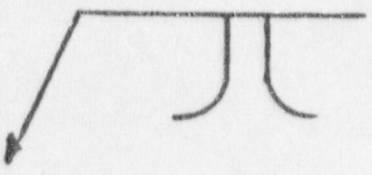
M E Lyle

J. A. Nichols

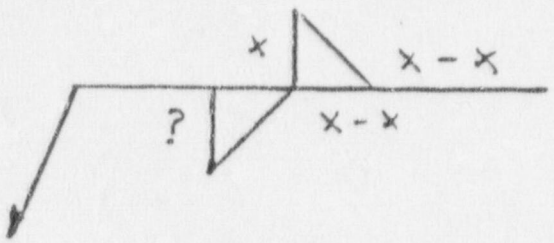
1.



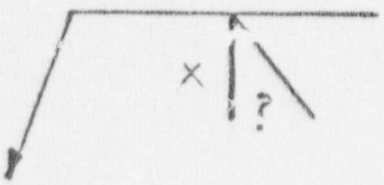
2



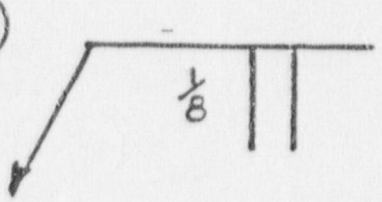
3



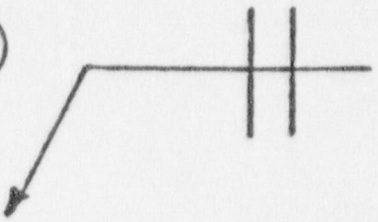
4



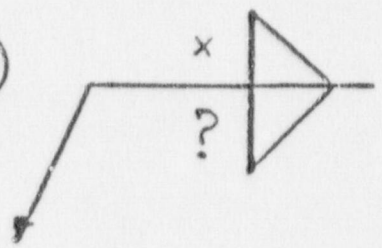
5



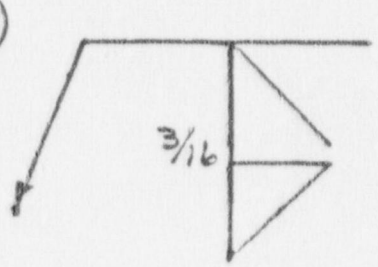
6

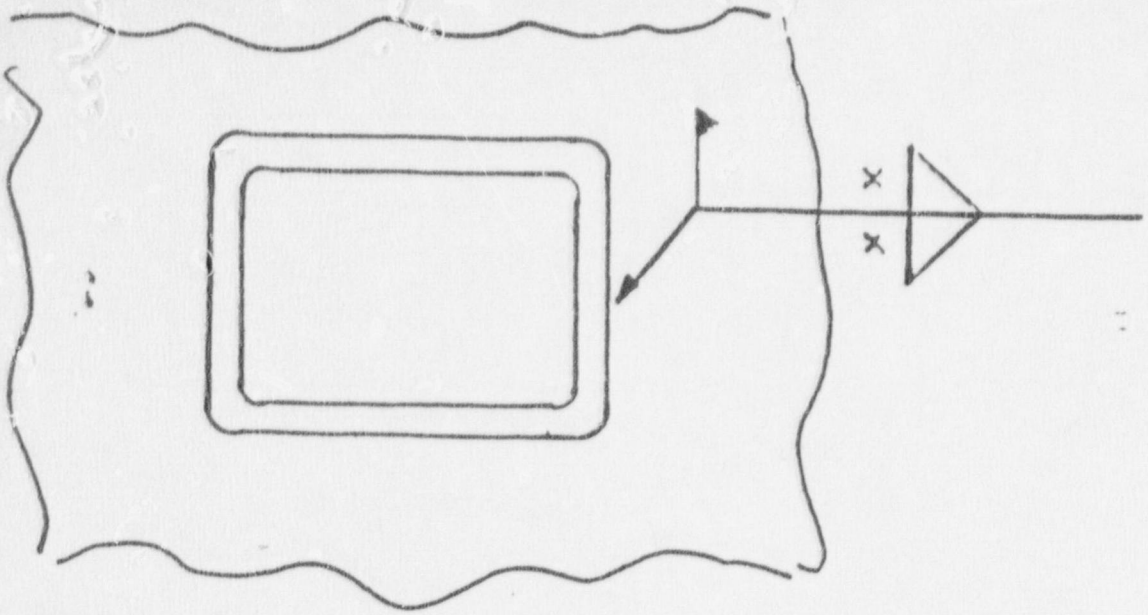


7



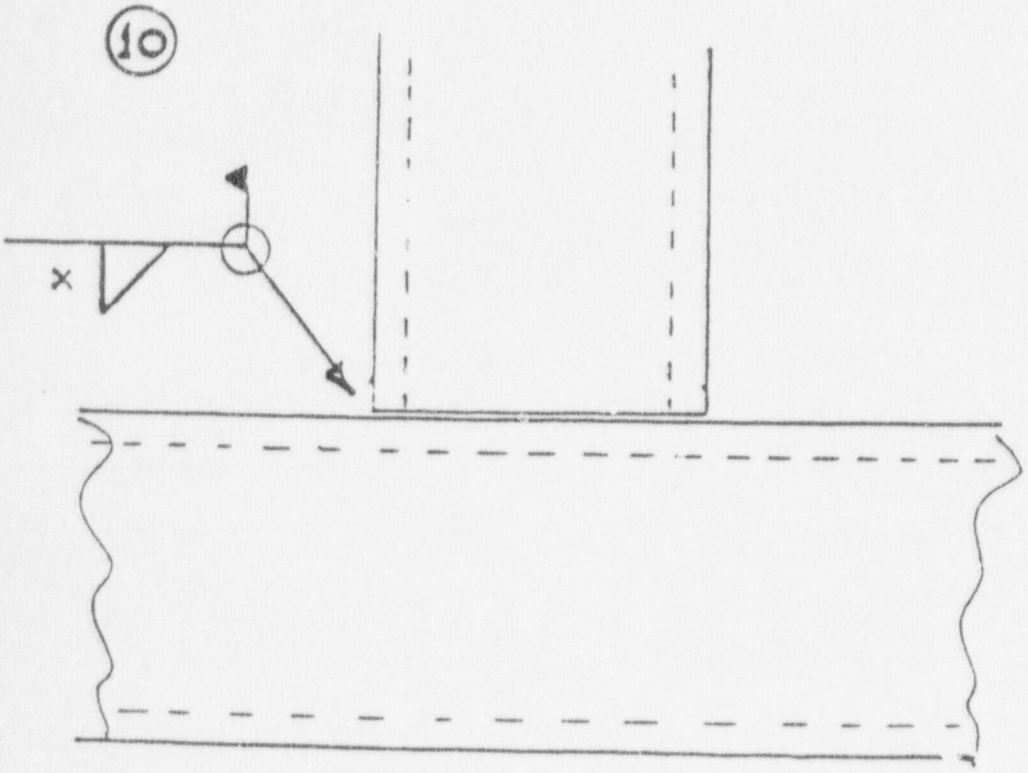
8



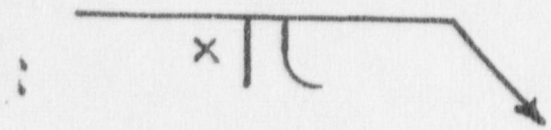


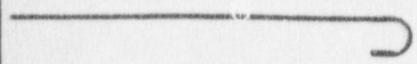
TUBE STEEL VERTICAL TO PLATE

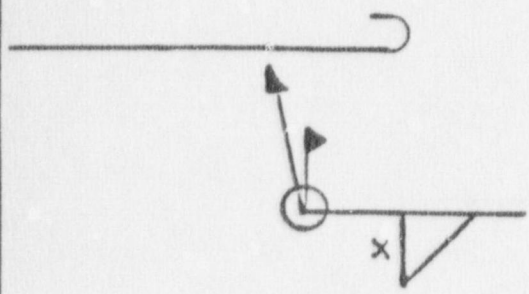
(10)

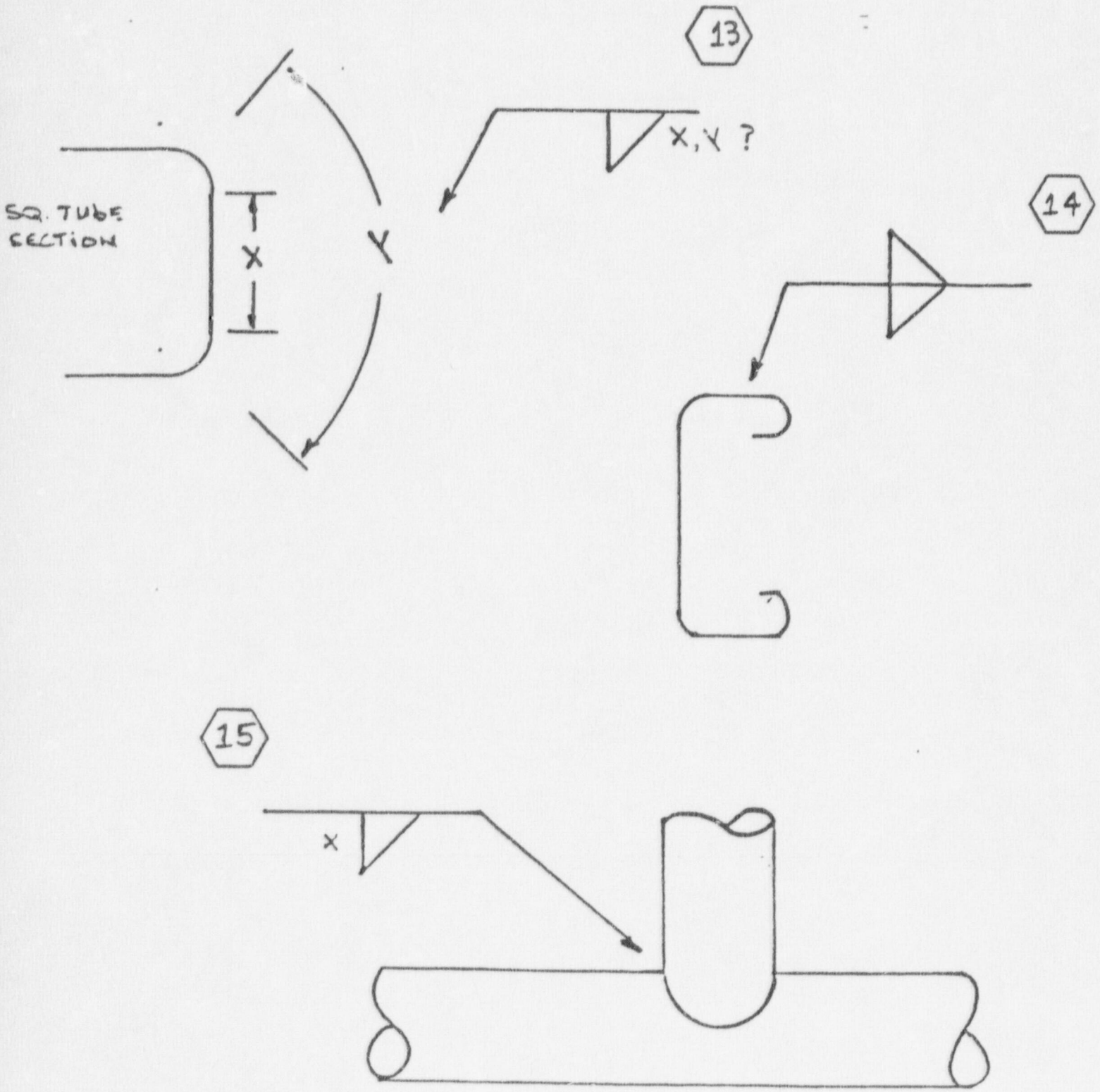


TUBE ON TUBE OF EQUAL SIZE








13
X, Y ?
SQ. TUBE SECTION
X
Y
14
15
X

FOR INFORMATION ONLY

January 18, 1984

Response to NRC questions resulting from H. Hudson allegations.

1. What was basis for omitting U.T. of full penetration welds <9/16" on rupture restraints?

   A. Prior to 1979 full penetration welds 5/16" and larger in rupture restraints were ultrasonically examined. Evaluations of Pullman's U.T. procedures for rupture restraints revealed problems with certain aspects of the procedures. In order to overcome the limited scanning capabilities of Pullman's procedure and to provide a more accurate means of defining defect size and location Engineering directed Department of Engineering Research (DER) to develop a new procedure based on AWS D1.1-79. This procedure was 3523 "Manual Ultrasonic Examination of Welds in Plate and Pipe Rupture Restraints Diablo Canyon Power Plant, Unit 1".

   B. Procedure 3523 does not in all aspects meet the requirements of AWS D1.1-79. In particular 3523 does not require examination of welds in material 5/16" to 9/16". This departure was based on technical limitations encountered during procedure development and qualification.

   C. Engineering was aware of the procedure limitations and applications. In addition Engineering had imposed a requirement for magnetic particle testing of all full penetration welds.

   D. It was Engineering's intent that procedure 3523 or an equivalent procedure be used for future rupture restraint work. This intent is repeated in Engineering Report 411-80.93 part 6.0.

FOR INFORMATION ONLY

FOR INFORMATION ONLY

CLARIFICATION OF WELDING PROCEDURE SPECIFICATIONS
FOR RUPTURE RESTRAINTS

PG&E specification 8833XR required that the fabrication and installation of Pipe Rupture Restraints be done in accordance AWS D1.0-69 or D1.1-72. Subsequently, PG&E determined that Pullman Power Products used ASME qualified procedures, such as 7/8. This procedure did not meet in all respects the preheat requirements of AWS D1.0-69/D1.1-72. Insufficient preheat may have caused welding related defects that were documented in NCRs DC1-78-RM-008, DC1-79-RM-006, DC1-79-RM-007, and DC1-79-RM-010.

The restraints were evaluated and defective weldments were repaired. All repair welding and new installation work from that point on were welded with PG&E approved written procedures to ensure adequate preheat. These procedures either meet AWS D1.1-79 or were approved for use under the requirements of AWS D1.1-79 paragraph 5.2.

R. S. Blackman for

R. D. Kerr
Pacific Gas & Electric
Corporate Welding Engineer

FOR INFORMATION ONLY

FOR INFORMATION ONLY

January 12, 1984

SUBJECT: DISCONTINUANCE OF WELDING PROCEDURE 88/89 AND WELDING TECHNIQUE SPECIFICATION AWS 1-3 USED FOR WELDING PIPE RUPTURE RESTRAINTS.

In early 1982 I challenged Pullman Power Products use of Welding Procedure 88/89 on the basis that it was not qualified in strict accordance with AWS. At that time I was not aware of welding technique specification no. AWS 1-1. For some reason our office did not have a copy. In February 1982 we received a letter from Pullman addressing the applicability of Welding Procedure 88/89 with AWS 1-1.

From a production point of view it was my opinion that Welding Procedure 88/89 was of very limited usefulness on Rupture Restraints. After a discussion with my supervision it was decided to discontinue the use of Welding Procedure 88/89 with AWS 1-3 on Rupture Restraints. I added the statement about a review to placate the Contractor, no review was ever intended.

R. D. Kerr, P.G.&E. Corporate Welding Engineer, has reviewed the procedure and found it acceptable as approved for use on Rupture Restraints.

Robert Torstrom

Robert Torstrom

FOR INFORMATION ONLY

January 16, 1984

FOR INFORMATION ONLY

Pullman Power Products Procedure 88/89 was reviewed previously by PG&E and approved for use in limited cases for Rupture Restraint weld repairs. The Rupture Restraint weld repair work was completed in accordance with NCR-DC-1-79-RM-010 which required the use of AWS D1.1-79. Paragraph 1.3.4 of AWS D1.1-79 allows the use of other welding processes providing they have been properly qualified and documented. In addition, as stated in paragraph 5.2, the Engineer at his discretion may accept evidence of previous qualification of the joint welding procedures to be employed. PG&E used the ASME Procedure qualification test for Procedure 88/89 as a basis for acceptance.

R. S. Blackman for
R. D. Kerr
Pacific Gas & Electric
Corporate Welding Engineer

FOR INFORMATION ONLY

INTEROFFICE MEMORANDUM

Diablo Canyon Project

PACIFIC GAS AND ELECTRIC COMPANY
BECHTEL POWER CORPORATION

To R.D. Etzler

From G.V. Cranston/G.H. Moore

Of Project Engineering - Units 1 & 2

At 45/10/C29 Extension 8-2963

Date November 23, 1983

File No. 146.20

Subject Governing Code for Qualification of Welders and Welding Procedure

Attention: D.A. Rockwell

The subject of the governing code for qualifying welders and welding procedures, was raised by J. Miller and others of General Construction. Project Engineering representatives met with Fred Breismeister of M&QS and Dixon Kerr of Dept. of Eng. Research. Based on Fred's and Dixon's recommendations, we suggest that the following statement be incorporated into ESD-223:

> "For welding on pipe hangers, supports, and rupture restraints, welders and welding procedures shall be qualified to ASME Section IX and/or AWS D1.1."

Please inform Pullman Product Co. that the acceptance criteria and documentation requirements as established in the existing Project Specifications and other documents shall not be altered by this statement.

for G.H. Moore

G.V. Cranston

SSC/TQuan/NT/ml

cc: M.R. Tresler
L.E. Shipley
P. Antiochos
S.S. Chitnis
V.P. Mercado
D.J. Curtis(site)
F. Breismeister
D. Kerr(PG&E)
M. Lepple(site)
J. Miller(G.C.)
J. Mccall

RECEIVED
7 DEC 1983

CC: To Rocky 12-7-83 DCC 8422
To J. Arnold 12-8-83
+ memo for P3 action

1143i/0001T-1

INTEROFFICE CORRESPONDENCE

DATE November 30, 1982

TO H. W. Karner

FROM C. M. Neary

SUBJECT A307 and A108 Materials

Per your request, I have evaluated A307 and A108 materials to determine if they may be considered as P-1 materials as specified in Section IX of the ASME Code.

Materials are assigned into P-Number groupings on the basis of comparable base metal characteristics such as composition, weldability, and mechanical properties (see QW-421). On this basis, materials not listed under a P-Number grouping may be considered as having a P-Number grouping by determining that the material in question is equivalent to a material with a P-Number listing. This justification was used in the evaluation of the A307 and A108 materials.

The A307 material on site is in the form of nonheaded anchor bolts (studs). Paragraph 1.3 of ASTM A307-80 requires that such studs meet the requirements of A36 steel. A36 steel is covered by the P-1 grouping. Theerfore, A307 may also be considered a P-1 material.

The A108 material on site is in the form of Nelson studs. ASTM A108 has no tensile strength requirements. Nelson specifies the chemistry meets the following requirements.

Carbon.	.23% max.
Manganese	.90% max.
Phosphorus.	.04% max.
Sulfur	.05% max.

These chemical requirements fall within those for A36 steel. The lack of a tensile strength requirement allows us to consider these studs as A36 steel. As A36 is a P-1 material, the studs are also a P-1 material.

C. M. Neary

C. M. Neary

CMN/lam

cc: File

FOR INFORMATION ONLY

INTEROFFICE MEMORANDUM

Diablo Canyon Project

PACIFIC GAS AND ELECTRIC COMPANY
BECHTEL POWER CORPORATION

To: M.E. Lopke

From: D.J. Curtis

Of: Onsite Project Engineering Group

At: Jobsite Extension 3064

Date: January 6, 1984

File No: 925

Subject: Effective Throat of Flare Groove Welds

AWS D1.1 Section 2.3.1.4 allows the use of an effective throat of 5/16R (where R = Radius of Round Bar) for Single Flare Groove Welds without performing a weld procedure qualification. It is accepted as being a conservative effective throat that can be increased if additional verifications are made in accordance with Section 2.3.1.4 (2) of AWS D1.1

Verifications have been made which substantiate the effective throat assumption of 5/16R as being conservative. One verification was done at the Diablo Canyon Jobsite by Pullman Power Products and a second verification was conducted by Pullman Power Products and United Engineers and Constructors at Seabrook Station.

Tests at the Seabrook Station were conducted using standard P-1 Pullman Power Products Welding Procedures. The Technical Report describing the verification is attached as Attachment #1. The purpose of this verification was "To verify, as a minimum, that the effective throat thickness for a flare-bevel-groove weld when filled to the solid section of the bar will be equal 5/16R, where R is equal to the radius of the bar." Four sizes of structural Tube Steel were welded using 3/32" and 1/8" diameter E7018 electrodes in the flat, vertical, and overhead welding positions.

The results from the Seabrook Station verification showed that the actual penetrations exceeded 5/16R by as much as a factor of 1.0 to 2.4 with a average factor of 1.7. The least amount of penetration occured when 3" x 3" x ¼" tube steel was welded using a 3/32" electrode in the flat position. In that case, the penetration equalled 5/16R.

Tests at the Diablo Canyon Jobsite were conducted using Pullman Power Products Diablo welding procedures. A brief summary is attached as Attachment #2. The tests were performed to verify that the actual penetrations met or exceeded the effective throat of 5/16R for the worst case identified by the verification done at the Seabrook Station. Six tests were conducted to determine the typical penetrations which would be achieved for flare bevel joints when welding 3 x 3 x ¼ tube steel using 3/32" and 1/8" E7018 electrodes in the flat position

All tests indicated that amount of penetration exceeds 5/16R by a factor of 1.4 to 1.7.

The code acceptance of an effective throat of 5/16R without qualification is conservative. Furthermore, tests made at the Diablo Canyon Plant and the Seabrook Station confirm this point. It is therefore appropriate for the designer to assume an effective throat of 5/16R for single flare groove welds.

If you have any questions or comments on this subject please do not hesitate to contact me.

Thank you,

Dan Curtis

D. Curtis/jb

Reply Requested: No

Attachments: Yes

cc: S. Chitnis
J. Longworth
L. Mangoba
V. Juneja
D. Tateosian

ATTACHMENT #1

SM: 4179A
Date: May 20, 1983
File No: 11.8.1

UNITED ENGINEERS & CONSTRUCTORS INC.

TECHNICAL REPORT

Date: May 20, 1983

Purpose of Report: Qualification and Verification of Flare-Bevel Groove Welds - Square Tube

Distribution:

M. P. McKenna	UEC591	W. J. Duffy	UEC589
D. C. Turnquist	UEC589	W. C. Leithead	UEC294
S. J. Pattison	UEC262	A. Bandopadhyay	UEC589
R. W. Gregory	UEC589	M. B. Lasota	UEC589
K. E. Berg	UEC196	P. N. Jathavedam	UEC787
S. C. Sethi	UEC288	B. Basu	UEC589
V. M. Alsan	UEC196	S. C. Madaras	UEC589
S. N. Caruso	UEC290	C. W. Mourar	UEC392
J. P. Whoriskey	UEC296	R. A. Mills	UEC392
J. R. Slotterback	11U0	B. J. Huselton	UEC589
D. E. Rhoads	07U4	O. P. Kalani	09U4
E. M. Hayes	UEC143	J. M. Benenati	09U9
R. H. Bryans	UEC262	S. K. Guha	UEC282
M. A. Edgar	UEC184	J. R. Julian	UEC262
R. C. Sevonty	UEC786	M. J. Konopka	07U8
G. A. Gallant	UEC262	DCC Field	UEC185
P. A. Leone	UEC591	DCC - PA	06U1
G. F. Rigamonti	07U4	SM File	UEC184
B. G. Levine	UEC262		
J. P. Cannon	14U3		
H. J. Kaplan	17U4		

Report Prepared By: T. R. Frolo
T. R. Frolo

Report Approved By: T P Vassallo/RJP
T. P. Vassallo, Jr.

By: [illegible]
Date: May 21, 1981
File No: 11.8.1

QUALIFICATION AND VERIFICATION OF FLARE BEVEL GROOVE WELDS

Purpose - To verify, as a minimum, that the effective throat thickness for a flare-bevel-groove weld when filled to the solid section of the bar will be equal 5/16 R, where R is equal to the radius of the bar.

Materials - Tubular steel sizes 3" x 3" x ¼", 4" x 4" x 3/8", 6" x 6" x ½" and 8" x 8" x ½" ASTM A500 was used.

Welding Process - The shielded metal arc welding process was used, utilizing SFA 5.1, E7018 electrodes with multiple passes.

Preheat and Interpass - The minimum preheat and interpass temperature was in accordance with ASNI/AWS D1.1, Table 4.2.

Procedures for Shielded Metal Arc - The welding was done in the vertical, overhead and flat planes utilizing 3/32" and 1/8" diameter electrodes in each position. The welding parameters were as follows:

3/32" - DCRP, 70-120 amps, 20-27 volts, 2 ipm min. travel,
1/8" -DCRP, 115-165 amps, 21-27 volts, 2 ipm min. travel.

Qualification - The samples were sectioned for visual examination. The welds were free from cracks and there was thorough fusion between adjacent layers of weld metal and the base metals. The welds, in general, were visually acceptable.

Conclusion - In general, 3/32" Ø electrodes showed good penetration exceeding the minimum throat thickness by approximately 50% except there were some problems with the 3" x 3" x ¼" tubes. The small radius did not permit the depth of penetration. The 1/8" Ø electrodes showed excellent penetration for exceeding the minimum throat thickness for the flare-bevel-groove welds. It is recommended that the Contractors be directed to utilize 1/8" Ø electrodes for the first pass to insure adequate penetration.

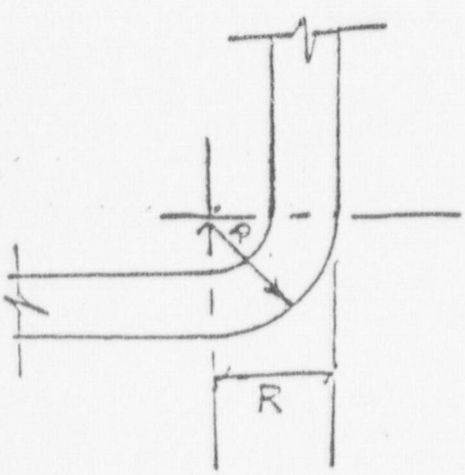
united engineers & constructors inc

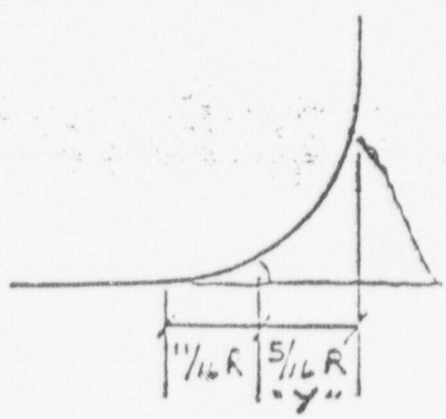
NAME OF COMPANY

SUBJECT: QUALIFICATION AND VERIFICATION OF FLARE-BEVEL GROOVE WELDS - SQUARE TUBE

J.O. NO.
SHEET NO. ___ OF ___
DATE
COMP. BY ___ CHK'D BY ___

TUBE SIZE	WELDING POSITION	TUBE CORNER RADIUS	MIN. REQUIRED 5/16 R	"Y" ACTUAL 3/32" ELECTRODE	"Y" ACTUAL 1/8" ELECTRODE
8"x8" x .500" WALL	FLAT	1.600	.3125	17/32" (.5312)	11/16" (.6875")
	VERT		5/16"	5/8 (.6250)	5/8" (.6250")
	OVERHEAD			5/8 (.6250)	3/4" (.750")
6"x6" x .500" WALL	FLAT	1.000	.3125	7/16" (.4375")	19/32" (.5938)
	VERT		5/16"	15/32" (.4688)	21/32" (.6562)
	OVERHEAD			7/16" (.4375)	23/32" (.7188)
4"x4" x .375" WALL	FLAT	.750	.234	7/16" (.4375)	7/16" (.4375)
	VERT		15/64"	3/8" (.3750)	3/8" (.4375)
	OVERHEAD			15/32" (.4688)	13/32 (.4062)
3"x3" x .250" WALL	FLAT	.500	.1563	5/32" (.1562)	3/16" (.1875")
	VERT		5/32"	3/16" (.1875")	7/32" (.2188)
	OVERHEAD			3/16" (.1875)	1/4" (.250")





Pullman Power Products Corporation

Diablo Canyon Nuclear Project
Post Office Box 367
Avila Beach, California 93424
Telephone (805) 595-2256

DATE: DECEMBER 9, 1983

TO: D. ROCKWELL, PG&E

FROM: H. KARNER, QA/QC

SUBJECT: NPS BEAM ATTACHMENT BBD-18 AND FLARE BEVEL WELDS

The NPS beam attachment BBD-18, which was in the possession of the NRC, has been examined by M.T. and U.T. Please find copies of the results of these examinations attached.

The NRC discussed with Pullman Power Products weld penetration for flare bevel welds on tube steel as used at Diablo Canyon. An investigation had previously been conducted by Pullman Power Products and United Engineers and Constructors, Inc., at Seabrook Station on this subject. This information was presented to the NRC at Diablo Canyon for their review.

Their review revealed that the minimum required throat was most difficult to obtain on small size tube steel (3" x 3") when using 3/32" electrode in the flat position.

As a result of this determination and discussions with Mr. Sam Reynolds of the NRC, Pullman Power Products prepared several sample welds at Diablo Canyon using 3" x 3" tube steel in the flat position with 3/32" electrode. Measurements were taken in the presence of Mr. Reynolds. The formal results of these sample welds are attached.

If you have any questions, please do not hesitate to call.

Harold Karner
QA/QC Manager

HK:sam

Attachments (originals)

cc: A. A. Eck w/attachments
P. Stieger
File

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

#137, 139, 140

CONFIDENTIAL SOURCE: YES ☒ NO ☐ Flein 10-3

149, 150

SUMMARY OF SPECIAL INSP -RELATED INFORMATION

DIABLO CANYON

RE: Diablo Canyon Concerns	DATE 11/13/84	TIME INITIATED 1:30p	TIME COMPLETED 4:45p

COPY

MEETING ✓
INTERVIEW
TELEPHONE CALL
COLLECT ( )YES ( )NO
OTHER

PARTICIPANTS NRC: E. H. Girard

OTHER: NAME	ORGANIZATION	HRS. ON SITE
Jim McWhorter (Quality Analyst)	Foley	4 hrs

LOCATION Diablo Canyon site

CALLED NO. | CALLING NO.

SUMMARY:
1. Question: ARE YOU, OR ARE YOU AWARE OF, IMPROPER MANAGEMENT PRESSURES TO "CUT CORNERS" (i.e. sacrifice safety to meet schedules, etc)?:

Reply: Yes. Rick Wilson has limited the identification of concerns. According to him if the hardware has not been adversely affected, there is no nonconformance. Also, no NCRs are to be written on work not required to be inspected. Concerns are identified on inspection reports (IRs) that should be NCRs but they never get there.

--Requirements have been circumvented by purchasing to contract 8833XR and installing to 5422. Items have been installed on contract 5422 that should come under specification 8833XR.

There are design control problems—There is no evidence of proper interface controls between electrical and mechanical groups. Mechanical will design instruments one way but electrical will have requirements that conflict.

A lot of verbal instruction has been used to accomplish work that should have been handled by DCNs.

Sometimes the accepted "as built" condition is not the true as-

OVER

WRITTEN BY E H Girard

DATE 11/16/84

PAGE OF

REGION V FORM: 113

WISHES TO BE ANONOMUS

1/14/83

An interview with Jim McWorter - Foley quality Analyst, indicated quality concerns and the system which addresses quality concerns with Foley. He stated that "the performance qualification of GTAW socket fillet welders WORKING on safety related instrumentation lines was insufficient to demonstrate their skill and ability to make sound welds" and that the PG&E document 8802 paragraph 2.62 commits to gas purge on these welds and this requirement is not being followed. He stated that the lines of concern were pressure tested and had passed PT examination, but he had seen evidence of gross melt through and "sugaring" on welds that had been removed. His specific concern was with the RVLIS.

He believed that Foley violated the SCIX performance qualification rules. He referenced a document trail of QW356 to QW403.16 to QW303.6 (not in 1980 or 1983 Code and not therefore applicable) to QW452.4. I informed him that the standard SCIX committee answers to this question

was that the qualification of welders with groove weld test assemblies qualifies welders to all fillets on all sizes which includes socket fillets on instrumentation tubing. This is the proper Codes and Standards interpretation, but does not properly address the welders ability to weld sound welds which is the intent of SCIX.

McMaster supplied two documents — Attached to show how this question was addressed.

The question of removal of gas purge (QW 405.8 should be addressed along with the licensee commitment in -880- para 2.62.

An engineering evaluation of the adequate performance of the tubing with unchecked weld quality (that passed pressure and PT tests) should be addressed.

A 2d question was the ability of the Foley QC program to adequately control bending of tubing. He indicated that he had seen examples of tubing with 50% wall reduction in bend areas.

IN MY OPINION - Both of these questions should be addressed by the licensee's engineering and quality personnel

SD Reynolds JR

PS - Rough cryptic notes also attached
comment by SDR
The Codes and Standards answer to 8802-1502 inspection report is legalistically correct, but may not be a "good engineering" answer in this particular case. It is the intent of SCIX that welders be qualified by methods that can demonstrate their ability to weld sound welds.

Original

THE HOWARD P. FOLEY COMPANY

INSPECTION REPORT

Page 1 of 1

NUMBER: 8802-1530

PREPARED BY: G. Herrmann/R.D. Risinger

ATTACHMENTS YES ☐ NO ☒

DATE: 8-15-83

ITEMS INSPECTED: QCP-5 App. I 8-08-83

UNIT I X UNIT II X

LOCATION: Various

INSPECTION CRITERIA ☐ DRAWING: ☐ SPECIFICATION: ☒ PROCEDURE:

DOCUMENT TITLE AND NUMBER: QCP-5 APPENDIX I

RESULTS OF INSPECTION:

1. PCN 7 deleted performance qualifications M-10 from QCP-5 App. I. (½" S.S. socket weld qualification.) Consequently there are no WP's in the procedure books to verify qualifications.

2. QW-303.5 fillet welds require that "welders who make fillet welds on pipe or tube less than 2 7/8 in. O.D. must pass the pipe fillet test per QW-452. 4-..... Currently there are no welders qualified to weld on pipe or tubing less than 2 7/8 in. O.D.

ISSUE X FILE ____

MAKE INTO NCR ____ OTHER ____

By R.G.

INITIATED BY: G. HERRMANN DATE: 8/15/83

DISPOSITION: SEE ATTACHED SHEET.

BY: [signature] DATE: 8-16-83

QUALITY CONTROL SUPERVISOR REVIEW:

ACCEPT ✓ REJECT ____

SIGNATURE: [signature] DATE: 8/16/83

CLOSE OUT COMMENTS: PCN 12 RE-INSTATES M-10 (EFFECTIVE DATE 8/26/83)

Q.C. INSPECTOR:

ACCEPT ✓ REJECT ____

SIGNATURE [signature] QA

DATE 10/16/83

HOLD TAG# N/A

REMOVAL BY ____

DATE ____

Q.C. SUPERVISOR FINAL:

SIGNATURE [signature] QA

DATE 10/16/83

HPF/IR 6-28-83

Close to File (date) 10/16/83

THE HOWARD P. FOLEY COMPANY
INSPECTION REPORT - CONTINUATION SHEET

NO. 3302-1330

CONTINUATION OF:

RESULTS OF INSPECTION ☐
PROPOSED DISPOSITION ☒
CORRECTIVE ACTION TAKEN ☐

DATE 8/16/83

1. With the deletion of WPS M-10 from Appendix I of QCP-5, two weld Procedure Specifications remain which are acceptable for Welder Performance Qualifications. Specifically, in QCP-5D, WPS M-01 and M-03 qualify a welder to make 1/4" Ø tubing and larger socket welds. Additionally, WPS M-10 will be included in the next PCN to QCP-5D.

2. QW-303.5 no longer exists. (See Winter '82 addenda to ASME Sec. IX). QW-303.1 states, in part, "... welders who pass the required tests for groove welds shall also be qualified to make fillet welds in all thicknesses and pipe diameters of any size within the limits of the welding variables of QW-350." Included in QW-350 "Welding Variables for Welders", under GTAW Essential Variables, QW-403.16 requires conformance to QW-452. QW-452.6 "Fillet Qualification By Plate Or ~~Tube~~ PIPE 8/16/83 Groove Weld Tests" qualifies fillet welds of all sizes, material thicknesses and diameters.

QW-482 SUGGESTED FORMAT FOR WELDING PROCEDURE SPECIFICATION (WPS)
(See QW-201.1, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name The H.P. Foley Company By: J R Wilson 8/14/83
Welding Procedure Specification No. M-10 Date 4-18-83 Supporting PQR No.(s) M-10PQR
Revision No. 1 Date
Welding Process(es) GTAW (Stainless to Stainless) Type(s) Manual
(Automatic, Manual, Machine or Semi-Auto.)

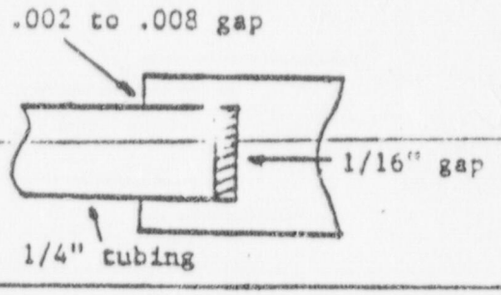
JOINTS (QW-402)

Joint Design Socket Weld
Backing (Yes) (No) xx
Backing Material (Type) N/A

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures, etc.)

Details



*BASE METALS (QW-403)

P-No. 8 Group No. 1 to P-No. 8 Group No. 1
OR
Specification type and grade ASTM A213 TP316
to Specification type and grade ASTM A479 TP316
OR
Chem. Analysis and Mech. Prop. N/A
to Chem. Analysis and Mech. Prop. N/A
Thickness Range:
Base Metal: Groove N/A Fillet 1/4" to Unlimited
Deposited Weld Metal
Pipe Dia. Range: Groove N/A Fillet 1/4" to Unlimited
Other Fillet welds Ref. ASME Sec. IX Table 452.4

*FILLER METALS (QW-404)

F-No. 6 Other N/A
A-No. 8 Other N/A
Spec. No. (SFA) 5.9
AWS No. (Class) ER316
Size of filler metals .045" to .125"
(Electrode, Cold Wire, Hot Wire, etc.)
Electrode-Flux (Class) N/A
Flux Trade Name N/A
Consumable Insert N/A

*Each base metal-filler metal combination should be recorded individually.

INFORMATION ONLY

(8/30/79)

This form (E00006) may be obtained from the Order Dept., ASME, 345 E. 47 St., N.Y., N.Y. 10017

WPR 1215 Rev. 1

ITEMS INSPECTED: 1/4" SS Tubing Welds

UNIT I LOCATION 85' Bench

FOLEY ELECTRICAL CONTRACTORS

INSPECTION REPORT

NO. 9002-1961

DATE 12-21-83

PAGE 1 OF 1

ATTACHMENTS: YES ____ NO X

INSPECTION CRITERIA DRAWING ☐ SPECIFICATION ☐ PROCEDURE ☒

DOCUMNET TITLE AND NUMBER: QCPM-1 WPS M-01 & M-10

RESULTS OF INSPECTION: Welder unable to maintain Gas Backing Purge during welding of stainless steel line, due to weld against closed system. (Bad Bellows) Flow could not be maintained per WPS. Are required. 15-20 CFH. Flow rate. (Ref- QCPM-1 4.3.4.5) FW# 6 LTHCO

ISSUE ☐

FILE ☐

INITIATED BY — 12-21-83 DATE

QC SUPERVISOR REVIEW — 12-21-83 DATE

DISPOSITION:

INFORMATION ONLY

DISPOSITION BY — DATE — QUALITY REVIEW — DATE

Q.C. INSPECTOR

ACCEPT _____ REJECT _____ HOLD TAG # _____ QC SUPERVISOR FINAL:

SIGNATURE — REMOVAL BY — SIGNATURE

DATE — DATE — DATE

HPF/IR 11-1-83

(Jim)

J. M° Whorter – Foley @ Analist

Instrumentation – (1978) June 7c

Qualificatan of procedures and welders for instrumentatio
– basically tubing 1" diameter to 3/16"
– Stainless tubing
– socket fillet type welds (essentially) no butt

– current procedure qualification practice
and previous welder qualification
Does WPS M-01 qualified by M-01 PQR
meet Code Rules Electrical and Mechanical
~~Pipe~~ PG&E 8802 Para 2.22 commits to SCIX

2.62 commits to
gas purge.

? Does QW 408.8 apply to welders where
they have been qualified w/ gas backing
if they weld w/o gas
what is the welding and metallurgical significance
e.g 3/16 x .049" wall tubing
has evidence that they delete backing

Gas purge is not a QC check off item for
socket fillets. Foley has no Oxygen analysis
equipments There is no way to verify the
purge.

Used Argon backing in welder performance test

QW 356 - reference 403.16
QW 403.16 references QW 303.6 (not in 1980 1983 SCIX
QW 452

QW 452.4
< 3/4" not less than size welded

Lack of adequate qualification to demonstrate welding apparatus skill and ability to make sound welds in apparatus need of!

Problem continues that less than satisfactory welds are very rare.

People have made available multi tubing melt thru and sugaring

Other concern - improper control and handling of tubing. Examples has been shown that there are some tubing with 50% wall reduction.

Still have passed pressure tests and PT examinations

Reactor Vessel Level Indicating System

Those items near lead me to believe that to a definite concern for [illegible] Solder related [illegible]

MR. McWhorter Interview 1/18/84 9:00 a.m. to 10:50 a.m.

Design Control Issue (PHIL MORRILL is addressing the DCN issue)

N.P. Foley completes discrete work activities (i.e. DCN) by PG&E issuing a work request. Foley Completes this work & closes the work request. Subsequently, PG&E issues a DCN revision and re-open the previous work request, which had already been closed. Foley tracks work by work request and not the DCN; PG&E is responsible for verifying that the DCN is complete and Foley completes the work statement of the work request. Example was shown Morrill where one work request accomplished FT installations & late a 2nd W.R. was issued to accomplish the same thing. PG&E mgmt doesn't appear to be in control of the situation.

As-built Issue:

(1) During 81/82 time frame HVAC support as-builts were not returned to PG&E for verification of design adequacy. N.P.F doesn't have as-built procedures for controlling as-built documentation and generation, as required by Foley QA manual.

(2) Specifics may be provided Paul Knight, QC Insp.

(3) PG&E has been provided HVAC support as-builts for about the last 4 months (late 83).

→ (4) ∴ PG&E has not been verifying the as-built condition to compliance with the design calculations ∴ PG&E Eng not in full control.

#140

HEAT Log PROBLEM

① Several IRs / NCRs Document material / Heat Log problems.

② There is no QC present when material (Steel, SS Tubing) is cut and the Heat Number is transferred to the remaining piece.

③ His concern is that Heat Nos have been applied to material in the field based on the Production copy of the Heat Log, which references Heat No. to material shape and size. (PAUL Knight has DETAILS)

④ Felo that crafts have a procedure requiring Heat No. Transfer but does it know if one is established.

⑤ Reference Recent PG&E audit on HVAC system which identifies the problem.

* ⑥ We Felo that Production has engaged in falsification of heat records; in the field by stamping heat Nos on steel after installation, and then Logging these Heat Nos onto documentation completed the falsifications. Questions to be answered is: Are these practices required by Codes & SPOs or is this something which the Licensee merely committed to?

#151

AUDIT ACTIVITIES

1. Foley QA does not audit
   a. Procedures for compliance to Codes, Standards and contract Specs. He is not aware of any requirement in this regard.

(b) Question to be answered is: How does PG&E assure that Foley procedures comply with license commitments and contract specifications or is Foley contractually obligated to assure this? This is a good idea because Foley is required to comply with their procedure set in the field.

#139

Inconel Steel Tube welding & Bending by Foley.

1. Concern is that Foley didn't have a mechanism for verifying purging gas flow and verifying O2 content in the line. Several instances were identified where the flow meter ball would stay up when the needle valve was closed.

(Randy Risinger & Rick HINES - Instrumentation QC

The individuals information is based upon conversations with Instrumentation QC and not on first hand knowledge.

The individual has observed ~~stacy~~ sugaring (⇒ no purge) and constriction in the weld area (due to burn through of the thin tubing) on welds which were cut out of these Tubing systems.

- Examine also controls applied to other SS Tubing welding, eg: PZR Reference leg resistings

Copyrighted Document
Addressed Under FOIA

For hard copy,
refer to PDR Folder: FOIA _____ _____

FOIA Name & Number: Dupe of 8706240010
Pages: _____
Accession Number: _____